

★ ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 62, No. 6 - June 2014

GENERAL MEETING - JUNE 18, 2014

*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)*

June 18, 2014

BRAD TUCKER

Astrophysicist/Cosmologist

University of California at Berkley

Research School of Astronomy and Astrophysics, Mt. Stromlo Observatory, Australia

EXPLODING STARS, DARK ENERGY & THE END OF THE UNIVERSE



Join Astrophysicist/Cosmologist Brad Tucker, one of the top researchers on Dark Energy, for an intriguing talk.

Tucker will discuss the brilliant explosions at the end of stars lives, known as supernova. The past 15 years has been a "boom" period for supernovae with vast amounts of time and effort being invested in these objects. Not only are they important for understanding the life of stars, but they can be used as cosmological probes to study what the Universe is made of and how it is growing. This use has shown that the Universe is accelerating in its expansion, the subject of the 2011 Nobel Prize, and is being caused by dark energy which will cause the end of the

Universe. In this talk, Tucker will show how our understanding of these objects has been revolutionized and what this means for the Universe.

***SAN FRANCISCO
AMATEUR ASTRONOMERS
JUNE EVENTS***

<p>June 18</p> <p>Open to the Public</p>	<p>Astronomy Lecture – Randall Museum (See previous page)</p>
<p>June 28</p> <p>Members Only</p>	<p>Mt. Tam Members Night @ Rock Springs Parking Lot - Mt Tam Jun 28 @ 5:00 pm – 2:00 am</p> <p>The SFAA hosts monthly public and members-only star parties at the Rock Springs parking lot in Mt Tamalpais State Park. The parking lot is above the Pan Toll ranger station, near the Mountain Theater.</p>
<p>July 5</p> <p>Public Star Party</p>	<p>Mt. Tam Public Star Party @ Rock Springs Parking Lot - Mt Tam Jul 5 @ 7:00 pm – 11:00 pm</p> <p>April – October only.</p> <p>See specific June lecture information in this newsletter</p> <p>The SFAA again joins the Mt Tam Interpretive Society at the annual ‘Summer Astronomy Program’ hosting public viewing events from April through October. SFAA members bring their telescopes, big and small, to Rock Springs parking lot and share viewing with the public after the astronomy lecture has concluded.</p> <p>More details can be found on our Mount Tam Lectures page.</p>
<p>July 12</p>	<p>San Francisco City Star Party @ Randall Museum Jul 12 @ 5:30 pm – 10:00 pm</p> <p>Come join us at the Randall Museum in San Francisco for a night under the stars. SFAA members provide telescopes for your viewing pleasure. See our City Star Parties page for directions on how to get to the site.</p>
<p>July 16</p>	<p>Astronomy Lecture @ Randall Museum Jul 16 @ 7:00 pm – 9:00 pm</p> <p>Once monthly, the SFAA hosts distinguished guest speakers who are leaders in the fields of astronomy, physics and related disciplines and they present to SFAA Members the latest developments from cutting-edge scientific programs. Held in the Randall Museum on the 3rd Wednesday of every month, join us in the Auditorium foyer for coffee and light snacks at 7:00 PM followed, in the Auditorium, by the General Meeting at 7.30 PM and lecture kick off at 8:00 PM.</p> <p>Information will be posted as available at Randall Museum Lecture page as it is available.</p>

SAN FRANCISCO AMATEUR ASTRONOMERS UPCOMING LECTURES

July 16, 2014

TOM GREENE

Astrophysicist, NASA Ames Research Center

THE JAMES WEBB SPACE TELESCOPE: SCIENCE POTENTIAL AND PROJECT STATUS

The unprecedented sensitivity and resolution of the James Webb Space Telescope (JWST) will significantly advance a broad variety of astrophysics soon after it is launched in 2018. Its large (6.5-m diameter) primary mirror and infrared instruments will allow it to see some of the very first luminous objects that formed in the Universe after the Big Bang. Other major science themes of JWST encompass studying the assembly of galaxies, the birth of stars and planetary systems, planetary systems and the origins of life. JWST will be the premier astrophysics space observatory for NASA and ESA over its 5 - 10 year mission lifetime, supplanting the Hubble Space Telescope (which primarily works at visible and ultraviolet light wavelengths). In addition to the topics covered in this talk, many scientists will use JWST to make discoveries that we have not yet imagined.

JWST employs many unique technologies, and the mission has been in development for over 10 years. Many major hardware components - all large optics and all science instruments - have been completed, and integration of major components has begun. In this talk I will illustrate the mission's science potential and highlight the status of this development effort.

September 17, 2014

ROGER ROMANI

Professor of Physics, Stanford University

BLACK WIDOW PULSARS: VENGEFUL STAR CORPSES

NASA's Fermi Gamma-ray Space Telescope has revealed a violent high-energy universe full of stellar explosions, black hole jets, and pulsing stars. These cosmic objects are often faint when observed with visible light, but glow bright with gamma rays. Dr. Romani will describe the quest to discover the true nature of the most puzzling of these gamma-ray sources. Several turn out to be a kind of star corpse called a 'black widow' pulsar. When a massive star dies, it leaves a collapsed remnant called a neutron star. When such a star corpse has a companion star, it can be reanimated by material from the companion. Ironically, the revived corpse then begins to vaporize its mate. Dr. Romani will discuss his group's discovery that these black widows may be the heaviest neutron stars known, on the edge of final collapse to black holes.

Roger Romani is professor of physics and member of the Kavli Institute at Stanford University. His research focuses on neutron stars and black holes. He enjoys finding new, strange phenomena in the sky and then building theoretical models to explain them. Past recognition for his work include Sloan Foundation and Cottrell Scholars fellowships and the Rossi Prize of the American Astronomical Society.

MESSAGE FROM OUR TREASURER (Reprint from May issue)

The Board and Officers have spent some time in writing down SFAA practices and procedures so that Members are informed on SFAA procedures and future Board/Officers don't have to reinvent the wheel every few years. From time to time we will include one of these Guidelines in Above The Fog so that Members are kept up-to-date regarding important SFAA administrative topics.

We welcome any suggestions for improvement. Please direct your inputs to me at sfaatreasurer@gmail.com Thank you.

Michael Patrick, Treasurer, SFAA

S.F.A.A. Guidelines

303 - Mt. Tamalpais Parking Passes

Owner: Officers & Board Members	Last Revision Date: 7 March 2014
Initial Approval & Effective Date: 18 March 2014	Last Review/Approval Date: 23 March 2014
Related Guidelines: 301 & 302	Next Review Date: January 2016

1. Guideline

Under an agreement with the California State Parks, the SFAA is authorized to issue CSP (California State Parks) Parking Passes to current members that allow the holder to stay and observe at the Rock Springs parking lot after normal park closing hours, up to 2:00 AM of the following morning. These passes must be displayed on the holder's vehicle dash at all times during scheduled member's only or public star parties. These passes are not valid on nights other than those scheduled and approved by the California State Parks Ranger. Failure to display a current pass may result in the vehicle being cited or towed by the California State Parks Ranger.

Please check before you leave home for Mt. Tamalpais that you have a valid parking pass, in your vehicle, which shows the current year.

2. Process for Obtaining a Parking Pass

SFAA Mt. Tamalpais/Rock Springs after hours parking passes will be issued to new or renewing members upon request as part of the joining or renewing process. Passes are not automatically mailed out upon joining or renewing.

Joining or renewing membership is best done through the SFAA website and there are two methods offered: using your credit card via a PayPal process or writing a check and mailing an application via the US Postal Service.

In the PayPal process under "Adding Special Instructions to the Seller" please write that you would like a parking pass mailed to you.

If you decide to write a check and mail in your "Application for New or Renewing Membership" form (also found on the "Membership" page of the SFAA website), after printing the form, fill it out and simply check the box next to "Please mail to me a Mt. Tamalpais Parking Permit".

In both cases a parking pass will be mailed to you within a few days of the processing of your membership.

Parking Passes are also obtainable from Board Members or Officers at the event on Mt. Tamalpais or at our monthly meeting / lecture at the Randall Museum. The requester must provide proof of payment for current membership. If current proof is not available, the Officer or Board member will take the requestor's name and inform the Treasurer. Upon verification of current membership the Treasurer will mail a pass to the requestor.

For SFAA Use Only

This document supersedes all prior versions. It is available to members by request and external auditors if necessary. The purpose of this document is to promote consistency and uniformity in action. Depending upon the SFAA's needs, policies may be changed by Officers with approval by the Board of Directors from time to time.

August 2-3, 2014 – Yosemite Star Party at Glacier Point



**To sign up, just e-mail Dave Frey at yofiestasemite@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.
Ken & Dave**

2014 ASTRONOMY PROGRAMS
Mt. Tamalpais State Park
Explore the Wonders of the Universe
 Free and open to all (no signup). [Directions](#)

<p>June 28 8:30 p.m.</p>	<p>Dr. Wil van Breugel, UC Merced "Masks of the Cosmos" Humans have always wondered about the Cosmos and their own place in it. Different cultures have believed that they have discovered its true nature, but might these ideas just be anthropological 'masks' projected on the universe?</p>
<p>August 2 8:30 p.m.</p>	<p>Dr. Beate Heinemann , Lawrence Berkeley Lab .physics.berkeley.edu/research/faculty/heinemann.html "How We Found the Higgs Boson" How does the Large Hadron Collider near Geneva in Switzerland work and how did its use lead to the discovery in 2012 of the Higgs boson. What is hoped to be learned in the future at this collider.</p>
<p>August 30 8:00 p.m.</p>	<p>Dr. Lloyd Knox , UC Davis virgo.physics.ucdavis.edu/~knox/ "The Big Bang in Context" Follow the history of the "big bang" picture of our origins of the universe, clarified by observational successes. What remaining questions drive scientists toward deeper exploration.</p>
<p>September 27 7:30 p.m.</p>	<p>Dr. Lynn Cominsky , Sonoma SU universe.sonoma.edu/~lynnc "NuSTAR's Sharper View of the Universe" Launched in June 2012, NuSTAR is bringing the high-energy Universe into focus. Exploding stars, hidden black holes and other exotic objects are all being studied in an entirely new light.</p>
<p>October 25 7:00 p.m.</p>	<p>Andrew Fraknoi, Foothill College foothill.edu/ast " The Top Tourist Sights of the Solar System" Where will Bill Gates' Great-Granddaughter go on her honeymoon? Using spectacular space photos we will explore the most intriguing future "tourist destinations" among the planets and moons in our cosmic neighborhood Co-produced with Wonderfest-part of Bay Area Science Festival</p>

June 2014 - THE EVENING SKY

May Sky Map: <http://skymaps.com/skymaps/tesmnl406.pdf>

May Sky Calendar: <http://skymaps.com/articles/nl406.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.chabotspace.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. 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>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>
<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>

BAY AREA EVENTS – JUNE 2014

<http://groups.yahoo.com/neo/groups/bayastro/conversations/topics/49>

**Tuesday, June 17
12 Noon**

**SETI INSTITUTE
COLLOQUIUM SERIES
189 Bernardo Avenue
Mountain View 94043**

**IOANA COZMUTA, Science and Technology Corporation, NASA Ames Space Portal
MICROGRAVITY, THE FUTURE OF INNOVATION**

The International Space Station is a US taxpayers investment estimated at about \$70 billion spent over 30 years (with an overall price tag of \$100 billion by all member nations), thus it is natural to ask about the ISS's Return on Investment to justify its continuous operation and existence its scientific payoff. While this is not a trivial financial question, a more appropriate measure for the ISS would be the Return on Innovation phrased from the perspective of: "What is the cost of NOT innovating and NOT exploring in microgravity?" This simply correlates with the otherwise-not-accessible-knowledge, the number of unique "lessons learned" and discoveries, especially those that enable humanity to pursue solutions for global critical problems and open up new avenues in areas at big impasse. To add to it, maybe space is the necessary step that humanity will have to undertake to progress, to change consciousness and awareness and to encourage creative cooperation coupled with a communitarian view of Earths future.

ISS is a top engineering achievement in space harboring a myriad of outstanding fundamental scientific investigations. There is a growing interest in highlighting the ISS achievements especially from the perspective of their impact on terrestrial technologies and by being the source of a cascade of accomplishments and developments ranging from the seed scientific discoveries to direct applications, many of them serendipitous in nature. The ultimate goal is to build upon these successes to increase the potential of commercialization and to create a stable, self-sustainable space based market. An overview of already identified microgravity benefits to material and life sciences will be given as well as examples highlighting the breadth of these scientific investigations and the aforementioned serendipitous effects. The value of a space-based novel initiative will be explored with specific examples in the works.

The talk will also touch upon the need for a customized on-demand payload return from the ISS to augment the current payload downmass to Earth and increase the ISS commercialization potential. The existing transportation infrastructure is correlated with the current ISS utilization demands in terms of bulk downmass and schedule frequency and it is operated by the SpaceX Dragon Capsule and the Russian Soyuz with a combined frequency of about three to seven times per year. Based on previous experience with commercial partners it appears that a customized on-demand payload return system better meets the customers' needs and directly encourages potential emerging markets of ISS users. The talk will briefly step through the rationale behind defining a metric (requirements and design functions) that identifies/assigns quantifiable system level parameters to capture the various aspects of the need for a customized on-demand payload return from the ISS.

ISS is the first platform of its kind that enabled long term human presence in space, long term exploration of skills needed to survive the extreme environment, long terms exposure of basic scientific experiments to the microgravity environment. No matter what angle we look at it, the ISS is first and foremost a learning platform. As such its primary role is to help answer fundamental questions about living and working in space and help figure out the capabilities we need that we don't have to ensure a future sustainable human exploration: one facet oriented towards the depths of space, the other towards Earth.

**Friday, June 20
8:30 PM**

**Lick Observatory
7299 Mt. Hamilton Rd
Mt. Hamilton, CA 95140**

LICK OBSERVATORY SUMMER VISITOR'S PROGRAM

THE LUMINOUS SEARCH FOR DARK MATTER

SPEAKER: AARON ROMANOWSKY, SAN JOSE STATE

Part of the Lick Summer Visitor's series. Tickets on sale 4/15 at Noon.

Website: <http://www.ucolick.org/public/sumvispro.html>

Cost: \$9.50

<p>Friday, June 20 9:45 PM – 11:45 PM</p> <p>Houge Park, San Jose</p>	<p>SAN JOSE ASTRONOMICAL ASSOCIATION STAR PARTY</p> <p>Interested in learning about the night sky? Come out and look through our members scopes and ask us questions. It's free and educational. Sunset 8:31 pm, 35% moon rises 1:58 am.</p>
<p>Saturday, 06/21/14 07:30 PM - 08:15 PM</p> <p>Chabot Space and Science Center 10000 Skyline Blvd Oakland, CA 94619</p> <p>Cost: Free with admission</p>	<p>A JEWEL IN THE SKY</p> <p>The International Space Station is the crowning achievement of many nations. It symbolizes a new beginning in the exploration of space; no longer do we compete as adversaries in our quest, instead, we explore beyond Earth as partners. Join Faride for a look into the history of Earth-orbiting space stations and the importance of the ISS, our jewel in the sky.</p> <p>Speaker: Faride Khalaf</p>
<p>Saturday, June 21 8:30 PM</p> <p>Lick Observatory 7299 Mt. Hamilton Rd Mt. Hamilton, CA 95140</p> <p>Cost: \$40</p>	<p>SANDRA FABER - UNIVERSITY OF CALIFORNIA AT SANTA CRUZ THE THIRTY-METER TELESCOPE: CALIFORNIA'S FLAGSHIP TELESCOPE FOR THE 21ST CENTURY</p> <p>Performer: Dave Rocha Trio</p> <p>Part of the Music of the Spheres series. Tickets on sale 4/15 at Noon.</p> <p>Website: http://www.ucolick.org/public/music.html</p>
<p>Tuesday, June 24 12:00 PM</p> <p>SETI INSTITUTE COLLOQUIUM SERIES 189 Bernardo Avenue Mountain View CA 94043</p>	<p>RED DRAGON: LOW COST ACCESS TO THE SURFACE OF MARS USING COMMERCIAL CAPABILITIES LARRY LEMKE, NASA AMES</p> <p>Abstract: One of Ames' long standing science interests has been to robotically drill deeply into Mars' subsurface environment (2 meters, or more) to investigate the habitability of that zone for past or extant life. Large, capable Mars landers would ease the problem of landing and operating deep robotic drills. In 2010, an Ames scientist realized that the crew-carrying version of the SpaceX Dragon capsule would possess all the subsystems necessary to perform a soft landing on Earth, and raised the question of whether it could also soft land on Mars. If it could, it might be a candidate platform for a Discovery or Mars Scout class deep drilling mission, for example.</p> <p>After approximately 3 years studying the engineering problem we have concluded that a minimally modified Dragon capsule (which we call the "Red Dragon") could successfully perform an all-propulsive Entry, Descent, and Landing (EDL). We present and discuss the analysis that supports this conclusion. At the upper limits of its capability, a Red Dragon could land approximately 2 metric tons of useful payload, or approximately twice the mass that the MSL Skycrane demonstrated with a useful volume 3 or 4 times as great. This combination of features led us to speculate that it might be possible to land enough mass and volume with a Red Dragon to enable a Mars Sample Return mission in which Mars Orbit Rendezvous is avoided, and the return vehicle comes directly back to Earth. This potentially lowers the risk and cost of a sample return mission. We conclude that such an Earth-Direct sample return architecture is feasible if the Earth Return Vehicle is constructed as a small spacecraft. Larry Lemke will present and discuss the analysis that supports this conclusion.</p>

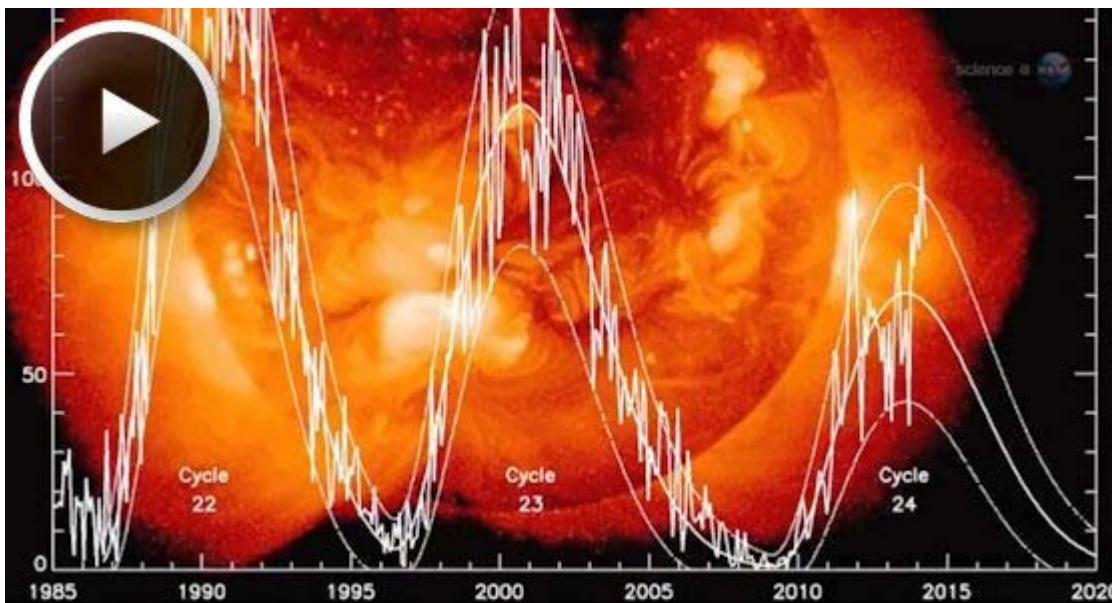
<p>Saturday, June 28</p> <p>MOUNTAIN THEATER Mt Tamalpais State Park Mill Valley CA 94941</p>	<p>DR. WIL VAN BREUGEL, UC MERCED MASKS OF THE COSMOS</p> <p>Humans have always wondered about the Cosmos and their own place in it. Different cultures have believed that they have discovered its true nature, but might these ideas just be anthropological 'masks' projected on the universe?</p> <p>Cost: Free</p>
<p>Monday, June 30 7:00 PM</p> <p>SOMA STREAT FOOD PARK 428 11th Street San Francisco CA 94103</p> <p>Cost: Free</p>	<p>DR. CHRIS MCKAY, NASA-AMES THE ROAD TO EUROPA</p> <p>"Europa Report" is, scientifically and dramatically, one of the best science fiction films to come along in years. According to Popular Science, it "sets a new standard for realism in sci-fi." At the same time, the critics at Rotten Tomatoes rate Europa Report as "80% Fresh." (That's high praise even for a Scorsese or Allen film!) The only way that Wonderfest and SF in SF can improve "Europa Report" is to follow it with the insights of legendary astrobiologist Dr. Chris McKay. McKay will likely poke some intriguing holes in Europa Report. In doing so, he will vastly inflate our understanding of interplanetary travel AND of hypothetical life in Europa's temperate ocean — in orbit around mighty Jupiter.</p>

Solar Mini-Max

NASA SCIENCE NEWS

June 10, 2014: Years ago, in 2008 and 2009 an eerie quiet descended on the sun. Sunspot counts dropped to historically-low levels and solar flares ceased altogether. As the longest and deepest solar minimum in a century unfolded, bored solar physicists wondered when "Solar Max" would ever return.

They can stop wondering. "It's back," says Dean Pesnell of the Goddard Space Flight Center. "Solar Max has arrived."



A new ScienceCast video examines the curious Solar Max of 2014. [Play it](#)

Pesnell is a leading member of the NOAA/NASA Solar Cycle Prediction Panel, a blue-ribbon group of solar physicists who meet from time to time to forecast future solar cycles. It's not as easy as it sounds. Although textbooks call it the "11-year solar cycle," the actual cycle can take anywhere from 9 to 14 years to complete. Some Solar Maxes are strong, others weak, and, sometimes, as happened for nearly 70 years in the 17th century, the solar cycle can vanish altogether.

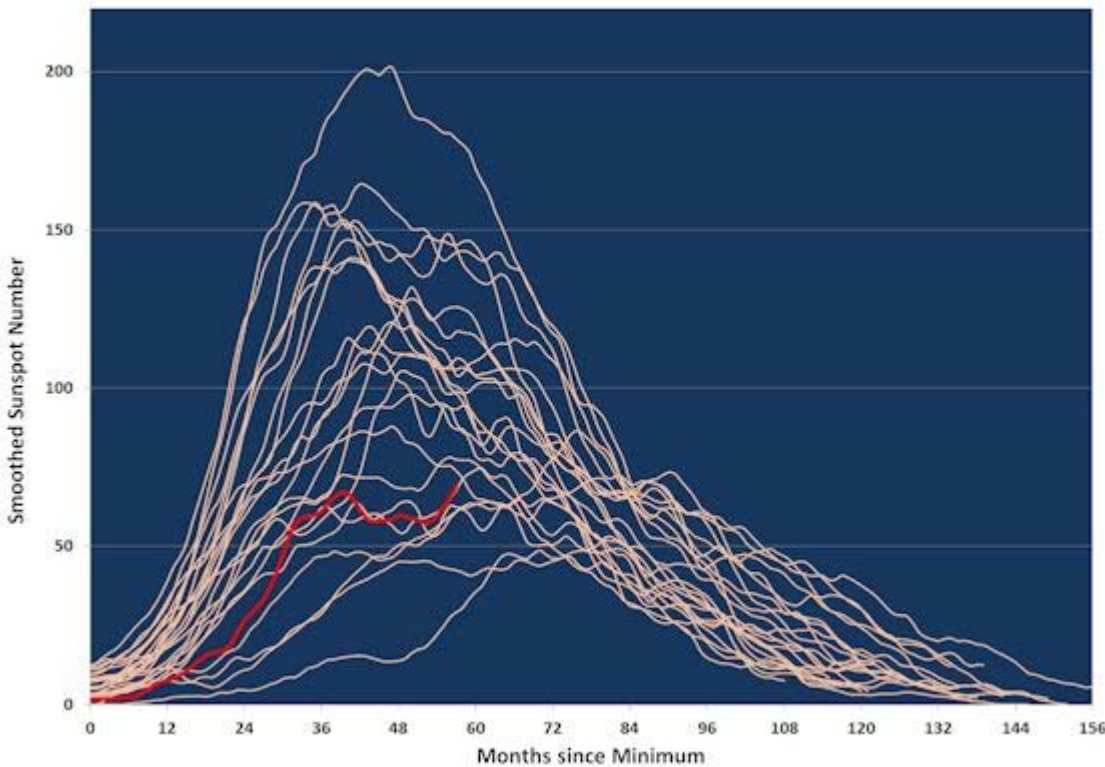
Pesnell points to a number of factors that signal Solar Max conditions in 2014: "The sun's magnetic field has flipped; we are starting to see the development of long coronal holes; and, oh yes, sunspot counts are cresting."

Another panelist, Doug Biesecker of the NOAA Space Weather Prediction Center, agrees with Pesnell: "Solar Maximum is here *Finally.*" According to an analysis Biesecker presented at NOAA's Space Weather Workshop in April, the sunspot number for Solar Cycle 24 is near its peak right now.

They agree on another point, too: It is not very impressive.

"This solar cycle continues to rank among the weakest on record," comments Ron Turner of Analytic Services, Inc. who serves as a Senior Science Advisor to NASA's Innovative Advanced Concepts program. To illustrate the point, he plotted the smoothed sunspot number of Cycle 24 vs. the previous 23 cycles since 1755. "In the historical record, there are only a few Solar Maxima weaker than this one."

As a result, many researchers have started calling the ongoing peak a "Mini-Max."



This plot prepared by Ron Turner of Analytic Services, Inc., shows the smoothed sunspot number of Cycle 24 (red) vs. the previous 23 cycles since 1755. [Larger image](#)

Pesnell believes that "Solar Cycle 24, such as it is, will probably start fading by 2015." Ironically, that is when some of the bigger flares and magnetic storms could occur. Biesecker has analyzed historical records of solar activity and he finds that most large events such as strong flares and significant geomagnetic storms typically occur in the declining phase of solar cycles—even weak ones.

Indeed, this "Mini-Max" has already unleashed one of the strongest storms in recorded history. On July 23, 2012, a plasma cloud or "CME" rocketed away from the sun as fast as 3000 km/s, more than four times faster than a typical eruption. The storm tore through Earth orbit, but fortunately Earth wasn't there. Instead it hit NASA's STEREO-A spacecraft, which recorded the event for analysis. Researchers now believe the eruption was as significant as the iconic Carrington Event of 1859—a solar storm that set telegraph offices on fire and sparked Northern Lights as far south as Hawaii. If the 2012 "superstorm" had hit Earth, the damage to power grids and satellites would have been significant.

It all adds up to one thing: "We're not out of the woods yet," says Pesnell. Even a "Mini-Max" can stir up major space weather—and there's more to come as the cycle declines.

Credits:

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

Web Links: [Solar Cycle Progression](#) -- NOAA [Space Weather Workshop](#)

Rosetta Comet Comes Alive

June 3, 2014: A spacecraft from Earth is about to do something no spacecraft has ever done before: orbit a comet and land on its surface.

Right now, the European Space Agency's Rosetta probe is hurtling toward Comet 67P/Churyumov-Gerasimenko. The spacecraft's mission is to study the comet at close-range as it transforms from a quiet nugget of ice and rock, frozen solid by years spent in deep space, to a sun-warmed dynamo spewing jets of gas and dust into a magnificently evolving tail.

News flash: The metamorphosis has begun.



A new ScienceCast video previews Rosetta's mission to Comet 67P/Churyumov-Gerasimenko [Play it](#)

"Comet 67P is coming alive," says Claudia Alexander, project scientist for the U.S. Rosetta Project at JPL. "And it is even more active than I expected."

Launched in 2004, Rosetta has spent the past few years in hibernation as it chased the comet across the Solar System. In January of 2014, with its destination in sight, Rosetta woke up and turned on its cameras. At first, the comet looked like a dimensionless pinprick, inactive except for its quiet motion through space. Then, on May 4th a bright cloud appeared around the nucleus.

"It's beginning to look like a real comet," says Holger Sierks of the Max Planck Institute for Solar System Research in Germany where Rosetta's OSIRIS science camera was built. "It is hard to believe," he says, "that only a few months from now, Rosetta will be deep inside this cloud of dust and en route to the origin of the comet's activity."

Spacecraft from NASA, ESA and other space agencies have flown by comets before. A whole armada of spacecraft visited Comet Halley in the mid-1980s, an international event which still serves as a touchstone of comet research. Other notable examples include NASA's Stardust mission, which flew through the tail of Comet Wild in 2004 and

returned the samples to Earth two years later; and the Deep Impact spacecraft, which in 2005 dropped a projectile into Comet 9P/Tempel, blowing a hole in its nucleus so that researchers could look inside.

Flybys are informative, but Rosetta will do much more.



Close-up of comet 67P/C-G on 30 April 2014. *Credit: ESA/ Rosetta/ MPS for OSIRIS Team MPS/ UPD / LAM/ IAA/ SSO/ INTA/ UPM/ DASP/ IDA*

"A flyby is just a tantalizing glimpse of a comet at one stage in its evolution," points out Alexander. "Rosetta is different. It will orbit 67P for 17 months. We'll see this comet evolve right before our eyes as we accompany it toward the sun and back out again."

The most exciting moment of the mission will likely come in November when a European-built lander descends from the spacecraft and touches down on the comet's surface. The lander's name is "Philae" after an island in the Nile, the site of an obelisk that helped decipher—you guessed it—the Rosetta Stone.

Because a comet has little gravity, the lander will anchor itself with harpoons. "The feet may drill into something crunchy like permafrost, or maybe into something rock solid," Alexander speculates.

Once it is fastened, the lander will commence an unprecedented first-hand study of a comet's nucleus while Rosetta continues to monitor developments overhead.

Although Rosetta is a European mission, NASA has contributed some important instruments to the spacecraft, and US scientists are just as eager as their European counterparts for Rosetta to arrive. The recent photos have helped mission controllers pinpoint 67P and start a series of maneuvers that will slowly bring the spacecraft in line with the comet in time for an August rendezvous.

"Our target is ahead," says Alexander, "and Rosetta is chasing it down!"

Credits:

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

Web Links: [Rosetta](#) -- ESA mission home page [Rosetta's Target Comet is Becoming Act](#)



**San Francisco Amateur Astronomers
Application for New or Renewing Membership**

1. Memberships, with dues payment, are for one year running from standard renewal dates of 1 July to 30 June and 1 January to 31 December.
2. Submitting appropriate dues in April, May, June, July, August, September, membership will run to 30 June of the next year.
3. Submitting appropriate dues in October, November, December, membership will run to 31 December of the next year; submitting appropriate dues in January, February or March, membership will run to 31 December of the same year.
4. Renewals are maintained at the original membership date unless the renewal is made later than the original cutoff date (e.g. September or March as described in 3). In such cases the membership date is shifted to the next renewal date 30 June or 31 December.
5. New or renewal memberships sent in via USPS mail will have membership start date based on postmark date.

This application is for:

- New
- Renewing

Name: _____

Address: _____

Email: _____

Home Telephone (optional): _____

Cell Phone (optional): _____

Membership Type: Individual \$25.00 / Family \$30.00 / Student \$10.00 / Supporting \$75.00

Please mail to me a Mt. Tamalpais Parking Permit

To complete the membership process:

- A. Print and fill out this form
- B. Make check or money order payable to San Francisco Amateur Astronomers
- C. Mail this form and payment to:

**Treasurer, SFAA
PO Box 15097
San Francisco, CA 94115**

New members will be entered onto the SFAA roster on the Night Sky Network (NSN) and will receive a verifying email from the NSN with username and password for the NSN. Renewing members will have their information updated but will not receive an email from the NSN. Both new and renewing members will receive a verifying email from the SFAA Treasurer upon completion of the membership process.

2013 CLUB OFFICERS & CONTACTS

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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 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/ Ken Frank ken@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/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 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

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