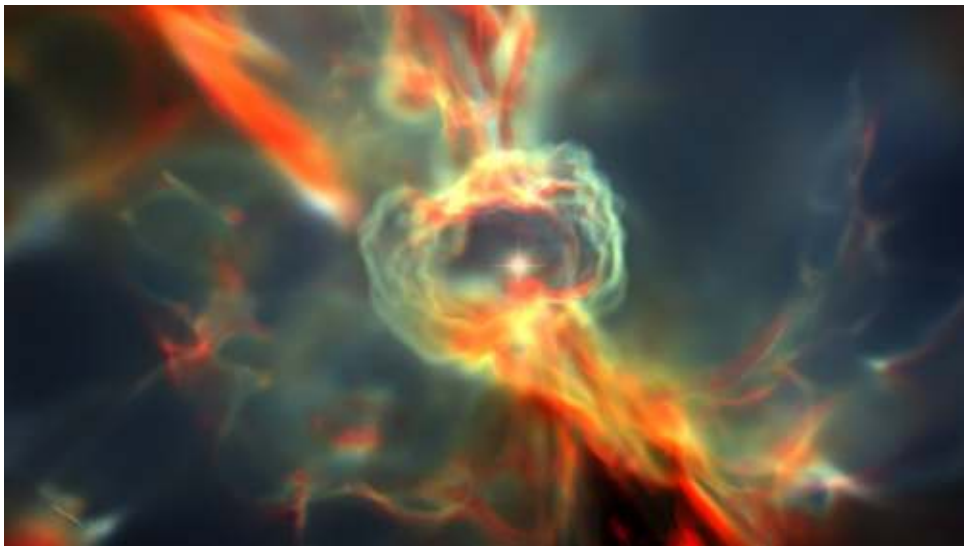
ABOVE THE FOG
• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

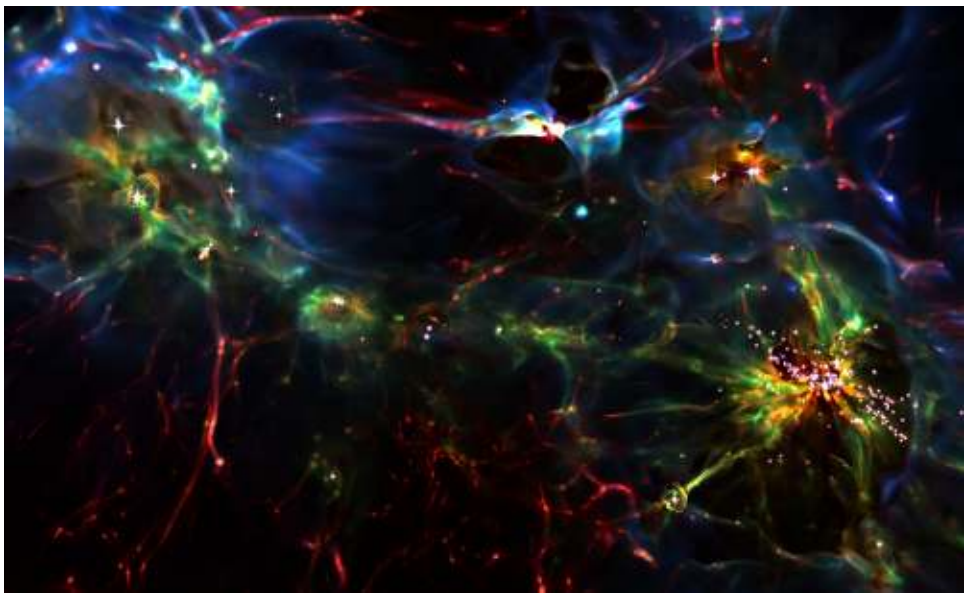
Vol. 61, No. 3 - March 2013

Wednesday, March 20, 2013
SAN FRANCISCO AMATEUR ASTRONOMERS

DR. RALPH KAEHLER
SCIENTIFIC VISUALIZATION
IN NUMERICAL ASTROPHYSICS AND COSMOLOGY



Three-dimensional movies of the birth of the first stars in the Universe are just some of the stunning visuals at the Schwob Computing and Information Center, a resource at KIPAC's Computational Physics Department. The visualizations are based on large-scale computer simulations that model complex astrophysical and cosmological processes, ranging from the formation of the first galaxies to the motion of dark matter on cosmic scales. In his presentation, Ralf will describe the role of scientific visualization in cosmological research, explain how he develops and employs state-of-the-art computer graphics techniques to produce the visualizations, and show us many examples of images and animations resulting from the work done at KIPAC. Dr Ralf Kaehler is a computational scientist at KIPAC, the Kavli Institute for Particle Astrophysics and Cosmology. He manages KIPAC's visualization laboratory, designs and implements computer graphics software and produces astrophysical images and movies that have been presented worldwide on numerous covers of magazines, in planetarium shows and TV documentaries.



This is one lecture you won't want to miss! (sent by an enthusiast who heard this lecture!)

PRESIDENT'S MESSAGE

Before I recap our viewing events, I'd like to share some big news about our 2012 awards winners.

Congratulations to the recipients of the **2012 Herman Fast Award -- Linda & Norman Mahan**. The Herman Fast Award is our highest honor. A search through our club's Above the Fog archives uncovers history of Herman Fast that includes stories of him observing double stars from Mt. Hamilton during WWII blackouts and falling asleep on newspapers after observing for the night.

We lucked out this month with the weather, enjoying several clear evenings for viewing.

Our CSP New Scope Forum on February 16th met a dramatic "matrimonial challenge." Our first clues that something unusual was about to happen was the arrival of a string quartet and the subsequent arrival of a flower-carrying crowd

wearing dresses and suits. As the wedding party walked down the aisle, SFAA'ers stepped aside, quietly assembling and aligning telescopes while the ceremony took place. Thanks to all of the SFAA'ers (10 or more of them!) who volunteered to help beginners align GOTO's, collimate, find north, identify constellations, point out Mercury, align finder scopes, and just supply general words of encouragement.

Thanks to our Marin-based SFAA'ers who hosted 3 stargazing events for the Marin County Free Library last month. There's nothing like showing folks how to find the great Orion Nebula through binoculars, at 7:30pm from the suburbs.

Many SFAA'ers reported a chilly night on Mt. Tam for our Members-Only night on February 9th. My husband Doug ("Husband Doug" as I call him) and I also experienced a cold night as well under dark skies -- we fell asleep to a camp covered in frost, and woke up on Sunday to our water bottles frozen solid.

Our March 9th Members-Only night is our Messier Marathon. Ken Frank, err… Sir Apparition of Messier, will kick off ceremonies, and we'll have a mostly informal observing program for the night. (See the announcement in this issue.) Hope to see you there!

Clear skies!

ANGIE TRAEGER
President
San Francisco Amateur Astronomers
2013

SAN FRANCISCO AMATEUR ASTRONOMERS YEAR 2012 AWARD RECIPIENTS

LINDA MAHAN
Herman Fast Award

NORMAN MAHAN
Herman Fast Award

ANTHONY BARREIRO
Observer of the Year

ADRIAN FERNANDEZ
Service Award

ADRIAN FERNANDEZ
Astroimager of the Year
FOR BRINGING THE BEAUTY OF THE NIGHT TO THE DAY

PAUL SALAZAR
Ringmaster of Annularity Award
WITH OUR THANKS AND APPRECIATION

LADD LINDSAY
Singularity Award
FOR SINGLE-HANDEDLY ENTERTAINING A CROWD OF 200 IN INCLEMENT WEATHER

MATT JONES
SFAA Air Mattress Astronomer Award
FOR THROWING AN EXCEPTIONAL PERSEIDS METEOR SHOWER STAR PARTY

SVEN HEMMERT
First Man Award
WITH OUR THANKS AND APPRECIATION

FRANK SCHMIDT
SFAA'S Most Caffeinated Award
FOR LIFTING OUR SPIRITS AND INTELLECT TO A GREATER HEIGHT

SPECIAL THANKS TO OUR GENERAL MEETING AND LECTURE SNACK VOLUNTEERS
DAVE GOGGIN, ANIL CHOPRA, JAMES MACE, KEN LUM, SUNIL NAGARAJ, DOUG TRAEGER, SHIRLEY GROSWIRD, SOAM VASANI

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.

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

CITY STAR PARTY

Saturday, March 16
See details in newsletter

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

March 9 - MESSIER MARATHON

April 6, May 4, 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.
For more information: http://www.sfaa-astronomy.org/starparties/

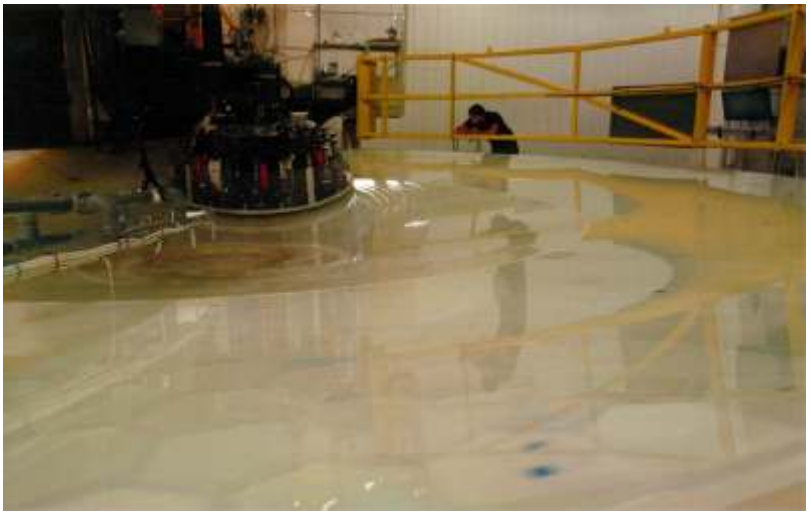
2013 Dates: April 13, May 11, June 15, July 13, Aug 10, Sept 7 and Oct 12

UPCOMING LECTURES

APRIL 17 – GASPARD DUCHENE
PLANET FORMATION AND STELLAR MULTIPLICITY:
INSIGHTS FROM RECENT SURVEYS AND PERSPECTIVES GASPARD DUCHENE UC BEREKLEY
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.

MAY 15 - ANTHONY AGUIRRE, Assistant Professor of Physics, University of California, 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.



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.

SAN FRANCISCO AMATEUR ASTRONOMERS

CITY STAR PARTY

SATURDAY
MARCH 16, 2013
7:00 pm – 10:30 pm

We will be setting up the City Star Party before dark. This is a great event for getting help with setting up your scope as well as hands-on help to get your telescope ready so that when darkness sets in, you can put your scope to work seeing many more items in the night sky.

Clear skies from the CSP team!

Time: Arrive before dark for scope setup and assistance.

09*Event Location

Land's End- Point Lobos
City Star Parties are held at this location throughout the year. Check the Club Calendar for a schedule.

Address: El Camino del Mar St
San Francisco, CA
(Get Directions)

Check Weather Forecast

SFAA City Star Parties

Notes:
Northbound on the Great Highway, follow the highway as it becomes Point Lobos Avenue and passes the Cliff House. After you pass a small road called Merrie Way, take the next left onto El Camino Del Mar and follow the road uphill. You will pass Seal Rock Street on your right and will see a "Not a Through Street" sign and another sign for Fort Miley. Continue until the road ends in a parking lot.

Contact **SFAA** for more information.

Email this Club

March 9th, 2013

SFAA Members-Only SUP Night

MESSIER MARATHON

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 at 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

March 2013 - THE EVENING SKY

March Sky Map: http://skymaps.com/skymaps/tesmn1303.pdf

March Sky Calendar: http://skymaps.com/articles/n1303.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

EVERY FRIDAY NIGHT **7:00 PM – 10:00 PM** **excluding major holidays** **The Telescope Makers' Workshop** **CHABOT SPACE AND SCIENCE CENTER** **10000 Skyline Boulevard** **Oakland, CA 94619-2450**	**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: Contact: E-mail Richard Ozer (rozer@pacbell.net) or (510) 406-1914
EVERY FRIDAY & SATURDAY EVENING, weather permitting **7:30 PM – 10:30 PM** **CHABOT SPACE AND SCIENCE CENTER** **10000 Skyline Boulevard** **Oakland, CA 94619-2450** **(510) 336-7300**	**EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES** For more information: http://www.chabotspace.org/ **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! **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) 12pm - 5pm: Observatories Open
Sunset – 5:11 PM **(TWICE MONTHLY)** **Inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.** **SAN MATEO COUNTY ASTRONOMICAL SOCIETY STAR PARTY**	**STAR PARTIES AT CRESTVIEW PARK, SAN CARLOS** Come out and bring the kids for a mind expanding look at the universe 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. 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.** **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. 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. 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.

BAY AREA EVENTS – MARCH 2013

Tuesday, March 5 **12:00 NOON** **SETI INSTITUTE** **COLLOQUIUM SERIES** **189 Bernardo Avenue** **Mountain View, CA 94043**	**ON THE ROAD TO EXTRAGALACTIC TRANSIENT DISCOVERIES** **SARAH SPOLAOR, JET PROPULSION LABORATORY** Surveys for radio pulsars serve as excellent historical records of the Galactic and extragalactic radio sky on sub-second time scales. Isolated radio impulses, such as those theorized to occur as signposts for evaporating black holes, coalescing neutron stars, and other violent phenomena, might be detectable in pulsar survey data. Lorimer et al. (2007) first reported the detection of a highly dispersed, 5 millisecond burst of radio emission from an unidentified extragalactic source. Since that discovery, dedicated searches of archival and new surveys have revealed a number of transient pulses that fit the mould of no astrophysical or manmade object known to us, some of them calling the Lorimer et al. pulse's extragalactic origin into question. Excitingly, recent discoveries in the southern-hemisphere High Time Resolution Universe survey may represent the first hint of an extragalactic pulse population. Dr Spolaor will discuss the pitfalls and advances in this highly dynamic field, and will discuss two current leading extragalactic pulse search and identification efforts: the High Time Resolution Universe survey (at Parkes Telescope) and the commensal V-Fastr survey (in progress at the Very Long Baseline Array).
Tuesday, March 4 **4:15-5:30 PM** **STANFORD UNIVERSITY** **HEWLETT TEACHING CENTER** **Room 201** **Palo Alto CA 94305** **Cost: Free/open to the public**	**THE SEARCH FOR THE ORIGIN OF COSMIC RAYS** **PROF. STEFAN WESTERHOFF - UNIVERSITY OF WISCONSIN-MADISON** **"THE SEARCH FOR THE ORIGIN OF COSMIC RAYS."**
Wednesday, March 6 **7:00-9:00 PM** **FOOTHILL COMMUNITY COLLEGE** **SMITHWICK THEATER** **12345 Moody Road** **Los Altos Hills CA 94022** **Cost: Free ($3 parking)**	**Silicon Valley Astronomy Lecture Series** **DR. DANA BACKMAN, SETI** **ASTRONOMY FROM THE STRATOSPHERE: NASA'S SOFIA MISSION** Why would NASA buy a used passenger airliner, cut a 10' x 10' hole in the fuselage, add a roll-back door, and install a 17-ton telescope inside? In his lecture, open to the public, Dr. Backman will introduce you to the engineering marvel and international scientific facility called SOFIA -- the Stratospheric Observatory for Infrared Astronomy. This remarkable airborne telescope began scientific research flights in 2010 and is already returning exciting discoveries about the birth of stars, interstellar chemistry, the atmospheres of giant planets, the environment around supermassive black holes, and other branches of astronomy. Dana Backman is the Director of Education and Public Outreach for the SOFIA project at NASA's Ames Research Center and an Adjunct Professor at Santa Clara University and the Stanford Continuing Studies Program. Before joining the SOFIA team, he was professor of physics and astronomy at Franklin and Marshall College in Pennsylvania. He is coauthor of three college-level

	astronomy textbooks and a frequent public speaker on astronomy and SOFIA. His research specialty is infrared astronomy (the study of the universe by collecting heat rays) – exactly the kind of work that the SOFIA telescope is designed to do. Please join us if you can. The normal Friday Night Staff should still plan on manning the observatory from 9pm to 11 as usual. It should be a fun night!
Thursday, 03/07/13 **4:00 PM** **Edenvale Branch Library** **101 Branham Lane East** **San Jose, CA 95111** **Cost: Free**	**NASASCIENCE4GIRLS AND THEIR FAMILIES** The Sun is our closest star! Join us and find out how NASA is helping us learn about our Sun, what it can teach us about other stars, and the many ways it affects our life on Earth. Website: http://www.sjpl.org/event/nasascience4girls-and-their-families-1
Thursday, March 7 **4:15 PM** **Lockheed Martin Colloquia** **3251 Hanover St** **ATC Auditorium** **Building 202** **Palo Alto, CA 94304**	**DR. CHUCK PACKER** **THE SHIRTSLEEVE INVENTION,** **THE THERMAL PROTECTION SYSTEM FOR THE SPACE SHUTTLE**
Friday, March 8 **7:00 - 10:00 PM** **WEATHER PERMITTING** **San Jose Astronomical Association** **Houge Park** **Twilight Drive** **San Jose, CA 95124** **Cost: Free**	**HOUGE PARK STAR PARTY** Meet with members of San Jose Astronomical Society for a Star Party, weather permitting.
Saturday, March 9 **11:00 AM - 04:00 PM** **CHABOT SPACE AND SCIENCE CENTER** **10000 Skyline Blvd** **Oakland, CA** **Cost: Free w/admission**	**INVENTION EXPERIENCE** They did it again! NASA 's newest Centennial Challenge, Night Rover and the I.S.I.S Project have joined forces with us to offer an epic, hands-on day of exploration and creation that will have the Center jumping. In the spirit of the NASA Night Rover Challenge, Invention Experience invites students to invent, prototype, and present their own ideas. Prize drawings, giveaways, face to face with experts in the field and more. Web site: http://www.chabotspace.org/calendar.htm?date=2-16-2013&p=301723
Monday, March 11 **7:30 - 9:00 PM** **BENJAMIN DEAN ASTRONOMY LECTURES** **CALIFORNIA ACADEMY OF SCIENCES** **55 Music Concourse Dr.** **San Francisco, CA 94118** **Cost: $12 General** **$8 Members**	**JENNIFER BLANK, NASA/AMES** **WHERE WILL CURIOSITY TAKE US? FOLLOWING THE MARS SCIENCE LABORATORY ROVER AS IT EXPLORES THE RED PLANET** NASA's most recent visitor to Mars, "Curiosity," touched down last August in Gale Crater. Curiosity is a rolling, robot geologist, carrying high resolution cameras and a suite of sophisticated analytical instruments which make up the Mars Science Laboratory. Blank is a member of the MSL Science Team, whose main goal is to discover clues in the rocks and soils on Mars that will indicate whether Mars once was capable of supporting life. Come hear Dr. Blank talk about Curiosity's first few months on Mars, the first discoveries, and the drive toward Mount Sharp, the rover's ultimate destination.

$10 Seniors	
Wednesday, March 13 **7:30 PM** **KEPLER'S BOOKS** **1010 El Camino Real** **Menlo Park, CA 94025** **(650) 324-4321**	**ELIZABETH KESSLER** **PICTURING THE COSMOS: HUBBLE SPACE TELESCOPE IMAGES AND THE ASTRONOMICAL SUBLIME** Elizabeth A. Kessler examines the Hubble's deep space images, highlighting the remarkable resemblance they bear to nineteenth-century paintings and photographs of the American West and their invocation of the visual language of the sublime. Drawing on art history and the history of science, as well as interviews with astronomers who work on the Hubble Heritage Project, Kessler traces the ways that the sublime, with its inherent tension between reason and imagination, not only forms the appearance of the images, but also operates on other levels. Strikingly illustrated with full-color images, this book reveals the scientific, aesthetic, and cultural significance of the Hubble pictures. "Picturing the Cosmos has helped me better understand what it is that fascinates me about the astronomical universe. Even though I've always loved to look directly at the night sky or at the wonders it holds with telescopes of many sizes and powers, reading here that 'astronomy is about the pleasure of looking' has revitalized this old habit and given it weight." --David H. DeVorkin, Senior Curator, Division of Space History, National Air and Space Museum Elizabeth Kessler teaches art history at Stanford.

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

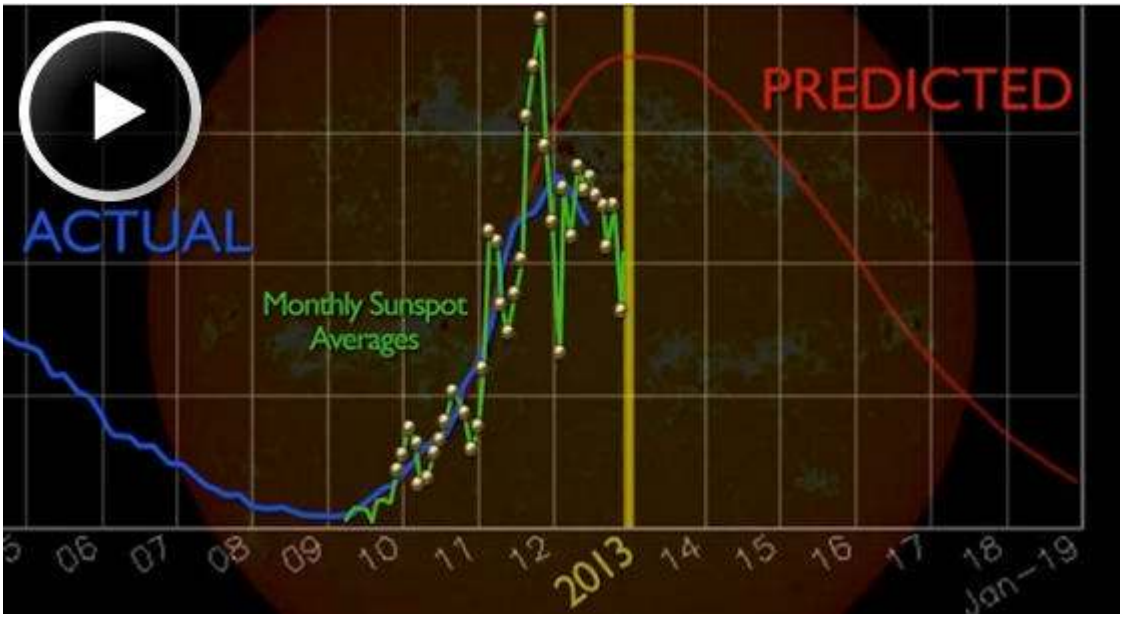
http://science.nasa.gov/science-news/

SOLAR CYCLE UPDATE: TWIN PEAKS?

March 1, 2013: *Something unexpected is happening on the sun. 2013 is supposed to be the year of Solar Max, the peak of the 11-year sunspot cycle. Yet 2013 has arrived and solar activity is relatively low. Sunspot numbers are well below their values in 2011, and strong solar flares have been infrequent for many months.*

The quiet has led some observers to wonder if forecasters missed the mark. Solar physicist Dean Pesnell of the Goddard Space Flight Center has a different explanation:

"This *is* solar maximum," he suggests. "But it looks different from what we expected because it is double peaked."



A new ScienceCast video explores the puzzling behavior of ongoing Solar Cycle 24. Play it

Conventional wisdom holds that solar activity swings back and forth like a simple pendulum. At one end of the cycle, there is a quiet time with few sunspots and flares. At the other end, Solar Max brings high sunspot numbers and solar

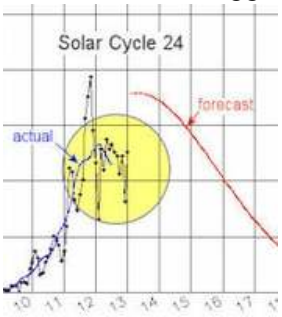
storms. It's a regular rhythm that repeats every 11 years.

Reality, however, is more complicated. Astronomers have been counting sunspots for centuries, and they have seen that the solar cycle is not perfectly regular. For one thing, the back-and-forth swing in sunspot counts can take anywhere from 10 to 13 years to complete; also, the amplitude of the cycle varies. Some solar maxima are very weak, others very strong.

Pesnell notes yet another complication: "The last two solar maxima, around 1989 and 2001, had not one but two peaks." Solar activity went up, dipped, then resumed, performing a mini-cycle that lasted about two years.

The same thing could be happening now. Sunspot counts jumped in 2011, dipped in 2012, and Pesnell expects them to rebound again in 2013: "I am comfortable in saying that another peak will happen in 2013 and possibly last into 2014," he predicts.

Another curiosity of the solar cycle is that the sun's hemispheres do not always peak at the same time. In the current cycle, the south has been lagging behind the north. The second peak, if it occurs, will likely feature the southern hemisphere playing catch-up, with a surge in activity south of the sun's equator.



Recent sunspot counts fall short of predictions. Credit: Dr. Tony Philips & NOAA/SWPC [full plot]

Pesnell is a leading member of the NOAA/NASA Solar Cycle Prediction Panel, a blue-ribbon group of solar physicists who assembled in 2006 and 2008 to forecast the next Solar Max. At the time, the sun was experiencing its deepest minimum in nearly a hundred years. Sunspot numbers were pegged near zero and x-ray flare activity flat-lined for months at a time. Recognizing that deep minima are often followed by weak maxima, and pulling together many other threads of predictive evidence, the panel issued this statement:

> *"The Solar Cycle 24 Prediction Panel has reached a consensus. The panel has decided that the next solar cycle (Cycle 24) will be below average in intensity, with a maximum sunspot number of 90. Given the date of solar minimum and the predicted maximum intensity, solar maximum is now expected to occur in May 2013. Note, this is not a unanimous decision, but a supermajority of the panel did agree."*

Given the tepid state of solar activity in Feb. 2013, a maximum in May now seems unlikely.

"We may be seeing what happens when you predict a single amplitude and the Sun responds with a double peak," comments Pesnell.

Incidentally, Pesnell notes a similarity between Solar Cycle 24, underway now, and Solar Cycle 14, which had a double-peak during the first decade of the 20th century. If the two cycles are in fact twins, "it would mean one peak in late 2013 and another in 2015."

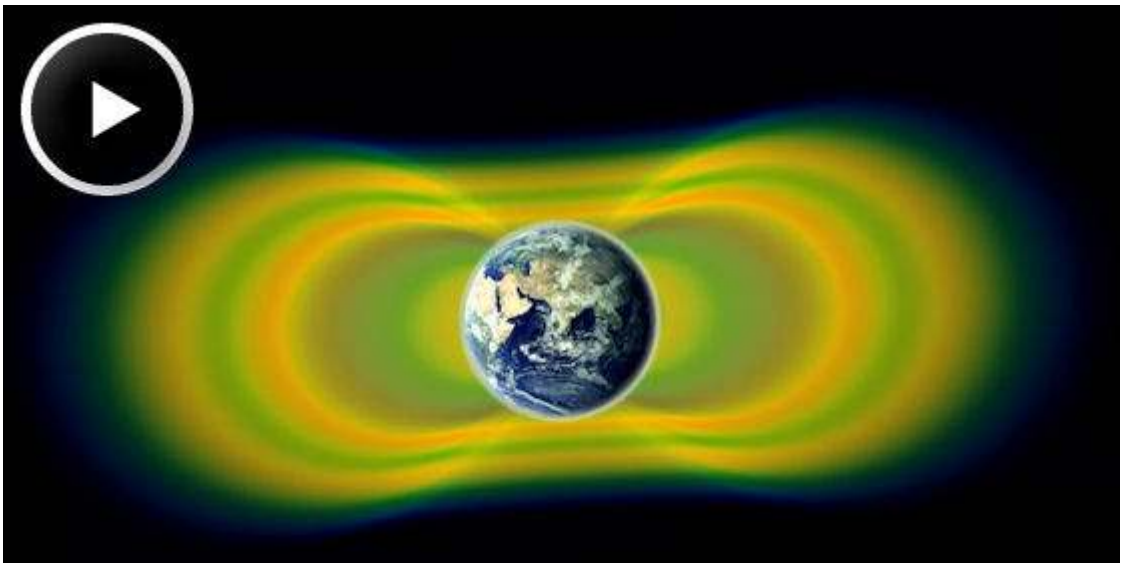
No one knows for sure what the sun will do next. It seems likely, though, that the end of 2013 could be a lot livelier than the beginning.

Author: Dr. Tony Phillips | Production editor: Dr. Tony Phillips | Credit: Science@NASA

VAN ALLEN PROBES DISCOVER A NEW RADIATION BELT

Feb. 28, 2013: Earth's radiation belts were one of the first discoveries of the Space Age. A new finding published in today's issue of Science shows that we still have much to learn about them. NASA's twin Van Allen Probes, launched just last August, have revealed a previously unknown third radiation belt around Earth.

"Even 55 years after their discovery, Earth's radiation belts still are capable of surprising us," said Nicky Fox, Van Allen Probes deputy project scientist at the Johns Hopkins University Applied Physics Laboratory in Laurel, Md. "We thought we knew the radiation belts, but we don't."



A video from the Goddard Space Flight Center recaps the discovery of the new radiation belt. Play it
Previous observations of the Van Allen belts dating back to the late 1950s have documented two distinct regions of trapped radiation surrounding our planet, known as the inner and outer radiation belts. Particle sensors aboard the twin Van Allen Probes quickly revealed to scientists the existence of a transient, third radiation belt. Scientists observed the third belt for four weeks before a powerful interplanetary shock wave from the sun annihilated it.
Each of the two Van Allen Probes carries an identical set of five instrument suites that allow scientists to gather data on the belts in unprecedented detail. Key data for this discovery came from the Relativistic Electron Proton Telescope (REPT) instrument, part of the probes' Energetic Particle, Composition, and Thermal Plasma Suite (ECT).

"This is the first time we have had such high-resolution instruments look at time, space and energy together in the outer belt," says Daniel Baker, lead author of the study and REPT instrument lead at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado in Boulder. "Previous observations of the outer radiation belt resolved it as a single blurry element. When we turned REPT on just two days after launch, we clearly saw the new belt and a [gap] between it and the outer belt."

Back in the 1950s when the radiation belts were discovered, they had little effect on ordinary people. Today the radiation belts are crucial to our high-tech society. Hundreds of satellites used for everything from weather prediction to GPS to television routinely skim the belts, subjecting themselves to energetic particles that can damage solar panels and short-circuit sensitive electronics. During geomagnetic storms when the belts are swollen by solar activity, whole fleets of satellites can be engulfed, imperiling the technological underpinnings of daily life on the planet below. The Van Allen Probes directly address these down-to-Earth problems

"The fantastic new capabilities and advances in technology in the Van Allen Probes allow scientists to see in unprecedented detail how the radiation belts are populated with charged particles, what causes them to change, and how they affect the upper reaches of Earth's atmosphere," says John Grunsfeld, NASA's associate administrator for science in Washington DC.

For more information about the Van Allen Probes, visit http://www.nasa.gov/vanallenprobes

Production editor: Dr. Tony Phillips | Credit: Science@NASA

More Information and Credits

Observations of the new belt were made by scientists from institutions including LASP; NASA's Goddard Space Flight Center in Greenbelt, Md.; Los Alamos National Laboratory in Los Alamos, N.M.; and the Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire in Durham.

The Van Allen Probes are the second mission in NASA's Living With a Star Program to explore aspects of the connected sun-Earth system that directly affect life and society. Goddard manages the program. The Applied Physics Laboratory built the spacecraft and manages the mission for NASA.

The Van Allen Probes were originally known as the Radiation Belt Storm Probes. They were later re-named after the discoverer of the belts, James Van Allen. A Sciencecast video introduces the mission

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/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/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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