

# ★ ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 57, No. 9 – September 2009

*Wednesday, September 16, 2009 – General Meeting*

Randall Museum . 199 Museum Way . San Francisco

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

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

**DR. ROBERT P. JOHNSON, UC SANTA CRUZ**

**Associate Director, Santa Cruz Institute for Particle Physics**



The Fermi Gamma-ray Space Telescope is a NASA mission in low-Earth orbit to observe high-energy gamma rays from the cosmos. The telescope far surpasses previous generations in its ability to detect and localize faint gamma-ray sources, as well as its ability to see 20% of the sky at any instant and scan the entire sky every few hours. Since its launch on 11 June 2008, Fermi has opened a new and exciting window on a variety of exotic astrophysical objects, including pulsars, black holes, active galactic nuclei, and gamma-ray bursts, and it will enable new research on such topics as the origin and circulation of cosmic rays and searches for hypothetical new phenomena such as annihilation of supersymmetric dark matter. In addition to presenting early science results, this talk includes an introduction to astronomy with gamma rays, descriptions of the instruments and their fabrication, and descriptions of the mission operations.

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*Dr. Robert Johnson  
is the Associate*

*Director of the Santa Cruz Institute for Particle Physics. His research interests include the Fermi Gamma-ray Space Telescope for which he led the conceptual design and prototyping efforts for the Large-Area Telescope silicon-strip tracker and managed the engineering and fabrication of the tracker subsystem, the primary system for detecting and tracking gamma rays, that is now functioning very well in orbit. He is presently engaged in analysis of Fermi science data including detection of radio-quiet gamma-ray pulsars and searches for dark-matter annihilation. For the BaBar experiment at the Stanford Linear Accelerator Center, Dr. Johnson led the conceptual design effort for the SVT readout electronics and contributed to the design, prototyping, and testing of the front-end readout ASIC. For the ALEPH experiment at CERN, he made contributions to the hardware and software of the Time-Projection Chamber. Studies of B physics, searches for anomalous charge, and strange baryon production.*



# IMPORTANT DATES

## SFAA GENERAL MEETINGS & LECTURES - SEPTEMBER 16 . OCTOBER 21 . NOVEMBER 18

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

## SFAA BOARD MEETINGS - SEPTEMBER 8 . OCTOBER 13 . NOVEMBER 10

*Second Tuesday of each month: 7:00 p.m. – 8:30 p.m.  
Randall Museum, 199 Museum Way (Near 14<sup>th</sup> Street and Roosevelt)*

## CITY STAR PARTIES - (NO SEPT.) . OCTOBER 24/6:30 P.M. . NOVEMBER 21/5:00 P.M.

### **TELESCOPE CLINIC ONE HOUR BEFORE SUNSET**

*Land's End (Point Lobos) - Map and directions:*

<http://www.sfaa-astronomy.org/clubarchive/directions-pointlobos.php>

NOTE: While City Star Parties WILL ALWAYS be held on Saturdays, some will be close to the last quarter phase of the moon; others will be close to first quarter. This is so we can work around dates for Mt. Tam public star parties as well as our Mt. Tam members-only events.

## MT TAM SPECIAL USE PERMIT STAR PARTIES - MEMBERS ONLY

### SEPTEMBER 26 (SFAA PICNIC) . OCTOBER 17 . NOVEMBER 14

#### **GATEKEEPERS NEEDED**

Special Use Permit observing nights on Mount Tamalpais are private and open *only* to SFAA members. Please arrive by sunset (times listed below). A permit is required for each car. We must vacate the mountain by 2:00 a.m. except on specially approved nights (such as Messier Marathon).

## MT TAM PUBLIC STAR PARTIES - SEPTEMBER 19/7:11 P.M. . OCTOBER 24/6:20 P.M.

#### **GATEKEEPERS: Sep – Ken+1 needed; Oct – Ken+1 needed**

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 go here: <http://www.sfaa-astronomy.org/starparties/>

## UPCOMING GENERAL MEETING LECTURES & EVENTS

NOVEMBER 18: This meeting will feature the movie BLAST!, about the Balloon-Borne, Large-Aperture, Submillimeter Telescope. <http://www.blastthemovie.com/about.html>

**DECEMBER 16: MEMBERS' NIGHT. ASTROPHOTOGRAPHY, ASTRONOMICAL ART AND LITERARY CONTESTS.**

Saturday



**September 26 2009 . 4:00 p.m.**  
**2008 SAN FRANCISCO AMATEUR ASTRONOMERS**  
**ANNUAL STAR-B-QUE**

**MT. TAMALPAIS STATE PARK**  
**BOOTJACK PICNIC AREA**

**THE 2009 SFAA ANNUAL STAR-B-QUE IN THE BOOTJACK  
PICNIC AREA IMMEDIATELY PRECEDES THE MEMBERS-ONLY  
SUP EVENT IN THE ROCK SPRINGS PARKING AREA.**

THE STAR-B-Q STARTS WITH A PICNIC AT BOOTJACK. SFAA SUPPLIES THE BASIC MAIN COURSE PROTEIN (HAMBURGERS, HOT DOGS) - YOU BRING WHATEVER YOU LIKE TO DRINK AND SHARE. IMMEDIATELY FOLLOWING, THE GROUP REPAIRS TO OUR ROCK SPRINGS PERMIT AREA BEHIND LOCKED GATES FOR A NIGHT OF MEMBERS-ONLY STARGAZING.

ON OR BEFORE SEPTEMBER 20, LET STEPHANIE, AT [VICEPRESIDENT@SFAA-ASTRONOMY.ORG](mailto:VICEPRESIDENT@SFAA-ASTRONOMY.ORG) KNOW IF YOU'RE COMING BY (WITH BOOTJACK IN THE SUBJECT LINE) -- AND PLEASE SHOW UP THIS TIME! WITH THAT SAID, IF YOU NEED TO CANCEL, LET ANNETTE KNOW FOR OBVIOUS REASONS, LIKE HAVING SIX MONTHS' WORTH OF HOT DOG BUNS IN THE FREEZER! THANKS





PLEASE CHECK THE WEBSITE AT [HTTP://WWW.SFAA-ASTRONOMY.ORG/CALENDAR](http://www.sfaa-astrology.org/calendar)

BEFORE THE EVENT AND MONITOR YOUR E-MAIL FOR CONFIRMATION OF DATE,  
TIME AND LOCATION OR FOR LAST MINUTE CHANGES.





### September 2009 Almanac for San Francisco (Pacific Daylight Time)




(Source: US Naval Observatory)

#### Sun and Moon Data:

Date	Astronomical Twilight Begins	Sunrise	Sunset	Astronomical Twilight Ends	Moon	Moonrise	Moonset
5 Sep	5:13 am	6:44 am	7:32 pm	9:03 pm		7:50 pm	7:46 am
12 Sep	5:20 am	6:49 am	7:22 pm	8:51 pm		0:45 am 13 Sep	3:14 pm
19 Sep	5:27 am	6:55 am	7:11 pm	8:39 pm		8:02 am	7:27 pm
26 Sep	5:34 am	7:01 am	7:00 pm	8:27 pm		3:01 pm	0:38 am 27 Sep

#### Planetary Data:

	Mercury		Venus		Mars		Jupiter	
								
	Virgo 1-23/Leo 24-30		Cancer 1-10 Leo 11-30		Gemini		Capricornus	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set
5 Sep	8:42 am	8:09 pm	4:08 am	6:08 pm	1:18 am	4:02 pm	6:26 pm	4:51 am
12 Sep	8:08 am	7:36 pm	4:22 am	6:06 pm	1:10 am	3:52 pm	5:56 pm	4:20 am
19 Sep	7:09 am	6:58 pm	4:37 am	6:03 pm	1:01 am	3:42 pm	5:27 pm	3:50 am
26 Sep	6:09 am	6:26 pm	4:52 am	5:59 pm	0:53 am	3:30 pm	4:58 pm	3:20 am

	Saturn		Uranus		Neptune	
						
	Virgo		Pisces		Capricornus	
Date	Rise	Set	Rise	Set	Rise	Set
5 Sep	7:33 am	8:04 pm	7:57 pm	7:48 am	6:37 pm	5:18 am
12 Sep	7:10 am	7:39 pm	7:29 pm	7:19 am	6:09 pm	4:50 am
19 Sep	6:47 am	7:13 pm	7:01 pm	6:51 am	5:41 pm	4:22 am
26 Sep	6:23 am	6:48 pm	6:32 pm	6:22 am	5:13 pm	3:53 am

#### September Phenomena:






- 16 September, 1:00 am: Moon at perigee, 226,211 miles (364,052 km)
- 17 September, 2:00 am: Uranus at opposition
- 22 September, 2:19 pm: Autumnal equinox
- 27 September, 9:00 pm: Moon at apogee, 251,302 miles (404,432 km)





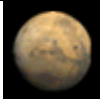

## October 2009 Almanac for San Francisco (Pacific Daylight Time)



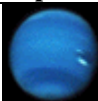
(Source: US Naval Observatory)

### Sun and Moon Data:

Date	Astronomical Twilight Begins	Sunrise	Sunset	Astronomical Twilight Ends	Moon	Moonrise	Moonset
3 Oct	5:40 am	7:07 am	6:49 pm	8:16 pm		6:18 pm	6:36 am
10 Oct	5:47 am	7:14 am	6:39 pm	8:06 pm		23:47 pm	2:02 pm
17 Oct	5:53 am	7:20 am	6:29 pm	7:56 pm		6:51 am	5:55 pm
24 Oct	5:59 am	7:27 am	6:20 pm	7:48 pm		2:08 pm	0:25 pm 25 Oct
31 Oct	6:06 am	7:34 am	6:12 pm	7:41 pm		4:46 pm	5:24 am

### Planetary Data:

	Mercury		Venus		Mars		Jupiter	
								
	Leo 1-3/Virgo 4-31		Leo 1-9/Virgo 10-31		Gem 1-12/Can 13-31		Capricornus	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set
3 Oct	5:42 am	6:09 pm	5:06 am	5:54 pm	0:44 am	3:17 pm	4:30 pm	2:51 am
10 Oct	5:50 am	6:05 pm	5:21 am	5:48 pm	0:34 am	3:04 pm	4:02 pm	2:22 am
17 Oct	6:17 am	6:05 pm	5:36 am	5:42 pm	0:24 am	2:49 pm	3:34 pm	1:55 pm
24 Oct	6:48 am	6:05 pm	5:51 am	5:36 pm	0:13 am	2:33 pm	3:07 pm	1:28 am
31 Oct	7:20 am	6:06 pm	6:06 pm	5:30 pm	0:01 am	2:17 pm	2:40 pm	1:03 am

	Saturn		Uranus		Neptune	
						
	Virgo		Pisces		Capricornus	
Date	Rise	Set	Rise	Set	Rise	Set
3 Oct	6:00 am	6:23 pm	6:04 pm	5:53 am	4:46 pm	3:25 am
10 Oct	5:37 am	5:57 pm	5:56 pm	5:24 am	4:18 pm	2:57 am
17 Oct	5:13 am	5:32 pm	5:08 pm	4:55 am	3:50 pm	2:29 am
24 Oct	4:49 am	5:06 pm	4:40 pm	4:27 am	3:22 pm	2:01 am
31 Oct	4:26 am	4:41 pm	4:12 pm	3:58 am	2:55 pm	1:34 am

### October Phenomena:

- 5 October, 7:00 pm: Mercury at greatest elongation, 17.9° west of Sun
- 11 October, 0:00 am: Mercury at greatest illuminated extent
- 13 October, 5:00 am: Moon at perigee, 229,327 miles (369,066 km)
- 21 October, 3:00 am: Orionids meteor shower peak





*Opportunity to Help and Get Free Admission*

**VOLUNTEERS NEEDED TO HELP  
WITH ASTRONOMICAL SOCIETY OF THE PACIFIC  
MEETING IN SEPTEMBER**

**Near SF Airport**

The 2009 Meeting of the Astronomical Society of the Pacific will be held Sat. Sept. 12 through Wed. Sept. 16, at the Westin Hotel in Millbrae, near the SF Airport. The topic will be education and outreach for astronomy.

The Society needs at least six volunteers for each day of the conference. If you work a day as a volunteer, you get registration for that day plus another day at the conference free. Volunteers assist with registration, message boards, audio-visual needs, checking badges, and other meeting-related tasks.

To get on the volunteer list, please email Cindy Hart with your name, contact information, and days of availability, at: <[chart@harteventmarketing.com](mailto:chart@harteventmarketing.com)>

For more information about the meeting, see the web site:  
<http://www.astrosociety.org/events/meeting.html>





**Saturday, September 12, 2009**  
**Westin Hotel at San Francisco Airport,**  
**Millbrae**

Astronomy enthusiasts of all ages are invited to join a gathering of local professional and amateur astronomers for an exciting day of:

- [Astronomy Lectures](#) from NASA and SETI Institute astronomers, astrophotographers, filmmakers, science historians, and more
- [Brown Bag Lunch Workshops](#) for amateur astronomers and the technically-inclined public
- [Daytime Sun Viewing](#) through safe solar telescopes
- [Astronomy Conversation](#) with representatives from local astronomy clubs and dealers
- [A Night of Stargazing](#) with expert interpretation, through an impressive array of telescopes.

There will also be an [Astronomy Raffle](#) offering dozens of cool prizes!

[Registration is now open!](#) Please check the [Register](#) page for more details.

*Sponsors*

This gathering is sponsored by the [Astronomical Association of Northern California](#) (AANC), in collaboration with the [Astronomical Society of the Pacific](#) (ASP). It is an opening event of the ASP Annual Meeting, September 12-16.

Download the [press release](#) (PDF, view with [Adobe Reader](#))





**Science Education and Outreach:  
Forging a Path to the Future  
September 12-16, 2009  
Westin SFO, Millbrae, California**

[Registration is now open](#) for the 2009 ASP meeting to be held in the San Francisco Bay Area at the Westin San Francisco Airport Hotel, 1 Old Bayshore Highway in Millbrae, California.

The ASP's annual meeting will be held in Northern California where the ASP was founded 120 years ago. The meeting will be located at the Westin SFO in Millbrae, California. In addition to the EPO symposia, there will be additional weekend hands-on workshops designed specifically for educators, as well as special sessions targeted to non-astronomy science practitioners.

<a href="#">How to Present</a>	<a href="#">Registration</a>	<a href="#">Proceedings</a>	<a href="#">Meeting Schedule</a>
<a href="#">Exhibitors</a>	<a href="#">Lodging</a>	<a href="#">Committee</a>	<a href="#">Co-Sponsors</a>

**September 12-16, 2009  
Westin SFO, Millbrae, California**

Save the date for the Astronomical Society of the Pacific's 120th Anniversary celebration!

**Registration is now open** for the 2009 ASP meeting to be held in the San Francisco Bay Area at the Westin San Francisco Airport Hotel, 1 Old Bayshore Highway in Millbrae, California. The theme of the 2009 gathering will be "Science Education and Outreach: Forging a Path to the Future."

The meeting proper begins on Sunday evening, September 13, with the annual members' meeting and the opening reception. Meeting sessions begin on Monday, September 14, with the annual awards banquet held on Tuesday evening, September 15. The meeting will conclude the early evening of Wednesday, September 16.

In addition, the meeting will be preceded by hands-on workshops scheduled on Saturday and Sunday, September 12-13, for formal and informal educators, with a separate daily workshop registration fee from the meeting registration fee -- watch for specific information and an announcement of scholarships for workshop attendees shortly. (If you would like to propose a weekend workshop, contact the ASP separately at [asilva {at} astrosociety.org](mailto:asilva@astrosociety.org).) Additional special events for the weekend are in the offing -- watch for announcements shortly.

Click on the links to find information and details on [hotel reservations](#), [meeting registration](#), [exhibiting](#), submitting [poster and presentation abstracts](#), and submitting [proceedings write-ups](#). Be sure to [sign up](#) to receive more information and meeting alerts, and check back frequently as information is added.

Please join us in September in the San Francisco Bay Area, during the International Year of Astronomy, the International Year of Science, and the 120th anniversary of the founding of the Astronomical Society of the Pacific, as we look forward and consider how, working together, we can advance a future of science literacy, enlightenment and achievement!

[Sign up to be notified](#) as additional meeting program events are announced.



**Sunday . September 27, 2009 . 2:00  
p.m.  
McBean Theater**

**TO THE MOON: A LOOK AT NASA'S  
LUNAR IMPACT MISSION AND THE  
HISTORY OF MOON  
EXPLORATION  
A TALK WITH SPACE HISTORIAN  
ANDREW CHAIKIN**

Take a trip to our nearest neighbor in space with renowned science journalist and space historian Andrew Chaikin. Coinciding with the 40th anniversary of the first moon landing, Chaikin's talk will introduce the past, present, and future of lunar exploration and include a visual tour of the moon's surface—from Apollo landing sites to the planned Lunar Impact point. Relive the achievements of Apollo lunar astronauts and learn about the ambitious LCROSS (Lunar Crater Observation and Sensing Satellite) mission, which will send a rocket crashing into the moon's permanently shadowed regions to kick up huge plumes of debris in the hopes of uncovering deposits of ice. In addition, Exploratorium physicists will give an entertaining and interactive overview of moon science. This event is included in the price of admission to the Exploratorium.

Go to: <http://press.exploratorium.edu/moon-webcast-september-2009/>

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**Friday . October 9, 2009 . 1:00 p.m.**

**Phyllis Wattis Webcast Studio**

(NOTE: Date subject to change. Please check back as the date gets closer at [www.explo.tv](http://www.explo.tv).)

**WEBCAST: SHOOT THE MOON! A MOON-SHAKING, CRASH-LANDING SEARCH  
FOR WATER**

Is water ice present or absent in a crater near the moon's polar region? Join the Exploratorium for a live webcast of the LCROSS (Lunar Crater Observing and Sensing Satellite) mission. LCROSS is a NASA mission investigating the presence of water ice. The Exploratorium Web team will cover the mission, the explosion on the moon, and the plume of matter that will shoot 40 feet into the air from the moon's surface, visible from Earth! Watch live online at: [www.explo.tv](http://www.explo.tv) or at the Exploratorium.

Go to: <http://press.exploratorium.edu/shoot-the-moon-october-2009/>



## Strategy & Astronomer Observation Campaign



### Observe the LCROSS impacts!

**Date & Time:** Projected lunar impact is on October 9, 2009 at 11:30 UT (7:30 a.m. EDT, 4:30 a.m. PDT), +/- 30 minutes.

The impact time will be refined as the mission progresses. Two weeks prior to impact, the impact time will be known to within a second.

Check back on this webpage for the most up-to-date timing information.

**Location:** LCROSS will impact at the south pole of the Moon. The final site selection will be made 30 days prior to impact.

Check back on this webpage for the most up-to-date impact location information:

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On Monday, June 29, 05:23 UT LCROSS flyby captured by Paul Mortfield, Backyard Astronomer Sierra Remote Observatories. [See animation of LCROSS in flight.](#)

26 June 2009:

From Dan Andrews: [The latest shots that show the LCROSS mission continuing on its journey.](#)

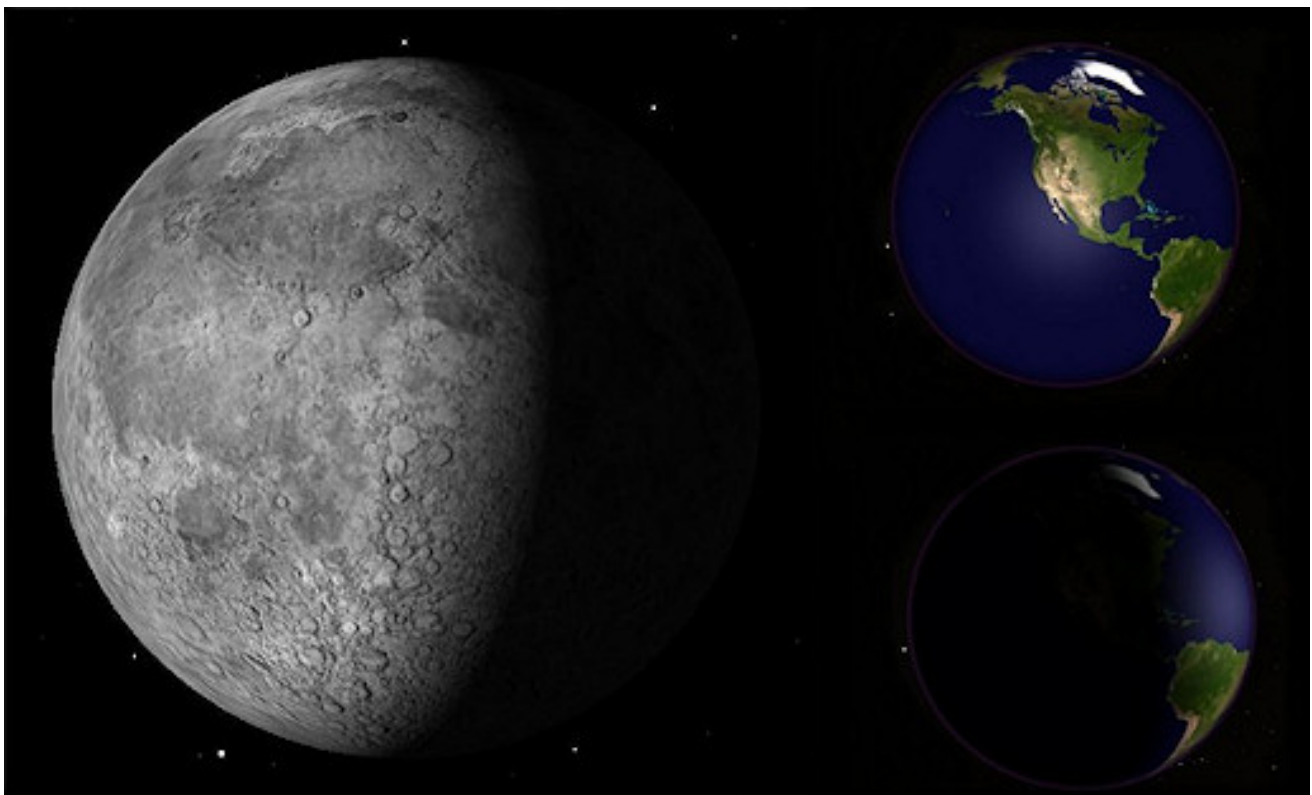
June 23: [LCROSS executed a swingby of the Moon.](#) [See Recap Video and Additional Images!](#)

There are a variety of ground-based and orbital observatories that can observe the dust and water plumes caused by the LCROSS impacts. The LCROSS team encourages observations of the impacts to further our understanding of impact physics, lunar resources (water), and lunar geology and origins (polar soil and regolith), and thereby support scientific and exploration objectives. The LCROSS Project is committed to working with the observational scientists to provide mission information that is critical to the planning and proposal of observations. In this way the LCROSS Project aims to develop a coordinated observation campaign utilizing ground-based and space-based observational assets.

With the impacts of the Centaur and Shepherding Spacecraft occurring within a permanently-shadowed crater near one of the lunar poles, the impacts themselves may be obscured by the crater rim as seen from Earth and Earth orbit. However, ground-based and orbital observatories will observe the dust and water vapor plume caused by the two impacts into the lunar surface. The impact ejecta cloud should be in view of Earth assets just several seconds after impact and will peak in brightness around 30-100 seconds after impact.

You may download the [Astronomer Justification](#) document. This text describes information relevant to the LCROSS mission. Astronomers may use this sample text in support of writing observing proposals to observe the LCROSS impacts and thereby participate in the LCROSS mission. Specific sections of this document include: Introduction, The LCROSS Mission, Mission Relevance and Impact to State of Knowledge, LCROSS Science Goals, LCROSS Shepherding Spacecraft (S/S-C) Measurement Goals, LCROSS Shepherding Spacecraft Payload, Impact Characterization, Lunar Polar Hydrogen - What we Know and Don't Know, The History of Lunar Volatiles: Sources and Sinks, Additional Sample Text: Experimental Design, Description of Experiment.

For additional information regarding the LCROSS Observation Campaign, please contact Jennifer Heldmann, Observation Campaign Coordinator ([Jennifer.Heldmann@nasa.gov](mailto:Jennifer.Heldmann@nasa.gov)).



Earth and Moon lighting conditions at the expected time of impact (October 9, 2009, 11:30 UTC). Click image for more detail.

## SEPTEMBER-OCTOBER 2009 BAY AREA ASTRONOMY EVENTS

**Saturday . September 12 . 9:00am-5pm and 6:30pm-9:30pm**

**WESTIN HOTEL, 1 OLD BAYSHORE HIGHWAY, MILLBRAE, CA**

**THE ASTRONOMICAL ASSOCIATION OF NORTHERN CALIFORNIA ANNUAL MEETING**

**2009: YEAR OF ASTRONOMY - AN ASTRONOMY EVENT FOR ALL AGES!**

**All ages welcome; children must be accompanied by an adult**

**Cost: \$39.95 per adult, children free**

**More Info: <http://www.aancstars2009.org>**

Astronomy enthusiasts of all ages are invited to join a gathering of local professional and amateur astronomers for an exciting day of astronomy lectures, demonstrations and family activities, followed by a night of stargazing through an impressive array of telescopes. This gathering is sponsored by the Astronomical Association of Northern California (AANC), in collaboration with the Astronomical Society of the Pacific (ASP). It is an opening event of the ASP Annual Meeting, September 12-16.

Speakers confirmed for attendance are:

- Dr. Peter Jenniskens, senior research scientist at SETI Institute's Carl Sagan Center for the Study of Life in the Universe and at NASA Ames Research, will describe his expedition to hunt for meteorite fragments in Sudan and their significance for Solar System research.
- Brian Day, NASA Ames Educator Resource Center, will update us on the NASA LRO and LCROSS mission to look for signs of water ice on the Moon's surface. Brian will also sponsor a brown-bag lunch workshop for amateur astronomers, focusing on observational and data submission protocols for the LRO/LCROSS mission.
- John Dillon, Randall Museum San Francisco, will present his illustrated talk The Autopsy of Heaven: Galileo, Telescopes and the Beginning of Modern Science.
- Christopher Go, astrophotographer, will present his talk Adventures of an Amateur Planetary Imager and discuss Solar System imaging with the Hubble Space Telescope (live video/audio feed)
- Kris Koenig, video producer and CEO of Interstellar Studios, discusses the making of his recent PBS documentary in his talk 400 Years of the Telescope: An International Year of Astronomy Celebration.
- Avani Bedagkar, high school student and astronomy enthusiast, will discuss the elementary school astronomy program she conceived and implemented, and how you can start a similar program in your own school.

Other daytime activities include sun-viewing through safe solar telescopes, Uncle Al's star wheels for kids, and opportunities to meet and speak with representatives from local astronomy clubs and dealers. There will also be an astronomy raffle offering dozens of prizes from local astronomy vendors.

As a special bonus, registrants will receive free admission to the following ASP-sponsored events on Sunday, September 13:

- Dr. Frank Drake, Director of SETI Institute's Carl Sagan Center for the Study of Life in the Universe, Reflections on the Drake Equation.
- Dr. Jon Jenkins, Co-Investigator and Data Analysis Lead for the NASA Kepler Mission, Finding a Home for ET: The Kepler Mission .
- Dr. Seth Shostak, Senior Astronomer at the SETI Institute, The Real ET.



• Dr. Margaret Race, Principal Investigator at SETI Institute's Carl Sagan Center for the Study of Life in the Universe, Discovering ET: What's Next?

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**Saturday . September 12 . 9:00am-5pm and 6:30pm-9:30pm**

**WESTIN HOTEL, 1 OLD BAYSHORE HIGHWAY, MILLBRAE, CA**

Part of the 120th Anniversary Meeting of **THE ASTRONOMICAL ASSOCIATION OF NORTHERN CALIFORNIA**

**A WEEKEND OF ASTRONOMY WORKSHOPS FOR EDUCATORS**

**HANDS-ON WORKSHOPS ON TEACHING ASTRONOMY AND RELATED SCIENCES (IN SCHOOLS, COLLEGES, AND MUSEUMS):**

\* One unit of Academic Credit available through San Francisco State U. for K-12 Teachers.

Join us for two days of information, classroom activities, and teaching resources, as we explore new ideas and techniques for teaching astronomy, space science, and earth science during the 2009 International Year of Astronomy and the Year of Science.

Participants have their choice of exciting workshops (which feature classroom-ready hands-on science activities). Topics include: the Moon and upcoming lunar science missions, the Sun and its relationship with our own planet, astrobiology and the search for life, understanding the universe through Hubble and other NASA missions, and following in the footsteps of Galileo through classroom activities and mastering use of a small telescope (free to participants). A workshop for college astronomy instructors will provide techniques for engaging students effectively, and workshops focusing on informal science education provide experience with interactive activities and storytelling as a means of communicating science. The Astronomical Association of Northern California will be holding a meeting for amateur astronomers during this same weekend.

Sunday afternoon, all workshop participants will join to hear a series of non-technical talks on the search for extra-terrestrial life, with the father of SETI, Dr. Frank Drake, award-winning science popularizer Seth Shostak, planetary protection scientist Margaret Race, and Douglas Caldwell, instrument scientist for the Kepler Mission, which is looking for Earths around other stars.

Cost: Only \$39.95 per day (\$78.90 for the weekend).

1 semester unit of academic credit: \$100 (optional) for those who attend both days and write a short paper.

For more information (including specific workshop descriptions and instructors) and to register, go to our web site: <http://www.astrosociety.org/events/2009mtg/workshops.html> (If you're just planning to attend the weekend workshops and not the entire meeting, use the "Weekend Workshops Only" registration form.)

For additional information, contact us at [2009meeting@astrosociety.org](mailto:2009meeting@astrosociety.org).

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**Friday . September 11 . 7:30 p.m.**

**PENINSULA ASTRONOMICAL SOCIETY MEETING, FOOTHILL COMMUNITY COLLEGE**

**12345 MOODY RD., LOS ALTOS HILLS - Room 8402, Bldg. 8400]**

**(Next to Parking Lot#8 near the entrance to the College)**

**EXPLORING THE INVISIBLE UNIVERSE: THE PAST AND FUTURE OF RADIO ASTRONOMY**

**SPEAKER: PETER WILLIAMS, UNIVERSITY OF CALIFORNIA, BERKELEY**

Visible-light astronomy has been practiced for millennia. Astronomical observations of radio waves are, in comparison, still a novelty. Over its short lifespan, however, the field of radio astronomy has still managed to produce some of the most impressive results of modern science, including the discovery of extrasolar molecules and the detection of

cosmic microwave background radiation, the key piece of evidence for the Big Bang. In this talk I'll discuss the basics of radio astronomy, what can be seen in the radio sky, and the different ways in which astronomy is done at optical and radio frequencies. I'll also talk about what we can expect from radio astronomy in the near and not-so-near future: an exciting convergence of recent technological advances promises do as much for radio astronomy as the invention of the CCD has done for visible-light astronomy. Special focus will be put on the Allen Telescope Array, a new telescope jointly operated by UC Berkeley and the SETI Institute, which exemplifies some of these advances.

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**Friday . September 11-12 7:30-10:30 p.m.**

**CHABOT SPACE AND SCIENCE CENTER, OAKLAND**

**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

**Friday . September 11 & 12 . 6:00 p.m.**

**DINNER, A MOVIE, AND THE UNIVERSE**

Join us for Chabot's unique evening social rendezvous. Start your night off with dinner and drinks, then cozy up in the planetarium as you're whisked to the edge of the universe and cap off the evening with telescope viewing featuring breathtaking views of the cosmos. Dinner: Buy advance tickets to ensure your dinner reservation. Purchase dinner separately at the cafe (\$15).

**ADVANCED TICKETS**

A Movie and the Universe: Admission to Chabot includes all access to our interactive exhibitions, a film in the MegaDome theater AND a show in the Digital Planetarium. Purchase your advanced tickets online or call the Box Office at (510) 336-7373.

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**FOOTHILL OBSERVATORY, FOOTHILL COLLEGE, LOS ALTOS HILLS**

**Friday . September 11 . 9:00-11:00 p.m.**

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 new 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. The choice of targets for any evening's viewing depends on the season and what objects are currently in the sky. On clear, dark, moonless nights, the telescopes give visitors views into the deeper reaches of space. Star clusters, nebulae, and distant galaxies provide dramatic demonstrations of the vastness of the cosmos.

**Saturday . September 12 . 10:00 a.m. -12:00 p.m. – IF IT IS CLEAR**

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.

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 \$2.00.

Come to Foothill Observatory and join us in the exploration of our Universe! 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 \$2.00.

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**Saturday . September 12 . 7:00 p.m. - Doors Open 6:30 p.m.**

**LICK OBSERVATORY**

**MUSIC OF THE SPHERES CONCERTS AT LICK OBSERVATORY**

For information on available tickets, check out: <http://www.ucolick.org/public/music.html>

**DANIEL ROEST & ALEX DE GRASSI**

**SPEAKER: GEOFF MARCY , UCB**

**TALK: "DETECTING OTHER EARTHS"**

Great Guitars! 2009. Fingerstyle icon Alex de Grassi joins classical guitarist Daniel Roest . De Grassi's fame spans the globe. His playing interweaves melody, counter-melody, bass, harmony, rhythm, and cross-rhythms, creating a canvas of sound rarely heard in a solo guitar performance. He has released sixteen albums since "Turning: Turning Back" helped launch Windham Hill's success in 1978. His tenth recording, "The Water Garden," garnered both Grammy and Indie Award nominations. He is the subject of a PBS concert/interview television show, "Alex de Grassi: The Artist's Profile." Daniel Roest's concerts have been a favorite of Lick audiences for many years.

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**Monday . September 14 . 7:30 p.m. - 8:30 p.m.**

**BENJAMIN DEAN LECTURE - THE VOYAGER JOURNEY TO INTERSTELLAR SPACE**

**ED STONE, CALIFORNIA INSTITUTE OF TECHNOLOGY AND VOYAGER PROJECT SCIENTIST**

Launched in 1977 to explore Jupiter, Saturn, Uranus, and Neptune, the two Voyager spacecraft revealed the remarkable diversity of these giant planetary systems. Now eight and ten billion miles from Earth, the Voyagers are exploring the outermost layer of the bubble created by Sun as they continue their journey to interstellar space that lies beyond.

**Reservations:** Ticket prices: Adults \$12, Seniors \$10, Academy members \$6. Seating is limited. To purchase tickets in advance, go [online](#) or call 800-794-7576.

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**Wednesday . September 16 . 12:00 Noon**

**SETI INSTITUTE COLLOQUIUM SERIES**

SETI Institute, Arecibo Room, 515 N. Whisman Road, Mountain View

**PAUL KALAS, SETI INSTITUTE AND UNIVERSITY OF CALIFORNIA, BERKELEY**

**HST IMAGING OF FOMALHAUT: DIRECT DETECTION OF AN EXOSOLAR PLANET AND KUIPER BELT AROUND A NEARBY STAR**

Advances in high-contrast imaging have produced a new sample of spatially resolved debris disks with morphologies attributed to the dynamical effects of planets. I will briefly review several cases, including our recent non-detection of Beta Pictoris b using Keck adaptive optics at L-prime. Then I will focus on the case for a planetary system around the nearby A star Fomalhaut. Optical coronagraphic observations using the Advanced Camera for Surveys aboard HST shows a vast dusty debris belt offset from the star and cleanly sculpted at its inside border. Follow-up HST images have further revealed a co-moving point source with apparent orbital motion 18 AU interior to the dust belt. I will discuss both the observational and theoretical evidence that the point source is a planet with < 3 Jupiter masses, making Fomalhaut b the lowest mass planet candidate detected via direct imaging. I will give alternate explanations and discuss future plans for the detailed mapping of Fomalhaut's planetary system.

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**Tuesday . September 29 . 7:00 p.m.**

**ORINDA LIBRARY, 26 Orinda Way, Orinda, CA**

**A FIRESIDE CHAT WITH GEORGE HAMMOND PREVIEWING *COPERNICUS, GALILEO AND KEPLER: REDEFINING OUR PLACE IN THE UNIVERSE***

Join author/performer George Hammond for a Fireside Chat previewing the upcoming *\*Copernicus, Galileo, and Kepler: Redefining Our Place in the Universe*, Humanities West's two-day program of lectures, discussions, music and dance presentations celebrating the International Year of Astronomy in honor of the 400th anniversary of modern astronomy and Galileo's first use of the telescope in 1609.

*\*Copernicus, Galileo, and Kepler: Redefining Our Place in the Universe* takes place on Friday, October 2, from 8 pm to 10:15 pm and Saturday, October 3, from 10 am to 4 pm, at Herbst Theatre, 401 Van Ness Avenue in San Francisco.

**Cost: FREE Info: [www.humanitieswest.org](http://www.humanitieswest.org)**

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Friday & Saturday, October 2 & 3, 2009

HERBST THEATRE, SAN FRANCISCO

HUMANITIES WEST PRESENTS *Copernicus, Galileo, and Kepler: Redefining our Place in the Universe*

Humanities West, a Bay Area non-profit, opens its 25th Anniversary Season with *Copernicus, Galileo, and Kepler: Redefining our Place in the Universe*, a two-day program of lectures, discussions, music and dance presentations celebrating the International Year of Astronomy in honor of the 400th anniversary of Galileo's first use of the telescope in 1609. The program takes place on Friday, October 2, from 8 pm to 10:15 pm and Saturday, October 3, from 10 am to 4 pm, at Herbst Theatre, 401 Van Ness Avenue in San Francisco.

*Copernicus, Galileo, and Kepler: Redefining our Place in the Universe* brings together a panel of world-class scholars and astronomers, along with an acclaimed San Francisco dance troupe to celebrate the International Year of Astronomy. The presentations explore how these three 16th and 17th century visionaries, with courage, persistence, and dedication to new methods of scientific observation and measurement, changed how we look at our place in the universe. Instead of the long-held belief that man and his earthly home were at the center of the universe, the findings of Copernicus, Galileo, and Kepler provided a new understanding of our solar system and led to today's astronomical shifts in understanding an expanding universe that may contain millions of life-supporting planets in our galaxy alone.

**Alexander Zwissler** (Executive Director, Chabot Space & Science Center) will moderate the program on Friday night. **Roger Hahn** (History, UC Berkeley) will provide the keynote address on *The Copernican Revolution* explaining the bizarre confusion in 16th century Christian Europe caused by Copernicus' assertions that man may not be at the center of the universe. **Kip Cranna** (SF Opera) follows with a discussion on why stargazers, from Pythagoras to Kepler, believed that mathematical laws producing musical harmony on earth also determine the movements of heavenly bodies. The evening ends with a performance of *The Star Dances*, by **Kathryn Roszak's Danse Lumiere**, introduced by **Bethany Cobb** (NSF Fellow, UC Berkeley). **Hally Bellah-Guther, Rita Dantas Scott, Damon Mahoney, and Lissa Resnick** perform Roszak's original choreography inspired by Kepler's "Music of the Spheres" and by the latest star/planet mapping by astronomers at UC Berkeley. Music includes Holst's "The Planets" for two pianos.

On Saturday **Paula Findlen** (History, Stanford University) lectures on *Galileo and the Telescope*, revealing how, in 1609, this new instrument changed how we look at the heavens and made Galileo one of the most important and ultimately controversial astronomers of his time. **Geoff Marcy** (Astronomy, UC Berkeley) will take a look at our fascination with finding life in other parts of the universe and our search for other earth-like planets. A performance by **George Hammond** (San Francisco attorney and author) follows. Hammond will impersonate Copernicus, wryly commenting on the "hot ideas" of 21st Century cosmology. **Alex Filippenko** (Astronomy, UC Berkeley) completes the program with a presentation on how the observations of very distant exploding stars (supernovae) show that the expansion of the Universe is now speeding up, rather than slowing down as would be expected due to gravity. Filippenko also discusses the nature of "dark energy," considered to be the most important unsolved problem in physics that may provide clues to a unified quantum theory of gravity.

For a complete program schedule and additional information about the presenters please visit [www.humanitieswest.org](http://www.humanitieswest.org)

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*Founded in 1983, Humanities West, a Bay Area non-profit, is dedicated to "exploring history to celebrate the mind and the arts." Designed to entertain and educate diverse audiences, these programs offer a lively combination of wide-ranging lectures and performances that encompass the fine and performing arts, social history, music, politics, and philosophy of the arts.*

*This program is supported in part by Grants for the Arts/ San Francisco Hotel Tax Fund; Bank of the West; Chabot Space & Science Center; Stanford Humanities Center, Stanford University; Institute of European Studies, UC Berkeley; Office of Resources for International Area Studies (ORIAS), UC Berkeley; Lawrence Hall of Science; Goethe-Institute; Mechanics' Institute; Fromm Institute for Lifelong Learning; Symposium Great Books Institute; Humanities Department, San Francisco State University; Leonardo daVinci Society; Osher Lifelong Learning Institute; Theatre Bay Area; and Townsend Humanities Center, UC Berkeley.*

Tickets for *Copernicus, Galileo, and Kepler: Redefining our Place in the Universe* are priced as follows: Single tickets for the Friday program are \$45 orchestra/grand tier and \$30 balcony; single tickets for the Saturday program are \$65 orchestra/grand tier and \$40 balcony, single tickets for both days are \$100 orchestra/grand tier and \$55 balcony. Special

Student/Teacher tickets are available at \$20 balcony for single day admission. Season tickets are also available and offer a significant savings. Season tickets for all three two-day programs in the 2009-10 Season, including *Alexander/Alexandria* (Feb. 5-6) and *The Florence of the Medici* (April 30-May 1), are \$220 orchestra/grand tier and \$140 balcony. A Fridays-only series is \$115 orchestra/grand tier and \$75 balcony, and a Saturdays-only series is \$175 orchestra/grand tier and \$105 balcony. Order direct from City Box Office at 415/392-4400 or [www.cityboxoffice.com](http://www.cityboxoffice.com). For more information call Humanities West at 415/391-9700 or check the website at: [www.humanitieswest.org](http://www.humanitieswest.org).

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**Thursday, October 1, 2009 . 5:30pm Reception . 6pm Lecture**

**COMMONWEALTH CLUB OF SAN FRANCISCO, Gold Room, 595 MARKET STREET, SAN FRANCISCO, CA**

**Humanities West & The Commonwealth Club of San Francisco Present**

***IN GALILEO'S FOOTSTEPS: EDWIN HUBBLE AND THE RESHAPING OF OUR UNIVERSE WITH ASTRONOMER BETHANY COBB (UC BERKELEY)***

Join astronomer Bethany Cobb (UC Berkeley) for a lecture and discussion organized by the Humanities Member-Led Forum at the Commonwealth Club on the astronomical work of Edwin Hubble. 300 years after Galileo's great discoveries, the true size and nature of the universe remained elusive. Using a 100-inch telescope at the Mount Wilson Observatory in California, Hubble not only resolved the "Great Debate" over the scale of the universe but also provided radical evidence that the universe is expanding.

This presentation is part of the International Year of Astronomy celebrating the 400th anniversary of Galileo's use of the telescope and complements the upcoming Humanities West program *\*Copernicus, Galileo, and Kepler: Redefining Our Place in the Universe* on Friday, October 2, from 8:00 p.m. to 10:15 p.m. and Saturday, October 3, from 10:00 a.m. to 4:00 p.m., at Herbst Theatre, 401 Van Ness Avenue in San Francisco.

*Dr. Bethany Cobb is a National Science Foundation Astronomy and Astrophysics Postdoctoral Fellow at UC Berkeley. She received her PhD at Yale University for research on massive stellar explosions called gamma-ray bursts. She is dedicated to public outreach in order to share her love of astronomy with others. She is also the astronomer for The Old Farmer's Almanac.*

**Cost: \$15 general public; \$8 Commonwealth Club members**

**Info: [www.humanitieswest.org](http://www.humanitieswest.org) OR [www.commonwealthclub.org](http://www.commonwealthclub.org)**

**Reservations: <http://tickets.commonwealthclub.org>**

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**Thursday, October 8, 2009 . 5:30pm Reception, 6:00 p.m. Discussion**

**COMMONWEALTH CLUB OF SAN FRANCISCO, Gold Room, 595 MARKET STREET, SAN FRANCISCO, CA**

**Humanities West & The Commonwealth Club of San Francisco Present**

**ASTRONOMY SALON - POST-PROGRAM DISCUSSION OF HUMANITIES WEST'S *COPERNICUS, GALILEO, AND KEPLER: REDEFINING OUR PLACE IN THE UNIVERSE* (OCTOBER 2-3 AT HERBST THEATRE)**

Join in an Astronomy Salon as a follow-up to the Humanities West program *Copernicus, Galileo, and Kepler: Redefining Our Place in the Universe*, held October 2 & 3, at the Herbst Theatre. The post-program discussion, organized by the Humanities Member-Led Forum at the Commonwealth Club, provides a unique opportunity to exchange ideas and deepen an understanding of the astronomical topics raised at the previous two-day symposium. This presentation is part of the International Year of Astronomy celebrating the 400th anniversary of Galileo's use of the telescope.

**Cost: \$15 general public; \$8 Commonwealth Club members**

**Info: [www.humanitieswest.org](http://www.humanitieswest.org) OR [www.commonwealthclub.org](http://www.commonwealthclub.org)**

**Reservations: <http://tickets.commonwealthclub.org>**



**UC Berkeley, Astronomy Department**  
**INTERNATIONAL YEAR OF ASTRONOMY PUBLIC TALKS**

**Saturday, September 19, at 11 a.m. - 12:00 Noon**  
**100 Genetics & Plant Biology Building**

**PROFESSOR NATHAN SMITH**  
**UC Berkeley**

**LIVE FAST – DIE YOUNG: MONSTER STARS AND THEIR TEMPER  
TANTRUMS**

This talk will discuss the properties of the most massive stars known, born with masses of 30 to 150 times the mass of our Sun. Massive stars dominate many of the physical processes in interstellar space when they explode as brilliant supernovae, but these stars also wreak havoc on their surroundings before they die, leading short lives that are very different from that of the Sun. Early on, their ultraviolet radiation and fast winds carve huge cavities in the dark clouds that gave birth to them, disrupting the cradles where many other less massive stars are quietly trying to begin their lives. Such regions are likely to be the birthplace of solar systems like our own. Later on, as these monster stars become violently unstable, they can erupt repeatedly like volcanoes or undergo violent encounters with companion stars before they finally meet their end in a supernova explosion, ending up as either a compact neutron star or black hole.

Nathan Smith is a postdoctoral researcher in astronomy at UC Berkeley, where he works on the life and death of massive and violently unstable stars such as Eta Carinae. He earned Bachelor's degrees in music and astronomy from Minnesota in 1997, received a Master's in astronomy from Boston University in 1999, and came back to Minnesota to finish a PhD in astronomy in 2002. He was then a NASA Hubble Fellow at the University of Colorado in Boulder, before moving to Berkeley. He's passionate about skateboarding, music (having studied classical music in India for a while, as well as touring the US with a painfully loud rock band), and unlike some astronomers whose office blackboards are covered with scrawled equations and scientific diagrams, most of Nathan's is taken up with names and star ratings of the single malt scotch whiskies he is partial to tasting with friends and colleagues at an informal weekly after-work "scotch hour". He is also responsible for producing some of the most [dramatic images](#) taken with the Hubble Space Telescope.

**Schedule of Monthly Talks**

<b>Date</b>	<b>Venue</b>	<b>Speaker</b>	<b>Topic</b>
October 17	100 GPB	<a href="#">Imke de Pater</a>	Fascinating Objects in our Solar System
November 21	100 GPB	<a href="#">Maryam Modjaz</a>	Cosmic Fireworks: The Explosive Deaths of Massive Stars
December 19	TBA	<a href="#">Dick Plambeck</a>	Star Formation through Radio Eyes

## 2009 CLUB OFFICERS & CONTACTS

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<i>Webmaster</i>	Joe Amato	wbmstr@sfaa-astronomy.org

## CLUB TELESCOPES

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

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

## CLUB ASTRONOMY VIDEOS

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

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

## MEMBERSHIP DUES

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

## SFAA WEBSITE AND ONLINE SERVICES

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

*Above the Fog* is the official bulletin of the San Francisco Amateur Astronomers. It is the forum in which club members may share their experiences, ideas, and observations. We encourage you to participate by submitting your articles, announcements, letters, photos and drawings. We would also like to hear from our new members. Tell us about yourself - what you have done in the past and what other clubs you have joined. **The deadline for the next issue is the 20th day of the month.** Send your articles to [Editor@sfaa-astronomy.org](mailto:Editor@sfaa-astronomy.org)

San Francisco Amateur Astronomers  
POB 15097  
San Francisco CA 94115

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

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 \$40 Institutional \_\_\_\_\_  
 \$75 Supporting \_\_\_\_\_

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

### MEMBERSHIP APPLICATION

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



Information Hotline: (415) 289-6636

Web Page: [www.sfaa-astronomy.org](http://www.sfaa-astronomy.org)

*Sharing the Wonders of the Universe*

**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.