

# ★ ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 61, No. 9 - September 2013

## **GENERAL MEETING – SEPTEMBER 18, 2013**

Randall Museum . 199 Museum Way . San Francisco

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

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

### **GIBOR BASRI PROFESSOR OF ASTRONOMY UC BERKELEY**

#### **BROWN DWARFS: THE SPECTROSCOPY OF SUBSTELLAR OBJECTS**



The most massive planet is nearly 6 times lighter than the least massive star. In between is the realm of brown dwarfs. In 1995 both the first brown dwarf and the first exoplanet were discovered. Since then we have found hundreds of each, and have learned quite a bit. Recent infrared surveys have now probed the whole sky to very faint levels. Recent discoveries include the coolest and closest brown dwarfs. This allows us to push to very cool objects - the spectral sequence has added 3 to the original 7: L, T, and Y dwarfs. We can actually see brown dwarfs, whereas exoplanets are almost all detected only indirectly. Brown dwarfs overlap in temperature with young massive exoplanets, so their spectra look much more like planets than stars. I will give a flavor of how spectroscopy can be used to study what the atmospheres and physical properties of such objects are like.

*Gibor Basri has been a professor of Astronomy at UC Berkeley for more than 30 years. He is known as one of the discoverers of brown dwarfs, and an expert on low mass stars. In addition, he has contributed significantly to our understanding of star formation, and is now a member of the Kepler mission team which is searching for earth-sized exoplanets. Professor Basri has employed telescopes ranging from nearby Lick Observatory to the mighty Keck telescopes on Mauna Kea to space-borne telescopes like Hubble and Kepler. He has been awarded a Miller Research Professorship, and Sigma Xi Distinguished Lectureship. Basri has over 200 publications and 10,000 citations to his work, has given many public lectures and appeared on several television programs. He has long made promotion of science in underrepresented communities a mission, and is now the Vice Chancellor for Equity and Inclusion at Berkeley.*

# PRESIDENT'S MESSAGE

Greetings SFAA'ers,



*Sue-Ellen at French American School, along with Joe, April 2013*

Since this edition of *Above the Fog* is coming out earlier than usual, I'll skip any housekeeping and share a story about my first experience with "educational astronomy outreach" for elementary school kids this summer.

I tagged along to two "Mars Week Kickoff" events being presented by Bob Haberman. Bob knows Mars forwards and backwards and he's experienced with presenting to elementary school aged kids. I don't have kids (but hope to someday) or have much experience with them, so I was looking forward to learning. To prepare for the events, I brushed up on basic Mars facts and potential colonization of Mars by humans to help answer questions or give the presentation myself in case something came up for Bob and he couldn't make it.

The first Kickoff event started the way I would expect. Instructors organized the students and then introduced us. Bob started his presentation with a lot of energy and got the kids to answer and ask

questions. After about 20 minutes the younger kids started losing their attentiveness while the 3rd to 6th graders held on strong.

What amazed me though was the skill level the younger kids had in releasing energy by squirming while remaining polite audience members. The squirmers seemed to know when they were being looked at because when I looked at one directly the kid would be perfectly still. Using averted vision however, I could see about 6 kids quickly sliding on the floor back and forth across the room.

They must have known when they were being looked at and stopped moving. (Opposite of the covert squirmers were also young "drapers" who hung on limply to the instructors, apparently too tired to sit up.)

The next day was another Mars Kickoff and it ended with a line of questioning and inspection, although not space or astronomy related at all. After camp was dismissed, Devon approached me. "Um, Miss Angie? Could I please ask you a question?"

"Sure Devon!" I replied.

"Do you and Mr. Bob live in the same house?"

"No," I said, smiling but trying not to laugh. "We are in the same astronomy club. We are astronomy club friends."



***Michael Patrick at the Marin Headlands Youth Hostel, June 2013***

Devon frowned and looked puzzled. He asked a follow-up.

"Does that mean you grew up in the same house together?"

"No, we are not siblings. It's a little like we play on a sports team together except we're in a club, not on a sports team."

Devon put his head in his hands and sighed, having the same frazzled look like I feel when I try to make sense of how a star heats up at the same time that it gets bigger and redder.

Devon wasn't the only one in that class to be left bewildered by the wonders of Mr. Bob and Miss Angie. After the event, across the street from the school, Bob and I chatted and did a post-mortem. Just as we turned around to leave and get our cars to drive away, we saw one of the students, Tiger Lily, clung to the chain link fence and apparently having been staring at us for a while. Jack, another student, was behind her, casually peering from the top of the play structure. Both Tiger Lily and Jack smiled and waved to us.

While I may never be able to solve the problem that amateur astronomy clubs may be more of a curiosity than astronomy itself, I can at least say that the kids got some exposure to astronomy and that I got a good laugh out of it.

Clear skies, and may your astronomy club experience be a fun one!



**ANGIE TRAEGER**  
President  
San Francisco Amateur Astronomers  
2013

**Mitchell Schoenbrun at the Exploratorium,  
August 2013**



**Bob Haberman at Webster Elementary School and McKinley Elementary School, July 2013**

# REQUESTS FROM RANGER RYEN FOR OUR MT. TAM OBSERVING NIGHTS

Greetings Mt. Tam observers! During a meeting with Ranger Ryen and Tinka Ross, Ranger Ryen passed along a few requests for our membership. One of them was completely news to me (Item #2 below), but after his explanation it makes perfect sense.

**1. Display your parking placard BEFORE the rangers stop by to inspect our dashboards.** The rangers are supposed to issue citations if we don't display a parking pass, and when they chase us down to ask for the passes they are only trying to be friendly and do us a favor. If you happen to forget to display your pass and the ranger asks you to display it, do so quickly. Stop your conversation, equipment setup, etc. and head to your car to get your parking pass.

To assist the rangers in speeding up their checks, you may find board members walking around during our members-only nights to remind folks to display passes. We'll also check for passes at the orange cone line during the Public Nights. (If you need to get your pass updated see the instructions on this page: <http://www.sfaa-astronomy.org/membership/>)

**2. Please don't drive around the half closed Pantoll Gate, where the exit is open and the entrance is closed.** (Yep, this is news to me -- Doug and I used to drive through the exit all of the time!) While the gate is half closed, the rangers are in the process of closing the park. Driving around the gate technically is a violation of some sort and the rangers protocol is to perform a "traffic stop" on anyone doing so. This takes up the rangers' time and is unnecessary.

If you encounter the gate half closed, wait at the bottom of the hill until the ranger comes back to close and fully lock up the gate. You can then show your parking pass and enter. Best practice is to arrive at Rock Springs before

sunset.

**3. For the Mt. Tam Public Nights, it is helpful to put small dim red led markers or glowy tape on the base of telescopes,** especially on tripod legs. Both Ranger Ryen and Tinka report that the public is sometimes nervous about approaching a telescope because they can't see where the telescope is. When looking at the ground there is no sky to silhouette the equipment, like there is for navigating around people or an eyepiece at night time. Placing little markers on the legs or bottoms of the scope helps the public avoid having to use bright red lights in order to get around.

Some helpful advice can be found on this page from the SF Sidewalk Astronomers: <http://www.sfsidewalkastronomers.org/index.php?page=organizing-a-public-star-party>, particularly a link to the glow-in-the-dark-tape. [http://www.scopestuff.com/ss\\_glot.htm](http://www.scopestuff.com/ss_glot.htm).

Board members are currently researching glowing marker products that the club could potentially provide and/or sell in small quantities to club members.

**4. For the Mt. Tam Public Nights, Ranger Ryen and Tinka thought it would be very nice if we could wear glowing name badges or a glowing club logo pin of some sort,** so that the public knows who the "owner" of a scope is. Sometimes as the telescope owner we stand amongst members of the public, and it makes it easier for the public to ask us a question if we stand out from the crowd.

Board members are researching glowing badges -- we want to make something available that is not too bright. Stay tuned for an evening demo of badge samples in July or August.

Thanks all!

# IMPORTANT DATES & UPCOMING SFAA VIEWING EVENTS

## SFAA GENERAL MEETINGS & LECTURES

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

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

September 18, October 16, November 20, December 18

---

## CITY STAR PARTY

[http://www.sfaa-astronomy.org/star\\_parties/city/](http://www.sfaa-astronomy.org/star_parties/city/)

---

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

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

**ALWAYS ON A SATURDAY**  
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/>

September 7 and October 12

---

## UPCOMING LECTURES



OCTOBER 26, 2013

**DR. STEVE STAHLER**

Theoretical Astrophysicist  
UC Berkeley

### THE BIRTH OF STAR CLUSTERS



Stars are not born alone, but in groups. In our own Milky Way Galaxy, these groups range from sparse associations of only a few dozen stars, to massive globular clusters with a million members. What is the basic reason why Nature forms stars in groups? And why do different regions of space create such vastly different entities? This talk will outline a new and comprehensive theory for the origin of clusters. It is based on observations not only of the clusters themselves, but also of the diffuse gas clouds that create all stars.

*Dr. Steven Stahl is a theoretical astrophysicist at U. C. Berkeley. Raised in Maryland, he was a professor at MIT before returning to the Bay Area in 1992. His research centers on the problem of star formation. In 2004, he coauthored*

*the first graduate text in the field. Dr. Stahl especially delights in the esthetic appeal of astronomy, which he tries to convey in his numerous public talks.*

**SAN FRANCISCO AMATEUR ASTRONOMERS  
MOUNT TAM SOCIAL  
SATURDAY, SEPTEMBER 7, 2013 – 5:00 PM**

**Before you get lost in the stars,  
come enjoy some food and friends**

**BOOTJACK PICNIC AREA  
MOUNT TAMALPAIS**

# **STAR-B-QUE**



**Our Member Social/Picnic is  
scheduled for September 7th at  
BootJack Picnic Grounds on Mt Tam,  
just before Dr. Pascal Lee's Public  
Lecture, "From Earth to Mars,"  
followed by the Star Party.**

**Come join us around 5pm for food, and even bring your  
own treat to sweeten the pot. Meet your fellow  
astronomers, and then enjoy a good lecture and night  
viewing the stars.**

**We have some special activities lined up especially for  
novice observers this year. It should be a good time all  
around.**

**Hope to see you there!"**



**JOHN DOBSON'S 98<sup>TH</sup> BIRTHDAY CELEBRATION**  
**Wednesday, September 18, 2013**  
**Griffith Observatory**  
**Los Angeles**



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

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

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

More info to come as we do the details. Maybe we can caravan down to LA.

If you cannot go and would like to give him a card of good wishes, just mail it to me:

773 Tiburon Blvd.  
Tiburon, CA  
94920

or post on facebook:

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

As John would say:  
"Over & Out"

## ANTHONY BARREIRO

### STAYING WARM WHILE OBSERVING

When people first start skywatching at night, we're often surprised at how cold it is. Most of us can remember nights when the sky was very clear and observing conditions may have been perfect, but after an hour or two we started shivering and either had to abandon our observing plans to warm up or risk hypothermia. Learning to stay warm at night is an essential skywatching skill.

When we're outside during the daytime, even if the air is cold, our bodies and surroundings absorb heat from the Sun. At night heat flows in the opposite direction, from the ground and our bodies out toward space. If there are clouds in the sky they will literally work like blankets, keeping the ground warmer. But we want to observe when the sky is clear, and on a clear night you lose a lot of body heat through radiation into space! Even a slight breeze will add wind chill, cooling your body even more. And after you set up your telescope you probably won't generate a lot of body heat through routine physical activity until you pack up at the end of the night. So it will feel cold. A good rule of thumb is to check the forecast low temperatures, and plan as if it will be 10 to 20 degrees Fahrenheit colder. During the summer in the bay area overnight lows in the 50's might not sound too cold, but you should plan as if the temperature will be in the 30's.

Your first line of defense against the cold is warm clothing. Wear layers, starting with thermal long underwear and two pairs of warm socks. Bring more warm clothing than you think you will need. A warm hat that covers the ears is essential. You might also want to bring a scarf or balaclava to cover your face if it's going to be really cold. Your outer layer of jacket and pants should be tightly woven windproof material. Fingerless gloves will keep your hands warm while still allowing you to change eyepieces and filters, focus your telescope, etc. If it's really cold, bring a pair of mittens to wear over your fingerless gloves. You can take the mittens off when needed. Insulated boots are a godsend. When I was wearing regular boots, even with two pairs of wool socks my toes often got cold and numb as the night progressed. Now that I have a pair of insulated boots my feet stay warm and comfortable all night long. Make sure that your boots are big enough to allow you to wear thick socks without pinching and cutting off circulation. Basically, if you dress as if you were going to climb the north face of Mount Shasta in the winter, you will be warm all night.

Bring plenty of water, a thermos with a hot beverage, and high-calorie snacks to fuel your body. Even though you're not sweating, your body is still losing a lot of moisture to the air and you need to remember to stay well hydrated. Dehydration puts you at greater risk of hypothermia! Alcoholic beverages impair the body's ability to stay warm, so save the beer for the next day. I like to snack on nuts and dried fruit because they provide a good balance of fat, protein, and carbohydrate. Be careful with refined sugar -- the initial sugar rush can be followed by a sharp drop in blood sugar, leaving your body less able to generate heat.

Remember to move around periodically to keep your blood circulating and to generate some body heat. Take a short walk, jump up and down, wave your arms around, do the hokey pokey -- it's dark, nobody's going to laugh at you. Ideally you should exercise before you start getting cold, but if you get absorbed in what you're seeing through the eyepiece or on your computer monitor and start getting cold, don't ignore the sensations of being chilled, they will only get worse. Take a break, move around, eat a snack, and drink something warm. If your observing site has a warming shelter, going inside for a few minutes to warm up can be a welcome break. If there's no shelter, wrapping up in a blanket in your vehicle or under trees or other cover can be helpful.

**When it's cold, our noses run. It's how our bodies moisten and warm the air on the way into our lungs. Bring a handkerchief or plenty of kleenex, and don't be ashamed to use them. Think of it as a sign of observing cred.**

**Hypothermia is a potentially life-threatening medical condition requiring immediate first aid and possibly a trip to the emergency room. In hypothermia the body's core temperature starts to drop. Warning signs of hypothermia include shivering, loss of coordination, slurred speech, and confusion. A person suffering from hypothermia may not understand what's happening, so keep an eye on your observing buddies, and take charge if they seem disoriented. First aid for hypothermia is to get the victim into a warm environment as quickly as possible, wrap them in blankets, and if they're conscious and able to swallow safely give them warm non-alcoholic beverages. Severe hypothermia is a medical emergency requiring a trip to the emergency room. The best treatment for hypothermia is to prevent it in the first place. If you start to shiver, you need to warm up immediately, even if that means abandoning your observing project.**

**Being prepared for the cold with more than enough warm clothing, water, your thermos bottle, snacks, a blanket, and knowledge of how to stay warm and safe will give you many nights of enjoyable observing in every season of the year. Clear skies!**

## NIGHT SKY NETWORK

### September 2013 - THE EVENING SKY

September Sky Map: <http://skymaps.com/skymaps/tesmn1309.pdf>

September Sky Calendar: <http://skymaps.com/articles/n1309.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><b>EVERY FRIDAY NIGHT 7:00 PM – 10:00 PM excluding major holidays</b></p> <p><b>The Telescope Makers' Workshop</b></p> <p><b>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</b></p>	<p><b>THE TELESCOPE MAKERS' WORKSHOP</b> is held every Friday night from 7pm - 10pm, excluding major holidays (e.g. Christmas Day and New Year's Day) that fall on Fridays. The Workshop is always closed on Memorial Day Weekend. Attendance every Friday night is not mandatory, and members work at their own pace. The Workshop meets at Chabot Space &amp; Science Center, 10000 Skyline Blvd., Oakland. Contact us for more specific details:</p> <p>Contact: E-mail Richard Ozer (<a href="mailto:rozer@pacbell.net">rozer@pacbell.net</a>) or (510) 406-1914</p>
<p><b>EVERY FRIDAY &amp; SATURDAY EVENING, weather permitting 7:30 PM – 10:30 PM</b></p> <p><b>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland CA 94619-2450 (510) 336-7300</b></p>	<p><b>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES</b> For more information: <a href="http://www.chabotspace.org/">http://www.chabotspace.org/</a></p> <p><b>Free Telescope Viewing</b> Regular hours are every Friday &amp; Saturday evening, weather permitting: 7:30pm -10:30pm Come for spectacular night sky viewing the best kept secret in the Bay Area and see the magnificence of our telescopes in action!</p> <p><b>Daytime Telescope Viewing</b> On Saturday and Sunday afternoons come view the sun, moon, or Venus through Chabot's telescopes. Free with General Admission. (weather permitting)</p> <p>12pm - 5pm: Observatories Open</p>
<p><b>Sunset – 5:11 PM (TWICE MONTHLY)</b></p> <p><b>Inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</b></p> <p><b>SAN MATEO COUNTY ASTRONOMICAL SOCIETY STAR PARTY</b></p>	<p><b>STAR PARTIES AT CRESTVIEW PARK, SAN CARLOS</b></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 <a href="mailto:SMCAS@live.com">SMCAS@live.com</a> or call Ed Pieret at (650)862-9602.</p> <p><b>Reasons to Attend</b> If you have kids interested in space or planets bring them here for a real life view of planets, nebula,</p>

	<p>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><b>EVERY CLEAR SATURDAY          MORNING OBSERVATORY          10:00 AM – 12:00 PM</b></p> <p><b>FOOTHILL COMMUNITY          COLLEGE          12345 Moody Road          Los Altos Hills</b></p> <p><b>Cost: Free</b></p>	<p>Solar observing with a Hydrogen alpha solar telescope every clear Saturday morning. This allows spectacular views of solar prominences and unusual surface features on the Sun not otherwise visible with regular white light telescopes.          Admission is free.</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd. exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$ 3.00.</p>
<p><b>EVERY CLEAR FRIDAY          EVENING          9:00 PM – 11:00 PM</b></p> <p><b>FOOTHILL COMMUNITY          COLLEGE OBSERVATORY          12345 Moody Road          Los Altos Hills</b></p> <p><b>Cost: Free</b></p>	<p>Foothill Observatory is open for public viewing every clear Friday evening from 9:00 p.m. until 11:00 p.m. Visitors can view the wonders of the universe through the observatory's computer-controlled 16-inch Schmidt-Cassegrain telescope. Views of objects in our solar system may include craters and mountains on the moon, the moons and cloud-bands of Jupiter, the rings of Saturn, etc. Deep space objects including star clusters, nebulae, and distant galaxies also provide dramatic demonstrations of the vastness of the cosmos. The choice of targets for          Any evening's viewing depends on the season and what objects are currently in the sky.</p> <p>The public viewing programs at Foothill are free of charge and are open to guests of all ages. Please note that the observatory is closed when the weather is cloudy. Also note that visitor parking permits are available from the machines in the parking lots for \$3.00.</p> <p>Come to Foothill Observatory and join us in the exploration of our Universe!</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$3.00.</p>

## BAY AREA EVENTS – SEPTEMBER 2013

<p><b>Tuesday, August 27</b> <b>7:00 PM NOTE LATER TIME</b></p> <p><b>SETI INSTITUTE</b> <b>189 Bernardo Ave</b> <b>Mountain View CA 94043</b></p>	<p><b>SPEAKER: FRANCK MARCHIS, SETI INSTITUTE</b> <b>SETI COLLOQUIUM SERIES: BREAKING THE SEEING BARRIER FOR PLANETARY ASTRONOMY</b></p> <p>When Galileo Galilei pointed his telescope toward Jupiter in 1609 and discovered what we now call the Galilean moons, he did not realized that he had just established a new research field in astronomy. In the past four centuries, planetary astronomy, the study of our solar system bodies using telescopes, has increased our knowledge of the environment of Earth, the evolution of the planets, the origin of comets and asteroids and the formation of our solar system. Space exploration accelerated planetary astronomy in the 1960s by allowing planetary scientists to access in-situ and detailed data. In this talk, I will discuss the contributions of telescopic observation over the past 50 years to planetary science, particularly the recent developments like adaptive optics which renewed interest in ground-based observations of planets. I will explore the contribution of all-sky surveys like Pan-STARRS and LSST, which provide several terabytes of data a week, changing radically the way we do astronomy. Looking to the future of space-based astronomy, I will consider whether the James Webb Space Telescope and ATLAST are potential successors to the successful Hubble Space Telescope. Finally I'll explore the way in which specialized low-cost telescopes designed to search and study exoplanets, planets around other stars, constitutes a paradigm shift in our field.</p> <p><a href="http://plus.google.com/events/c6muvec6gait4fb1rfvoq212eo4">http://plus.google.com/events/c6muvec6gait4fb1rfvoq212eo4</a></p>
<p><b>Tuesday, 08/27/13</b> <b>07:15 PM - 09:00 PM</b></p> <p><b>Lindsay Wildlife Museum</b> <b>1931 First Ave</b> <b>Walnut Creek, CA 94597</b></p> <p><b>Cost: Free</b></p>	<p><b>SPEAKER: DR. GIBOR BASRI, UC BERKELEY</b> <b>TOPIC: STATUS OF KEPLER MISSION</b></p> <p>Our monthly meetings begin with a short "What's Up" presented by one of our members followed by a speaker. This month's speaker is – Dr. Gibor Basri, UC Berkeley,</p> <p>There is no fee for visitors but we appreciate a donation for light snacks and beverages.</p>
<p><b>Tuesday, September 3</b> <b>12:00 NOON</b></p> <p><b>SETI INSTITUTE</b></p> <p><b>189 Bernardo Ave</b> <b>Mountain View, CA 94043</b></p>	<p><b>COLLOQUIUM SERIES</b> <b>SPEAKER: JASON ROWE, SETI INSTITUTE</b> <b>MAPPING THE SURFACE OF A ROCKY EXTRASOLAR PLANET: KEPLER-10B</b></p> <p>Kepler-10b is a terrestrial planet orbiting its host star every 20 hours. At semi-major axis of 0.017 AU the planetary surface receives a massive amount of flux that heats to approximately 2000 K. The Kepler photometer with its broadband filter can detect thermal emission from the planet and an occultation with a depth of 8 parts-per-million has been clearly detected. We also confirm the detection of a phase curve with a shape dominated by the day-night cycle of the planet. There is also significant asymmetry present. We present or interpretation of the asymmetry through thermal and reflection models of the planetary surface and present a surface brightness map of a rocky extrasolar planet.</p> <p><a href="https://plus.google.com/events/c8blek6pbl89lfd4o9666aimk8">https://plus.google.com/events/c8blek6pbl89lfd4o9666aimk8</a></p>

<p>Friday, September 6 8:00 PM</p> <p><b>SAN MATEO COUNTY ASTRONOMICAL SOCIETY COLLEGE OF SAN MATEO PLANETARIUM, BUILDING 36 PARKING LOT 5 1700 W Hillsdale Blvd San Mateo CA</b></p> <p><b>Cost: Free and open to the public</b></p>	<p><b>DR. JONATHAN FORTNEY, ASSOC. PROFESSOR ASTRONOMY &amp; ASTROPHYSICS, UCSC</b> <b>CHARACTERIZING THE ATMOSPHERES OF "LOW MASS, LOW DENSITY" TRANSITING EXOPLANETS</b></p> <p>Dr Fortney is a planetary scientist that works to understand planets as classes of astrophysical objects. His current research is on modeling planetary atmospheres, interiors, and thermal evolution. Exciting exoplanet observations are happening on two fronts: the close-in transiting planets that can be studied with space-based and ground-based telescopes, and the young warm Jupiter-class planets far from their parent stars, which can be directly imaged.</p> <p>His work on exoplanets makes connections between these distant planets, which we are just beginning to understand, and our solar system's planets, for which we have abundant data and a long history of research. However, there are classes of planets that astronomers are finding, like "Super Earths," that have no analogue in the solar system! These exciting fields will continue to expand, fueled by ground-based observations, space missions, and new modeling efforts.</p>
<p>Friday, September 6 8:45 – 11:45 PM</p> <p><b>SAN JOSE ASTRONOMICAL ASSOCIATION Houge Park Twilight Drive San Jose, CA 95124</b></p>	<p><b>HOUGE PARK STAR PARTY</b></p> <p><b>Cost: Free</b></p>
<p>Saturday, September 7 7:30 – 8:15 PM</p> <p><b>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</b></p> <p><b>Free with admission</b></p>	<p><b>SPEAKER: FARIDE KHALAF</b> <b>SATURN V: THE FIRST 700 SECONDS</b></p> <p>Where were you when the Apollo program launched its first ship into space? Gas and smoke billowing from below, fire flaring from ignition, the countdown... that's the outside look. Join the discussion as we explore the lesser known technical aspects of missions past including launch preparation and vessel details. Ask questions, share memories, inspire a new generation to take to space.</p> <p>Website: <a href="http://www.chabotspace.org/space-talks.htm">http://www.chabotspace.org/space-talks.htm</a></p>
<p>Saturday, September 7 7:30 PM</p> <p><b>MOUNTAIN THEATER MT TAMALPAIS STATE PARK Mill Valley CA 94941</b></p>	<p><b>SPEAKER: PASCAL LEE, MARS INSTITUTE</b> <b>FROM EARTH TO MARS</b></p> <p>The first human mission to Mars will be humanity's greatest undertaking in space exploration in the 21st century. As with all expeditions, its success will depend on planning and first steps towards the journey are already under way.</p>

<p><b>Monday, September 9 4:10 – 5:00 PM</b></p> <p><b>EVANS HALL UC BERKELEY Room 60 Berkeley CA 94720</b></p> <p><b>Cost: Free</b></p>	<p><b>Speaker: GREG GALLOWAY, MSRI ON THE TOPOLOGY OF BLACK HOLES AND BEYOND</b></p> <p>In recent years there has been an explosion of interest in black holes in higher dimensional gravity. This, in particular, has led to questions about the topology of black holes in higher dimensions. In this talk we review Hawking's classical theorem on the topology of black holes in 3+1 dimensions (and its connection to black hole uniqueness) and present a generalization of it to higher dimensions. The latter is a geometric result which imposes restrictions on the topology of black holes in higher dimensions. We shall also discuss recent work on the topology of space exterior to a black hole. This is closely connected to the Principle of Topological Censorship, which roughly asserts that the topology of the region outside of all black holes (and white holes) should be simple. All of the results to be discussed rely on the recently developed theory of marginally outer trapped surfaces, which are natural spacetime analogues of minimal surfaces in Riemannian geometry. This talk is based primarily on joint work with Rick Schoen and with Michael Eichmair and Dan Pollack.</p>
<p><b>Monday, September 9 7:30 – 9:00 PM</b></p> <p><b>CALIFORNIA ACADEMY OF SCIENCES 55 Music Concourse Drive San Francisco CA 94118</b></p> <p><b>Cost: \$12 General \$8 Members</b></p>	<p><b>Speaker: DAVID MORRISON, NASA Lunar Science Institute THE CHELYABINSK METEOR: A COSMIC WAKE-UP CALL?</b></p> <p>What would happen if a large sized asteroid or space object collided with the Earth? On February 15 2013, a rocky projectile entered the Earth's atmosphere traveling at more than 11 miles per second. It was about 65 feet in diameter, or half the diameter of the famous Tunguska impact of 1908, which flattened a thousand square miles of Siberian forest. Its terminal explosion, at an altitude of 14 mi, released energy of about half a megaton, equivalent to a couple dozen Hiroshima-sized atom bombs. About two minutes later, the shock wave reached the ground in Chelyabinsk Russia, breaking windows and injuring about 1500 people from flying glass. The Chelyabinsk impactor was smaller than most asteroids that have been detected by the telescopes of the NASA Spaceguard Survey, which focuses on finding asteroids of about 100m or larger. Since it approached the Earth from very near the direction of the Sun, it could not have been seen by any ground-based optical telescope of any size. It therefore struck without warning. Has this event served as a kind of cosmic wake-up call for planetary defense? NASA scientist David Morrison will speak to us about how we survey space to try to determine when Earth will be impacted by a large space object, and what the potential implications could be for life on Earth.</p>
<p><b>Tuesday, September 10 7:00 PM – NOTE LATER TIME</b></p> <p><b>SETI INSTITUTE 189 Bernardo Ave Mountain View, CA 94043</b></p>	<p><b>COLLOQUIUM SERIES SPEAKER: JOHN LEWIS, PROFESSOR EMERITUS OF PLANETARY SCIENCE UNIVERSITY OF ARIZONA, LUNAR AND PLANETARY LABORATORY TO THE ASTEROIDS – AND BEYOND!</b></p> <p>Tsiolkovskii and Goddard dreamed of the day when we would have access to the resources of the asteroids. Today, with an enormous and rapidly growing body of data on meteorites, the Near-Earth Asteroids (NEAs) and their more distant counterparts, we can envision the propulsion systems, transportation system architectures, ores, processing schemes and markets for products made from materials sourced in nearby space. Most of these products are of greatest value and significance in space; some, such as platinum-group metals and energy, would be worth returning to Earth. The resources of the NEAs also provide the propellants and structural materials for a broad expansion of human presence in space.</p> <p>This talk will survey the what, where, how and why of space resource utilization-- and raise the timely question of when.</p> <p><a href="https://plus.google.com/events/cfij418phv10tocljpb2dp56630">https://plus.google.com/events/cfij418phv10tocljpb2dp56630</a></p>



<p>Friday, September 13 7:30 PM</p> <p>LICK OBSERVATORY 7299 Mt. Hamilton Road Mt. Hamilton CA 95140</p> <p>Website: <a href="http://www.ucolick.org/public/sumvispro.html">http://www.ucolick.org/public/sumvispro.html</a></p> <p>Cost: \$9.50</p>	<p><b>SPEAKER: FRANCK MARCHIS, SETI INSTITUTE</b> <b>SETI COLLOQUIUM SERIES: BREAKING THE SEEING BARRIER FOR PLANETARY ASTRONOMY</b></p> <p>When Galileo Galilei pointed his telescope toward Jupiter in 1609 and discovered what we now call the Galilean moons, he did not realized that he had just established a new research field in astronomy. In the past four centuries, planetary astronomy, the study of our solar system bodies using telescopes, has increased our knowledge of the environment of Earth, the evolution of the planets, the origin of comets and asteroids and the formation of our solar system. Space exploration accelerated planetary astronomy in the 1960s by allowing planetary scientists to access in-situ and detailed data. In this talk, I will discuss the contributions of telescopic observation over the past 50 years to planetary science, particularly the recent developments like adaptive optics which renewed interest in ground-based observations of planets. I will explore the contribution of all-sky surveys like Pan-STARRS and LSST, which provide several terabytes of data a week, changing radically the way we do astronomy. Looking to the future of space-based astronomy, I will consider whether the James Webb Space Telescope and ATLAST are potential successors to the successful Hubble Space Telescope. Finally I'll explore the way in which specialized low-cost telescopes designed to search and study exoplanets, planets around other stars, constitutes a paradigm shift in our field.</p>
<p>Friday, September 13 7:30 PM</p> <p>FOOTHILL COLLEGE Room 5105 Los Altos Hills CA 94022</p> <p>Cost: Free</p>	<p><b>Speaker: DR. BRAD TUCKER, UC BERKELEY</b> <b>EXPLODING STARS, DARK ENERGY, AND THE END OF THE UNIVERSE</b></p> <p>Most stars end their lives in brilliant explosions known as supernova. These massive bursts briefly outshine all the light from the galaxy wherein they occur. 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 use 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. I will show how our understanding of these objects has been revolutionized and what this means for the Universe.</p>
<p>Friday, September 6 8:45 – 11:45 PM</p> <p>SAN JOSE ASTRONOMICAL ASSOCIATION Houge Park Twilight Drive San Jose, CA 95124</p>	<p><b>HOUGE PARK STAR PARTY</b></p> <p>Cost: Free</p>
<p>Saturday, September 7 7:30 – 8:15 PM</p> <p>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</p> <p>Free with admission</p>	<p><b>SPEAKER: FARIDE KHALAF</b> <b>STAYING ALIVE: THE SOKOL SPACESUIT</b></p> <p>Come learn the brief history of spacesuits from the earliest pressure suits worn by aviators in the 1930s to the state of the art used on the International Space Station. You'll get a chance to see an actual Russian Sokol Spacesuit with a demonstration of its features and its use. Made in great numbers since 1973, Sokol is the most commonly used spacesuit and is described as a rescue suit, not capable of being used outside the spacecraft in a spacewalk or extra-vehicular activity. The Sokol spacesuit (Russian: Сокол, Falcon) is a type of Russian space suit worn by all who fly on the Soyuz spacecraft.</p> <p>Website: <a href="http://www.chabotspace.org/space-talks.htm">http://www.chabotspace.org/space-talks.htm</a></p>

<p><b>Saturday, September 14</b> <b>6:30 – 11:00 PM</b></p> <p><b>MT DIABLO STATE PARK</b> Lower Summit Parking Lot Walnut Creek CA 94598</p> <p><b>Cost: Free</b></p>	<p><b>GO INSIDE A TELESCOPE</b></p> <p>How do telescopes work? Take a look inside and learn about 400-year-old technology still in use today. Then look through all the telescopes to experience the universe.</p>
<p><b>Saturday, September 14</b> <b>7:00 PM</b></p> <p><b>LICK OBSERVATORY</b> 7299 Mt. Hamilton Road Mt. Hamilton CA 95140</p> <p><b>Cost: \$40.00 General,</b> <b>Preferred options available</b></p>	<p><b>Speaker: RAJA GUHA THAKURTA, UC SANTA CRUZ</b> <b>ISLAND UNIVERSES</b></p> <p><b>Performer: LAURA ELLIS</b></p> <p>Programs include concert, a talk by a University of California astronomer about current research, and (weather permitting) viewing through the historic Great Lick Refractor and the Nickel 40-inch telescope. Knowledgeable local amateur astronomers outside the buildings provide additional telescopes and informal astronomy discussions.</p> <p>Due to safety concerns, children under the age of 10 will not be admitted to Music of the Spheres</p> <p>Website: <a href="http://www.ucolick.org/public/music.html">http://www.ucolick.org/public/music.html</a></p>

### NASA SCIENCE CAST

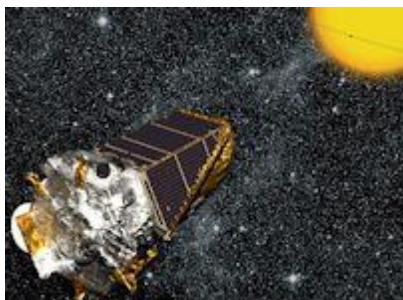
The Science@NASA team is pleased to announce a new product: the ScienceCast. Every week, we produce a short video highlighting a topic in NASA science news. A complete list of ScienceCast episodes may be found on Science@NASA's Youtube channel: <http://www.youtube.com/user/ScienceAtNASA> . Enjoy!

### NASA SCIENCE NEWS

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

## THE STRANGE ATTRACTION OF HOT JUPITERS

**August 17, 2013:** When the Space Age began, astronomers knew of exactly *zero* planets outside the solar system. What a difference 50 years makes.



*An artist's concept of NASA's Kepler spacecraft. [Home page](#)*

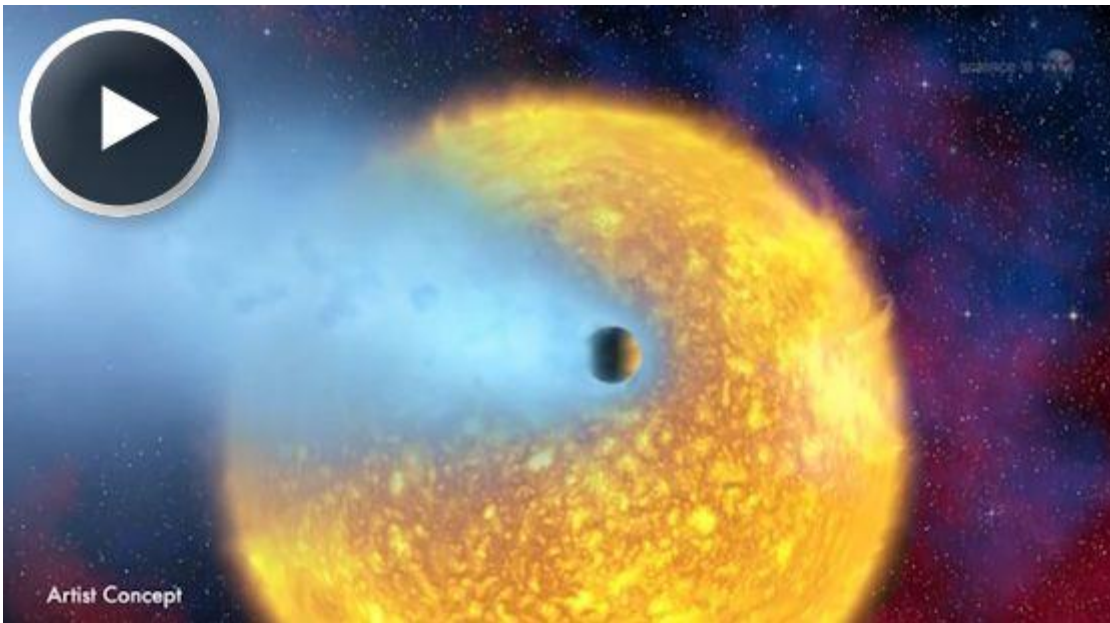
Modern, ground-based telescopes and NASA's Kepler spacecraft have now confirmed more than 850 exoplanets, while thousands more await confirmation. The pace of discovery suggests "there are at least 100 *billion* planets in our galaxy," says John Johnson of Caltech, who works with data from the Kepler mission. "That's mind-boggling."

When the hunt for exoplanets began, the focus was on Earth-like worlds, planets like our own that might support alien life in distant solar systems. Yet planets as small as Earth are difficult to detect when they circle stars hundreds of light years away. Indeed, only a handful have been found so far.

The real haul has been in gas giants, especially "hot Jupiters." These are behemoth worlds that orbit close to their parent stars, blocking a fraction of the star's light when it transits in front. Observations of hot Jupiter "mini-eclipses" have yielded hundreds of discoveries.

At first considered to be the "chaff" researchers would have to wade through to get to the fainter Earth-like worlds, hot Jupiters are now attracting their own attention.

Consider the case of "HD189733b," discovered in 2005 by a team working at the Haute-Provence Observatory in France. Because it is nearby, only 63 light years away, and because it blocks a whopping 3% of the light from its orange-dwarf parent star, astronomers are rapidly learning a great deal.



A new ScienceCast video explores the unexpected and exotic characteristics of hot Jupiters. [Play it](#)

For one thing, it's blue. Data obtained by the Hubble Space Telescope suggest that, seen from a distance, the azure disk of HD 189733b would look to the human eye much like Earth. Indeed, some members of the media have taken to calling it "the *other* blue planet."

It is, however, anything but Earthlike.

In 2007, Heather Knutson of Caltech made a global temperature map of HD189733b using NASA's infrared Spitzer Space Telescope. She knew it would be hot because HD189733b orbits its star 13 times closer than Mercury. "Even so, we were impressed by the readings," she recalls. Temperatures ranged from 1200 F on the nightside to 1700 F on the dayside. Thermal gradients drive winds as fast as 6000 mph, carrying suffocating heat around the globe.

The blue color may be caused by silicate particles in the planet's atmosphere, which scatter blue wavelengths of light from the parent star. The same physics plays out in Earth's atmosphere, although the chemicals are different. Silicates are a component of glass, so some researchers have speculated that it is actually raining molten glass on HD189733b.

The newest observations come from a pair of X-ray observatories. NASA's Chandra and the ESA's XMM Newton watched HD189733b transit its star and detected a drop in X-rays three times deeper than the corresponding decrease in optical light. This means the outer atmosphere is larger than anyone expected.

In fact, it is probably boiling away. Authors of the study estimate HD189733b is losing 100 million to 600 million kilograms of mass per second.

"The extended atmosphere of this planet makes it a bigger target for high-energy radiation from its star, so more evaporation occurs," notes Scott Wolk of the Center for Astrophysics.

Blasts of stellar radiation hitting the planet at point-blank range could have another effect: auroras that wrap around the planet from pole to pole, orders of magnitude brighter than any Northern Lights in our own solar system. This is speculative, though.

While the search for Earth-like planets proceeds, hot Jupiters are a welcome albeit unexpected diversion. It makes you wonder, what will we be looking for 50 years from now...?

**Credits:**

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

**More information:**

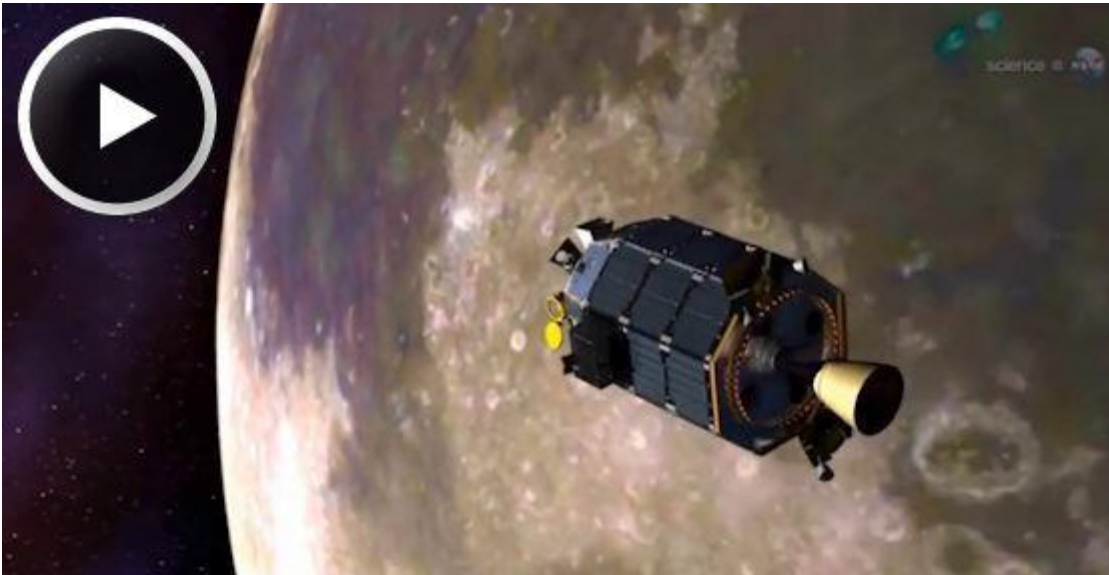
[Big Weather on Hot Jupiters](#) -- ScienceCast video

## NASA MISSION TO STUDY MYSTERIOUS LUNAR TWILIGHT RAYS

**September 3, 2013:** Back in the 60s and 70s, Apollo astronauts circling the Moon saw something that still puzzles researchers today. About 10 seconds before lunar sunrise or lunar sunset, pale luminous streamers would pop up over the gray horizon. These “twilight rays” were witnessed by crewmembers of Apollo 8, 10, 15 and 17.

Back on Earth, we see twilight rays all the time as shafts of sunlight penetrate evening clouds and haze. The “airless Moon” shouldn’t have such rays, yet the men of Apollo clearly saw them.

Later this week a NASA spacecraft is going back to the Moon to investigate. Slated for launch on Sept 6, 2013, the Lunar Atmosphere and Dust Environment Explorer (“LADEE” for short) will seek out twilight rays and other mysteries of the lunar atmosphere.



A new ScienceCast video explores the mysteries of the lunar atmosphere. [Play it](#)

“Yes, the Moon *does* have an atmosphere,” says Richard Elphic, the project scientist for LADEE at NASA Ames. “It’s just much more tenuous than ours.”

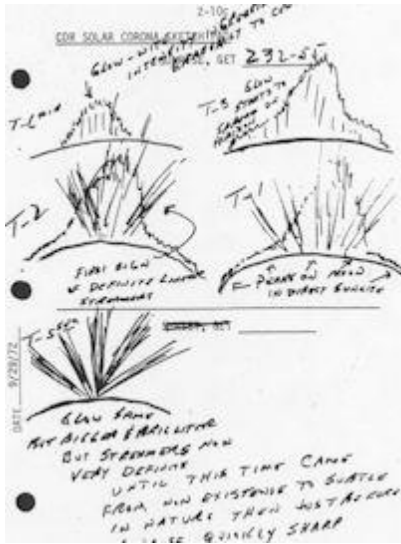
The Moon’s atmosphere is so flimsy—about ten thousand billion times less dense than Earth’s—that a good sneeze would rip through it like a hurricane. “Lunar air” is a gossamer mix of argon-40, which seeps out of the ground due to radioactive decay in the lunar interior, plus elements such as helium, sodium, and potassium, sputtered off the lunar surface by solar wind and micrometeoroids.

None of these gases appear in sufficient quantities, however, to explain the twilight rays.

“We’re missing something,” says Elphic.

The missing piece might be dust. When sunlight falls on the Moon, solar UV radiation electrifies the unprotected topsoil, possibly causing lightweight grains of moondust to rise off the ground, joining the gases already there.

“This electrically charged dust may be what the astronauts saw,” says Elphic. LADEE’s Lunar Dust Experiment will collect and analyze dust in the Moon’s atmosphere to test this hypothesis.



Lunar twilight rays sketched by Apollo 17 astronauts.

Researchers have a special name for atmospheres as fantastically thin as the Moon’s: an exosphere. On Earth, molecules in the thick air are constantly bumping into each other, spreading pressure and heat in all directions. In an exosphere, however, molecules are so far apart they rarely collide.

“Instead of bumping into each other,” says Elphic, “they bump into the lunar surface.”

Air molecules coming into contact with moondust are expected to stick, briefly, before moving on again. Hop and stick, hop and stick. At any given moment millions of molecules could be hopping like bunnies across every square inch of lunar terrain. Ultraviolet, visible light, and mass spectrometers on board LADEE will inventory the molecules present and determine how they behave.

“The dusty, flimsy mix of atoms and molecules in the lunar atmosphere is sure to have alien properties that our experience on Earth has not prepared us to anticipate,” says Elphic.

To find out, LADEE will be working on a deadline. On April 15<sup>th</sup> of next year, the sunset-colored shadow of Earth will envelop the Moon for a lunar eclipse. It will be a grand sight from Earth, but bad news for LADEE. The spacecraft is solar powered and requires sunlight to charge its batteries. An eclipse could end the mission.

“The current plan,” says Elphic, “is, before the eclipse, to guide the spacecraft into the surface of the moon for a final impact that we can study. We’ll be taking data until the very end.”

#### Credits:

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

#### Related Links:

[Lunar Atmosphere and Dust Environment Explorer](#) -- home page

## 2013 CLUB OFFICERS & CONTACTS

<i>President</i>	<b>ANGIE TRAEGER</b>	sfaapresident@sfaa-astronomy.org
<i>Vice President</i>	Matt Jones	vicepresident@sfaa-astronomy.org
<i>Secretary</i>	Douglas Smith	
<i>Treasurer</i>	Michael Patrick	treasurer1@sfaa-astronomy.org
<i>Speaker Chair</i>	Linda Mahan	speakerchair@sfaa-astronomy.org
<i>City Star Party</i>		
<i>Bulletin Editor</i>	Annette Gabrielli	editor@sfaa-astronomy.org
<i>Telescope Loans</i>	Anhil Chopra	telescopes@sfaa-astronomy.org
<i>Honorary Director and Board Member Emeritus</i>	John Dobson	
<i>Board Members</i>	Anhil Chopra Bob Haberman Sunil Nagaray Paul Salazar Mitchell Schoenbrun George Teiber	
<i>1<sup>st</sup> Alternate</i>	Suzanne Huang	
<i>2<sup>nd</sup> Alternate</i>		
<i>Webmaster</i>	Matthew Jones	

## CLUB TELESCOPES

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

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

## CLUB ASTRONOMY VIDEOS

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

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

## MEMBERSHIP DUES

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

## SFAA WEBSITE AND ONLINE SERVICES

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

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

San Francisco Amateur Astronomers  
POB 15097  
San Francisco CA 94115

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

You can choose E-Mail (Recommended) or hard copy delivery for Above the Fog (Check one)

\_\_\_\_\_ E-Mail \_\_\_\_\_ Hard Copy

Information: Name(s) \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_  
Home Phone \_\_\_\_\_  
E-Mail \_\_\_\_\_  
Zip \_\_\_\_\_

Membership Categories (Check one): \_\_\_\_\_  
\$10 Youth/Student \_\_\_\_\_  
\$25 Individual \_\_\_\_\_  
\$30 Family \_\_\_\_\_  
\$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.