SJAA Activities Calendar
Jim Van Nuland

June (late)
26 General Meeting at 8 p.m. Our speaker is Brian Day of NASA/Ames, who will speak on the LCROSS mission.

July
2 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA.
2 Houge Park star party. Sunset 8:32 p.m., 63% moon rises 11:53 p.m. Star party hours: 9:45 until midnight.
10 Dark Sky weekend. Sunset 8:30 p.m., No moon. Henry Coe Park’s “Astronomy” lot has been reserved.
16 Houge Park star party. Sunset 8:27 p.m., 37% moon sets 11:27 p.m. Star party hours: 9:30 until midnight.
24 General Meeting at 8 p.m. Our speaker is Dr. Jonathan Devor. His talk is on “Searching for Eclipsing Binary Stars, and the Strange Things We Find.”
30 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA.
30 Houge Park star party. Sunset 8:17 p.m., 77% moon rises 10:21 p.m. Star party hours: 9:15 until midnight.

August
7 Dark Sky weekend. Sunset 8:09 p.m., 5% moon rises 4:32 a.m. Henry Coe Park’s “Astronomy” lot has been reserved.
20 Houge Park star party. Sunset 7:53 p.m., 90% moon sets 3:38 a.m. Star party hours: 8:30 until 11:30 p.m.
28 General Meeting at 8 p.m. Our speaker is Dr. Seth Shostak from the SETI Institute. His talk is on “New Approaches to the Search for Extraterrestrial Intelligence.”

The Board of Directors meets before each general meeting at 6:30 p.m. All are welcome to attend.

24 hour news and information hotline:
(408) 559-1221
http://www.sjaa.net

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Getting to the Point
Paul Kohlmiller

What's the point? Is the purpose of being an amateur astronomer just to learn things for ourselves? Is it to satisfy our greedy eyeballs by catching million year old photons? I like to think that we also do something that goes beyond our own personal universe. The Houge and school star parties are a great example of this. But I like to talk about another way to spread our starry interest: Project ASTRO.

For 6 years I have been the visiting astronomer at a school in San Jose. My teacher, Jennifer, has been great. You can translate that to mean: she lets me do what I want. At my last visit for the school year (I do 6-8 visits per year) the class gives me homemade cards thanking me. I'll share some of those with you.

When you become part of Project ASTRO you are given training and a small mountain of ideas that you can do with your class. Being the type that doesn't take orders all that well, I come up with my own activities. One small idea is I tell the story of James Lick, how he couldn't marry his girlfriend, how me made money in South America building pianos and how he ended up in San Francisco during the gold rush. Since I’m just talking through the story, I bribe the students into listening by giving them a piece of individually wrapped chocolate. The connection, my big reveal at the end, is that Lick is the one who convinced Ghiradelli to move from Peru to San Francisco. One student said “You taught us what [James Lick] had to go through just to get with a girl.” Another said, “I also liked the James Lick story because I never knew James Lick was a person.” I’m glad I was able to clear that up. Another student missed my point, ”The activity I liked the most
The Shallow Sky

Plus one Ring; Minus one Belt
Akkana Peck

Saturn still shines in the early evening sky for July viewing. It’s getting low, though — not quite 40 degrees up at sunset — so get your viewing in while you can.

Here’s one thing you won’t see. Last year, NASA’s Spitzer Space Telescope discovered an immense new ring around Saturn, far beyond any of the existing rings. It stretches from about 6 million kilometers from the planet to nearly 20 million km, about the distance of Saturn’s distant moon Phoebe. For comparison, Saturn’s more familiar ring system, out to the F ring, reaches only to about 120,000 km.

Phoebe, the moon surrounded by the new ring, is a weird moon because it doesn’t orbit in Saturn’s ring plane. Stranger, it orbits backward — “retrograde”, or in the opposite direction from the other moons and the rings. The new large ring, too, is tilted at 27 degrees to Saturn’s other rings, and its particles, too, have retrograde orbits like Phoebe.

The material in the large ring is so sparse that although it would span about a degree in our sky if we could see it, it’s far too faint to see visually with any telescope. Even Cassini, looking up close and personal, couldn’t see it; it took Spitzer’s infra-red camera to detect it.

There’s one more interesting thing about this immense ring: what happens to the particles in it. Some of them smack into Phoebe, giving that moon the heavily cratered appearance Cassini photographed early in its mission. But some of the smallest particles, driven by the effect of sunlight as it’s absorbed and re-radiated, end up falling in toward Saturn — a trajectory that leads them straight into the leading edge of the next moon in, Iapetus.

Remember Iapetus, the strange moon that’s dark on its leading edge but light on the other side? Ring particles from Saturn’s largest ring may finally explain how Iapetus got that yin/yang look.

Venus still hangs in the July early evening sky, though it’s getting lower, and it’s joined by Mercury after the first week of the month. On the night of July 12-13 look for Mercury on the edge of the Beehive cluster (M44). Mars is there too, looking small and distant just off Leo’s hind foot between Saturn and Venus.

Jupiter rises around midnight, so if you stay up until the wee hours, you can get a good look at it. But if you look, you might notice something strange. Those equatorial bands that are the most obvious features you can see on Jupiter, the features that jumped out at you even in your first look through a yard-sale Tasco ... well, one of them is gone!

That’s right, Jupiter’s southern equatorial belt (SEB) has disappeared. The Great Red Spot (GRS) is still there, and in fact it’s looking much redder than we’re used to seeing ... but that may be partly because the dark reddish band in which it usually sits is no longer there. What a strange sight!

But it’s a great opportunity, too. Normally the GRS is a bit subtle and hard to see, since it’s about the same color as the band surrounding it. But now it should really stand out.

Mind you, we’re talking about a belt of clouds that normally measures two or three earth diameters by ... well, so much bigger than the earth that it’s hard even to compare them. That’s a lot of atmospheric to suddenly go missing.

If you do stay up for Jupiter, take a look at Uranus and Neptune too, both in the morning sky this month. Pluto, too, is almost perfectly placed for observing — for some value of perfect that includes being in the heart of the Milky Way, right at the edge of a bunch of stars of similar magnitude in the cluster M24. But give it a try anyway — a good Plutocrat loves a challenge!
Kip Thorne: Why was the black hole hungry?

Stephen Hawking: It had a light breakfast!

Black hole humor—you gotta love it. Unless you’re an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution.

How do you observe an object that eats light for breakfast?

“Black holes are creatures of gravity,” says physicist Marco Cavaglia of the University of Mississippi. “So we have to use gravitational waves to explore them.”

Enter LIGO—the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein’s Theory of General Relativity, black holes and other massive objects can emit gravitational waves—ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth.

“The principle is simple,” says Cavaglia, a member of the LIGO team. “Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by.”

Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! “It is a difficult measurement,” allows Cavaglia.

Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave.

Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth.

So far the results are ... nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection.

Does this mean Einstein was wrong? Cavaglia doesn’t think so. “Einstein was probably right, as usual,” he says. “We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range.”

So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO—a next generation detector 10 times more sensitive than its predecessor. “We’ll be monitoring a volume of space a thousand times greater than before,” says Cavaglia. “This will transform LIGO into a real observational tool.”

When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punchline may yet make astronomers smile.

Find out more about LIGO at http://www.ligo.caltech.edu/. The Space Place has a LIGO explanation for kids (of all ages) at http://spaceplace.nasa.gov/en/kids/ligo, where you can “hear” a star and a black hole colliding!
Getting to the Point
Continued from page 1

was when we were learning about the person who made a type of chocolate.” Or “I learned that James was one of the first ones to make chocolate.” Not really. But I did get comments like “The James Lick chocolate story was exciting because we got to know James Lick’s life and what he did.”

Another activity based on something we did during Project ASTRO training was designing alien life forms using clay. “[Making aliens] was my favorite because we got to use playdoo(sic) and work with our friends to make ideas for alien parts.”

Comet making is a great activity that we do once each year. “[Comet making] was one of my most unique and interesting experiences.” High praise or a person with very low expectations, I don’t know which. “The way [comet making] was exciting because we were using dry ice.” The dry ice was the point of interest for another student, “The thing I liked about the comets is I liked when the comets were smoking.” One person almost remembered the entire comet/meteor recipe, “I liked making the meteor out of dry ice, water, corn starch (actually corn syrup), and dirt.” Other students recalled the strong smell from the ammonia that we used.

Another activity that we learned during Project ASTRO training was to make a model of the solar system using toilet paper to determine the representative distances between each planet. “It was fun making a mess with the toilet paper.”

Now I fully understand that the students were at least partially coerced into making the cards by the teacher. But apparently the only requirement was to write about one thing. So I thought it was interesting that one student almost covered every visit. “It was fun when we did the alien, comets, light waves/sound waves, James Lick/chocolate, light refracting glasses, saw rainbows when looking at light, temperature graph, toilet paper solar system, colored “NASA” picture – pixels, and also glasses to look at sun.”

So what is my point? I just want to make it clear how the amateur astronomer payment system works. At a star party you get paid in exclamations, “Wow!”, “Cool!”, “Is that real?” In Project ASTRO the payoff might come in comments like the ones listed here or the ones that you get from the students themselves. They come back a year or two later and say “Remember me, Mister Kohlmiller?”. And if Jennifer is there she helps me out, “Jeff was in the class last year”. “Hey Jeff, how’s school going this year?”

There are reasons for not doing Project ASTRO. The visits require an hour or two. If you can’t spare the time there is nothing I can say. But every other objection can be countered. You don’t know all the answers to the questions they might ask? Say so, tell what you do know, then watch the ASP video for handling these questions. Kids scare you? Well, they’re kids and you’re an adult. You are most likely to be teaching fifth graders which is a good age: not yet steeped in attitude.

Each year Project ASTRO tries to create teacher-astronomer partnerships. Some years they have more teachers than astronomers and sometimes the other way around. This year it seems astronomers are needed and San Jose is a particular area. If you are interested, find out more at http://www.astrosociety.org/baprojectastro.html.

These pictures show students doing one of my favorite first-visit-of-the-year activities. They plot the average high temperatures for various cities, some in the northern hemisphere and some in the southern hemisphere. The stark difference in the plots are used to prove this point: the seasonal temperature changes can’t be due to differences in the Sun/Earth distance because part of the Earth has winter at the same time that another part has summer. Once we prove that the seasons aren’t caused by distance, then it is easier to explain how the Earth’s tilt is the key factor. Photos by the author.
Directions to Houge Park

Houge (rhymes with “Yogi”) Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three blocks, cross Sunrise Drive, then turn left into the park.

From Hwy. 85, take the Bascom Avenue exit. Go north, and turn right at the first traffic light, onto White Oaks Road. At the first stop sign, turn left onto Twilight Drive. You will now be passing the park. Turn right at the first driveway, into the parking lot.

Observatory Fund

The SJAA Board of Directors has released the following statement:

“The SJAA Board Of Directors has dissolved the Observatory Committee and plans to absorb Observatory Fund donations into the club’s General Funds. This ad will be run in the May, June and July Ephemeris seeking input from any donors regarding these plans. If you are a donor and would like to comment, please contact the Board of Directors.”

For additional background information, the following information is from last August’s SJAA Ephemeris. The author is Greg Claytor.

PUBLIC NOTICE IS HEREBY GIVEN that the San Jose Astronomical Association, a California nonprofit public benefit corporation 501(c)(3), will terminate its effort to obtain or construct an observatory using its Observatory Fund, that it no longer has any plan now or in the future to obtain or construct an observatory and that, without objection, its board of directors will re-direct the clubs Observatory Funds into other acquisitions and/or activities.

If you have contributed to this fund, have knowledge of others who may have contributed to this fund or have any interest at all in this fund, please contact the San Jose Astronomical Association by mail:

San Jose Astronomical Association PO Box 28243 San Jose, CA 95159-8243

Ed. Note: This is the third and final notice.

New Logo

You may have noticed the new SJAA Logo on the cover of this newsletter. It is the work of Rob Jaworski. Thanks Rob.

SJAA Yosemite Public Star Party 2010

Jim Van Nuland

The annual SJAA Yosemite star party will be held on September 3, 4, and 5, at Glacier Point in Yosemite National Park. Up to 30 people will be given free admission and camping, in exchange for three public events on Friday, Saturday, and Sunday evenings. The rest of the time we can be tourists.

We are expected to have at least one scope per two people, and to attend at least two of the star parties, not just Friday or Saturday. Sunday is expected to be nearly as busy as Friday and Saturday. For these reasons, this is probably not suitable for a family camping trip.

The camping is rough by modern standards: no dining room, no showers, no hot water. Read about it on the SJAA Yosemite page http://www.sjaa.net/yosemite.shtml, then contact me with questions. That page also has sun and moon rise and set times.

If you can tolerate the limitations, tell me the number of people you’ll have, and the number of scopes that will be set up for the public. E-mail me at jvn@sjpc.org, or phone 408-371-1307 11 a.m. to 11 p. m. Priority is given to SJAA members.
The Last Month In Astronomy

13-JUN-2010  **Hayabusa Returns**  The Hayabusa reentry capsule has been found in Australia. This spacecraft was launched by the Japan Aerospace Exploration Agency, JAXA, in May 2003. It landed on the asteroid Itokawa but it isn’t certain how many samples were successfully captured and if they are intact in the capsule. This spacecraft had a number of problems to overcome and it was not at all guaranteed that it would survive reentry. [http://www.jaxa.jp/projects/sat/muses_c/index_e.html](http://www.jaxa.jp/projects/sat/muses_c/index_e.html)

10-JUN-2010  **Exoplanet Motions**  For the first time, astronomers have been able to follow the motion of an exoplanet as it moves from one side of the star to the other side. This planet has an orbit about the size of Saturn’s, the smallest orbit of an exoplanet that can be directly imaged. This planetary system is young and that shows that so-called gas giant planets can form within planetary discs in just a few million years. [http://www.portaltotheuniverse.org/news/view/61853/](http://www.portaltotheuniverse.org/news/view/61853/)

10-JUN-2010  **Why Mars Has No Organics**  If it is true that Mars harbored life at some point in its past then we should be able to find organics on the planet now even if life went extinct more than a billion years ago. New research has found reasons for the lack of organics. The combination of iron oxides and an abundant supply of UV radiation can break down the organics. This means that the next thing to search for on the Martian surface is the remnants of these reactions. [http://www.liebertonline.com/doi/pdfplus/10.1089/ast.2009.0433](http://www.liebertonline.com/doi/pdfplus/10.1089/ast.2009.0433)

08-JUN-2010  **Methane Eaters**  It sounds like science fiction but researchers from the SETI Institute and a couple of Canadian universities have discovered methane-eating bacteria. They were found in Canada’s extreme northern reaches. The researchers were looking for methane-creating bacteria but that search came up empty. Instead they found anaerobic bacteria growing in a very cold and salty spring. These bacteria survive in temperatures that are much colder than the warmest parts of Mars. And it opens the possibility of similar bacteria on Titan. [http://www.astrobio.net/pressrelease/3519/methane-eaters-at-lost-hammer](http://www.astrobio.net/pressrelease/3519/methane-eaters-at-lost-hammer)

07-JUN-2010  **Rocket Sets Speed Change Record**  Excuse me if this sounds trivial but NASA’s ion-fueled Dawn spacecraft has set a record. The record is for the greatest velocity change produced only by the engine of a spacecraft. The spacecraft achieved an accumulated acceleration of more than 9,600 miles per hour. The Dawn spacecraft is heading toward Vesta and Ceres, the first and fourth largest asteroids. True, this total acceleration took a long time, 620 days to be exact. But on the other hand it only needed 363 pounds of propellant (xenon). And the new record will not stand. Dawn is expected to eventually achieve a total velocity change of 24,000 miles per hour over 2,000 days of propulsion. [http://www.jpl.nasa.gov/news/news.cfm?release=2010-192&rn=news.xml&rst=2626](http://www.jpl.nasa.gov/news/news.cfm?release=2010-192&rn=news.xml&rst=2626)

04-JUN-2010  **Falcon 9 Flies**  The Space Exploration Technologies’s Falcon 9 rocket successfully put a dummy spacecraft in orbit. NASA Administrator Charles Bolden said ‘Space X’s accomplishment is an important milestone in the commercial transportation effect and puts the company a step closer to providing cargo services to the International Space Station.’ This launch of the Falcon 9 gives us even more confidence that a resupply vehicle will be available after the space shuttle fleet is retired.” [http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-132_SpaceX_Launch.html](http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-132_SpaceX_Launch.html)

04-JUN-2010  **Non-acidic Water on Mars**  Sometimes an observation is made but the science from that observation takes years. In 2005, the Mars Rover Spirit studied an outcrop that demonstrated that water was present some time ago. Nothing terribly unique about that, right. But the rover found carbonates although it took a lot of earth-based lab work to confirm the finding. Carbonates would erode in an acidic environment so their presence means that water, at least in this area, was not acidic and therefore more habitable. [http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-131_SPIRIT_FINDINGS.html](http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-131_SPIRIT_FINDINGS.html)

03-JUN-2010  **Green Fuzzies**  The Gemini’s telescope Near-Infrared Imager has been studying some green fuzzy regions. These regions appear in the infrared spectrum at 4.5 microns, this often gets printed with the color green. The latest data shows that these regions are molecular hydrogen’s emissions believed to be associated with massive young stellar objects (MYSOs). Another green fuzzy associated with a different MYSO shows up as green because the infrared bands that printed in blue or red are suppressed by gas and dust. [http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-131_SPIRIT_FINDINGS.html](http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-131_SPIRIT_FINDINGS.html)

28-MAY-2010  **SOFIA First Light**  The Stratospheric Observation for Infrared Astronomy, SOFIA, has achieved first light. The Boeing 747-based observatory has a 2.7 meter reflecting telescope that was built in Germany. The first light flight took off from NASA’s Dryden facility in Palmdale, CA. The 8 hour flight reached a height of about 35,000 feet with a crew of 18 persons not counting pilots. The objects imaged in infrared were Jupiter and the galaxy M82. SOFIA gets above 99% of the planet’s water vapor which enables it to image in the parts of the infrared spectrum that do not usually reach Earth’s surface. These first light images were an unqualified success. [http://www.dlr.de/en/desktopdefault.aspx/tabid-1/117_read-24659/](http://www.dlr.de/en/desktopdefault.aspx/tabid-1/117_read-24659/)
Loaners
The loaner program offers members a means to try scopes of various sizes and technologies before you buy. For more information please see the loaner program web page: http://www.sjaa.net/loaners

Q & A
Q: What are the percentages that the Sun will survive the Milky Way’s collision with Andromeda by a) being ejected into a tail; b) ending up 100,000 lightyears from the new galactic center; c) switch to the Andromeda Galaxy?
A: a) 12%; b) 50%; c) 3%. (“Death from the Skies”, Phil Plait, pg. 257)

Hot Dates
Golden State Star Party, July 10-14, Adin, California. For more information, see http://www.goldenstatestarparty.org.

SETIcon - Aug. 13-15, Santa Clara. SETIcon will offer fascinating and fun panels about astrobiology and SETI research, with speakers ranging from SETI Institute scientists to science fiction actors. We’ll have four simultaneous program tracks: general sessions, hard-core science, education/family activities, and individual sessions. For more info go to: http://www.seticon.com/

SJAA Yosemite Public Star Party 2010 - Sept. 3-5

“We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces.”
- Carl Sagan

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Articles for publication should be submitted by the 10th of the previous month. The PDF version is generally available by the 24th of the previous month and the HTML version by the last day of the previous month.
San Jose Astronomical Association Membership Form

- New  - Renewal (Name only if no corrections)

Membership Type:
- Regular — $20
- Regular with Sky & Telescope — $53
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Subscribing to Sky & Telescope magazine through the SJAA saves you $5 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

- I prefer to get the Ephemeris newsletter in print form. The newsletter is always available online at http://ephemeris.sjaa.net

Questions?
Send e-mail to membership@sjaa.net

Bring this form to any SJAA Meeting or send to the club address (above). Please make checks payable to “SJAA”.

You can join or renew online:
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