



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

April (late)

- 23 Houge Park star party. Sunset 7:50 p.m., 78% moon sets 3:49 a.m.
Star party hours: 8:45 until 11:45.
- 25 **Auction XXX. Open at noon. Selling 1:00 to about 5 p.m. in the hall at Houge Park. See <http://sfbay.craigslist.org/sby/eve/1582539763.html> for more details. To post items to be offered at the Auction go to <http://tech.groups.yahoo.com/group/sjaauction/>.**

May

- 7 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA.
- 7 Houge Park star party. Sunset 8:03 p.m., 31% moon rises 3:00 a.m.
Star party hours: 9:00 until midnight.
- 8 Dark Sky weekend. Sunset 8:04 p.m., 31% moon rises 3:25 a.m.
- 15 Dark Sky weekend. Sunset 8:10 p.m., 6% moon sets 10:23 p.m.
Henry Coe Park's "Astronomy" lot has been reserved.
- 21 Houge Park star party. Sunset 8:15 p.m., 65% moon sets 2:21 a.m.
Star party hours: 9:15 until midnight.
- 29 **General Meeting** at 8 p.m. Our speaker is Dr. Bradford Holden of Lick Observatory, speaking on The Physical Evolution of Massive Galaxies.

June

- 4 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA.
- 4 Houge Park star party. Sunset 8:24 p.m., 47% moon rises 1:26 a.m.
Star party hours: 9:30 until midnight.
- 5 Dark Sky weekend. Sunset 8:25 p.m., 37% moon rises 1:51 a.m.
- 12 Dark Sky weekend. Sunset 8:29 p.m., No moon. Henry Coe Park's "Astronomy" lot has been reserved.
- 18 Houge Park star party. Sunset 8:31 p.m., 51% moon sets 12:54 a.m.
Star party hours: 9:45 until midnight.
- 29 **General Meeting** at 8 p.m. Our speaker is Brian Day of NASA/Ames, who will speak on the LCROSS mission.

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>

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 column will be repeated in the June and July issues of the SJAA Ephemeris but not on the front page.



A Menagerie of Mad Moons

Akkana Peck

Saturn is the biggest show in the May evening sky. It's already up when it gets dark, a bit over a month past opposition, and its rings are still very close to edge on — less than two degrees as viewed from Earth.

And it has a few moons, of course. Aside from bright Titan (magnitude 8.4), Saturn's moons are elusive targets compared to Jupiter's four Galilean moons. But Saturn's moons make up for lack of brightness with sheer numbers. It has so many that it's hard even to list how many moons Saturn has, since more are being discovered all the time. <http://saturn.jpl.nasa.gov/science/moons/> lists 54 named satellites (by the time you read this that number may have changed again), and of course there are hundreds of smaller ones — even if you don't count the millions of particles that make up the spectacular ring system.

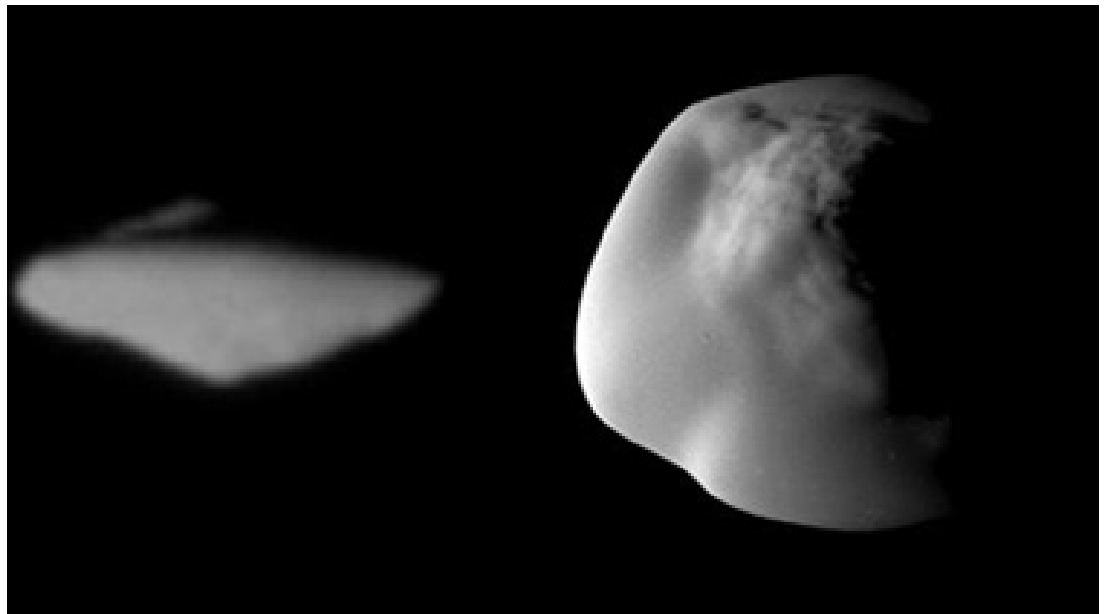
For an observer with a small telescope, your main targets will be Rhea, Tethys, and Dione, all around 10th magnitude. Owners of larger scopes can add 12th magnitude Enceladus. And both groups can target the odd moon Iapetus: like one of those sugar cookies half dipped in chocolate, Iapetus' leading edge is very dark while the trailing edge is bright, so its brightness varies between 10th and 12th magnitude depending on which side is pointing toward us.

Saturn has other fascinating but less observable moons. Perhaps the weirdest are the miniature "flying saucers" Pan and Atlas. Both are tiny — only about 10 and 20 km respectively — which unfortunately makes them far too

faint to see with a small Earth-based telescope. They probably each play a part in maintaining order in Saturn's ringsystem: Pan is actually inside the Enke division in Saturn's A ring, while Atlas skirts the outer edge of the A ring.

And don't discount Titan. Though it's no longer the largest moon in the solar system (Jupiter's Ganymede turned out

sits a few degrees below gibbous Venus in the evening twilight sky. It should be a lovely view, and a beautiful start to any star party. Parts of Asia and Africa will see an occultation, but from here Venus and the moon never get closer than a few degrees (they will have set before they make their closest pass). Venus also passes near the open cluster M35 around May 21st, a Friday, so grab



The unusual flying saucer shape of the Saturnian moon Atlas is seen in this photo from NASA.

to be larger), Titan is plenty interesting. It has methane lakes, and may have a "methane cycle" much like Earth's hydrologic cycle, with liquid methane and ethane raining down into lakes and rivers, which then evaporate into clouds before raining down again. A report in the last month predicted a huge underground ocean of methane, based on analysis of Titan's gravitational influence on the Cassini spacecraft.

So there's plenty to look at — and think about — while you're looking at Saturn.

Venus is also prominent in May's early evening skies. If you're star partying on the evening of Saturday the 15th, a slim crescent moon, just two days past new,

a binocular or wide-field telescope and take a look.

Mars is still visible in the evening sky, but it has shrunk to half its opposition diameter. It's getting tough to see any detail on such a small disk! But if you've been watching it throughout its opposition, you'll probably still be able to make out some of the major features.

The rest of the planets — Jupiter, Uranus, Neptune, and Pluto — are in the morning sky. Mercury, which spends most of May hiding out behind the sun, joins the other morning planets at the end of the month.

It's tough to be a geologist when you can't tell one rock from another. Is that a meteorite or a chunk of lava? A river rock or an impact fragment? Houston, we have a problem!

It's a problem Spirit and Opportunity have been dealing with for the past six years. The two rovers are on a mission to explore the geology of the Red Planet, yet for the longest time they couldn't recognize interesting rocks without help from humans back on Earth.

Fortunately, it is possible to teach old rovers new tricks. All you have to do is change their programming—and that's just what NASA has done.

"During the winter, we uploaded new software to Opportunity," says Tara Estlin, a rover driver, senior member of JPL's Artificial Intelligence Group, and the lead developer of AEGIS, short for Autonomous Exploration for Gathering Increased Science. "AEGIS allows the rover to make some decisions on its own."

Estlin and her team have been working for several years to develop and upload increasingly sophisticated software to the rovers. As a result, the twins have learned to avoid obstacles, identify dust devils, and calculate the distance to reach their arms to a rock.

With the latest upgrade, a rock hound is born.

Now, Opportunity's computer can examine images that the rover takes using its wide-angle navigation camera (NavCam) and pick out rocks with interesting colors or shapes. It can then center its narrower-angle panoramic camera (PanCam) on targets of interest for close-up shots through various color filters. All this happens without human intervention.

The system was recently put to the test; Opportunity performed splendidly.

At the end of a drive on March 4th, the rover settled in for a bit of rock hunting. Opportunity surveyed the landscape

and decided that one particular rock, out of more than 50 in the NavCam photo, best met criteria that researchers had set for a target of interest: large and dark.

"It found exactly the target we would want it to find," Estlin says. "It appears to be one of the rocks tossed outward onto the surface when an impact dug a nearby crater."

The new software doesn't make humans obsolete. On the contrary, humans are very much "in the loop," setting criteria for what's interesting and evaluating Opportunity's discoveries. The main effect of the new software is to strengthen the rover-human partnership and boost their combined exploring prowess.

Mindful that Opportunity was only supposed to last about six months after it landed in 2004, Estlin says "it is amazing to see Opportunity performing a brand new autonomous activity six years later."

What will the rock hounds of Mars be up to six years from now? Stay tuned for future uploads!

Learn more about how the AEGIS software works at <http://scienceandtechnology.jpl.nasa.gov/newsandevents/newsdetails/?NewsID=677>. If you work with middle- or high-school kids, you'll find a fun way to explore another kind of robot software—the kind that enables "fuzzy thinking"—at http://spaceplace.nasa.gov/en/educators/teachers_page2.shtml#fuzzy.



Opportunity spots a rock with its NavCam that its AEGIS software says meets all the criteria for further investigation

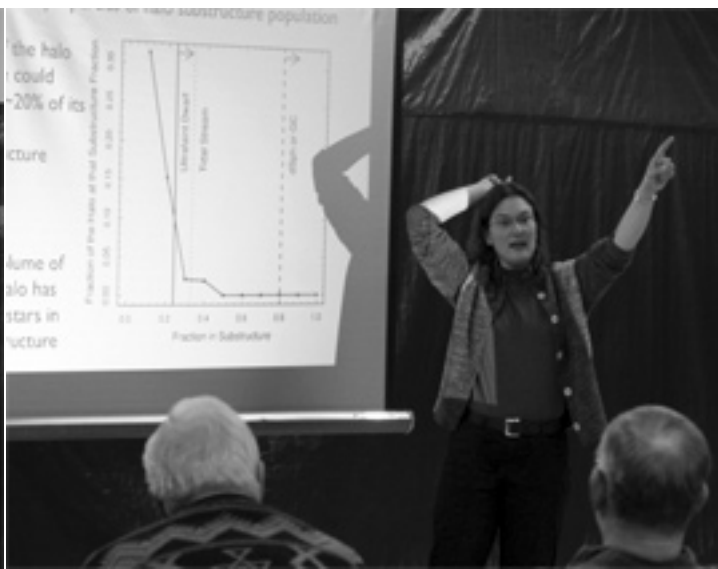
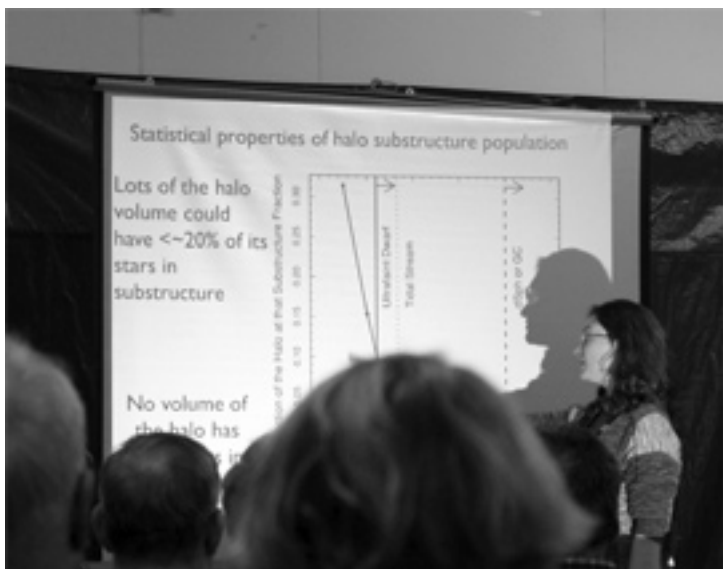
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Photos



The picture above shows Dr. Peter Jenniskens and part of the great crowd that came to hear his talk last January 30th. It was fascinating to hear about the ultimately successful hunt for meteorites in the deserts of Sudan. Bottom left shows Rob Sigler who came to talk to us August 1, 2009. He was discussing the significant improvements that could be realized with liquid-filled apochromats. The bottom right photo shows Brian Kruse talking about Project ASTRO at the February meeting. All of these talks are at Houge Park during the General Meeting which is always at 8 p.m. on Saturday.





The photos above are from the latest General Meeting held March 27 when Dr. Constance Rockosi from the UC Lick Observatory gave a talk on the structure of the Milky Way. Below left is Rogelio Bernal Andreo (February 27) who gave a talk on amateur astrophotography using sites in Santa Clara county or nearby. You can see his work at <http://blog.deepskycolors.com/>.



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

08-APR-2010 **Volcanoes on Venus** The European Space Agency (ESA) has a spacecraft called Venus Express which has been orbiting the solar system's hottest planet for the last 4 years. It has found compelling evidence that volcanoes on that planet are active. An instrument onboard called VIRTIS (Visible and Infrared Thermal Imaging Spectrometer) can see through the Venusian clouds and sees the surface is glowing in some infrared frequencies. The glowing areas are probably lava flows. The next step is to find rocky materials that might be the same as those on Venus and see their infrared signatures when they are heated up to 600 degrees Celsius. http://www.dlr.de/en/desktopdefault.aspx/tabid-1/117_read-23529/

08-APR-2010 **Global Hawk Flies** NASA has successfully completed the first science flight of the unpiloted Global Hawk aircraft. This robotic plane can fly as high as 60,000 feet (about twice the usual cruise height of a commercial passenger jet) and it can stay up for 30 hours. David Fahey, a research physicist at NOAA's Earth System Research Laboratory (Boulder, CO) says "The Global Hawk is a fantastic platform because it gives us expanded access to the atmosphere beyond what we have with piloted aircraft. We can go to regions we couldn't reach." <http://www.jpl.nasa.gov/news/news.cfm?release=2010-120&rn=news.xml&rst=2554>

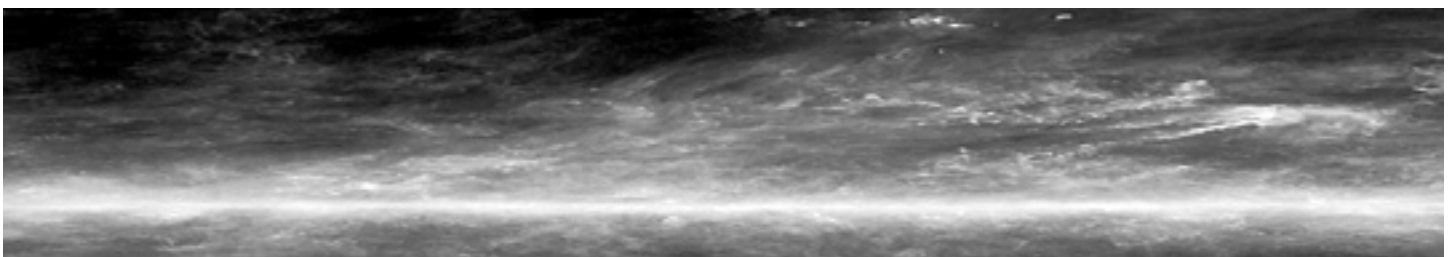
07-APR-2010 **Summer on Triton** The first infrared analysis of the Neptunian moon, Triton, shows that the thin atmosphere thickens during its summer. The ESO's Very Large Telescope also discovered carbon monoxide and methane. A season on Triton lasts 40 years and the last summer solstice occurred in 2000. The summer season, still around -235 degrees Celsius, causes frozen nitrogen, carbon monoxide and methane to sublimate. The summer atmosphere on Triton is estimated to be 4 times thicker now than it was when Voyager 2 flew past Neptune in 1989. That still leaves an atmosphere that is 20,000 times less than the atmosphere on Earth. http://www.eso.org/public/news/eso1015/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+EsoTopNews+%28ESO+Top+News%29

06-APR-2010 **Brown Dwarf Planet** A planet-like object has been found around a brown dwarf. The object formed in less than 1 million years, the age of the brown dwarf itself. This goes against some models of planet formation. According to Kevin Luhman of the Center for Exoplanets and Habitable Worlds at Penn State University "it appears that nature is able to make planetary-mass companions through two very different mechanisms." <http://www.astronomy.com/asy/default.aspx?c=a&id=9728>

31-MAR-2010 **Forensic Astronomy** Astronomers have assembled 3-4 perspectives of supernova remnant Cassiopeia A. Alex Filippenko from Berkeley says "Light echoes allows us to conduct forensic studies of stars that exploded long ago, before modern astronomical instruments became available. It's kind of like getting photographs of a crime that was committed years ago, before cameras existed." Alex and friends made the light-echo measurements. The echoes are found in light bouncing off of interstellar dust. Most of the light from Cass A swept past Earth 330 years ago. The echoes that are bouncing off of dust is light that simply took a longer path to get here. The measurements were made using the Maxall 4-meter telescope at Kitt Peak and the 10-meter Keck 1 telescope. The new measurements show that the supernova explosion was asymmetrical. http://keckobservatory.org/index.php/news/astronomers_see_historical_supernova_from_new_angle/

30-MAR-2010 **LHC sets record** A focused collision of protons at the Large Hadron Collider set a new energy record of 7 trillion electron volts. Scientists at Berkeley built the detector called ATLAS and the experiment called ALICE which will be used when the LHC changes from protons to heavy ions which should produce a quark-gluon plasma. <http://newscenter.lbl.gov/news-releases/2010/03/30/lhc-new-physics/>

17-MAR-2010 **Planck Images Cold Dust** The Planck spacecraft, an ESA mission launched a year ago, has imaged a swath of the Milky Way. It shows the bright band of the disk. The image was taken in the far infrared. Charles Lawrence, the NASA project scientist for this mission, says "We can see the cold dust and gas that permeate our galaxy on very large scales, while other missions like Herschel can zoom in to see the detail." Image below is from ESA and the HFI Consortium, IRAS. NASA Photo ID is PIA12964 <http://jpl.nasa.gov/news/news.cfm?release=2010-087>



It Must Be Astronomical ...

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>

Hot Dates

Golden State Star Party, July 10-14, Adin, California. Early registration is \$60 and registration is now open. 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

CalStar - Oct. 7-10. <http://www.observers.org/CalStar/>

Elections 2010

The elections of officers for the SJAA board was done during the board meeting in March. The current officers were all elected to continue in those positions for another year.

Q & A

Q: What is the distance to the closest black hole?

A: The closest know black hole is Cygnus X-1 which is 1,600 lightyears away. But there may be millions of black holes in the galaxy. How often does one come near to us? Just ordinary stars come within 1 parsec (3.26 lightyears) about once in a 100,000 years. There are thousands of stars for every black hole. ("Death from the Skies", Phil Plait, pg. 161)

"All of the books in the world contain no more information than is broadcast as video in a single large American city in a single year. Not all bits have equal value." - Carl Sagan

Officers and Board of Directors

Pres Rich Neuschaefer
VP Greg Claytor
Sec Mark Wagner
Tres Robert Armstrong
Dir Lee Hoglan
Dir Gordon Reade
Dir Rod Norden
Dir Kevin Roberts
Dir Rob Jaworski

School Star Party Chairman

Jim Van Nuland (408) 371-1307

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San Jose, CA 95159-8243

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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.

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San Jose Astronomical Association Membership Form

P.O. Box 28243 San Jose, CA 95159-8243

New **Renewal** (Name only if no corrections)

Membership Type:

- Regular — \$20
 Regular with Sky & Telescope — \$53
 Junior (under 18) — \$10
 Junior with Sky & Telescope — \$43

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:

<http://www.sjaa.net/SJAAmembership.html>

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