

# EPHEMERIS

## December 2011

### SJAA Activities Calendar

Jim Van Nuland

### Mission Juno Launch, August 5, 2011

Jane Houston Jones

#### (late) November

- 26 Dark-Sky weekend. Sunset 4:52 p.m, 5% moon sets 6:30 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

#### December

- 2 Houge Park star party. Sunset 4:50 p.m, 57% moon sets 12:44 a.m. Star party hours: 7:00 until 10:00 p.m.
- 10 General Meeting. Board meeting at 6:30; General Meeting at 8:00. Our speaker is Dr. Bruce Margon, on "Glimpsing the Edge of the Universe: Results from the Hubble Space Telescope". **Holiday Party - Bring your favorite dessert or appetizer to share. Contributions of food or drink are appreciated but not necessary. No alcohol, please.**
- 16 Astronomy Class at Houge Park. 7:00 p.m. The topic: The Sun, planets and minor solar system objects.
- 16 Houge Park star party. Sunset 4:52 p.m, 60% moon rises 11:23 p.m. Star party hours: 7:00 until 10:00 p.m.
- 17 Dark-Sky weekend. Sunset 4:52 p.m, 33% moon rises 1:33 a.m.
- 24 Dark-Sky weekend. Sunset 4:55

p.m, 5% moon sets 6:30 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

- 30 Houge Park star party. Sunset 4:59 p.m, 40% moon sets 11:30 p.m. Star party hours: 7:00 until 10:00 p.m.

#### January

- 7 General Meeting. Board meeting at 6:30; General Meeting at 8:00. Our speaker is Dr. Alex Filippenko (UC Berkeley) on "The Birth and Early Evolution of the Universe".
- 13 Astronomy Class at Houge Park. 7:00 p.m. The topic: Winter Constellations / Highlight Objects. (outdoors)
- 13 Houge Park star party. Sunset 5:12 p.m, 74% moon rises 10:22 p.m. Star party hours: 7:00 until 10:00 p.m.
- 14 Dark-Sky weekend. Sunset 5:13 p.m, 62% moon rises 11:30 a.m.
- 21 Dark-Sky weekend. Sunset 5:20 p.m, No moon. Henry Coe Park's "Astronomy" lot has been reserved.
- 27 Houge Park star party. Sunset 5:26 p.m, 23% moon sets 10:14 p.m. Star party hours: 7:00 until 10:00 p.m.

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

Two weeks after I started work at NASA's Jet Propulsion Laboratory in late 2003 I was given my first "real" assignment. I was asked to sit in on Mission Juno's design meetings and write the E/PO (Education and Public Outreach) proposal outline for the mission, a page-and-a-half summary with a budget. It was exciting to delve into a new kind of out-of-this-world work and begin a dream-come-true job as the informal and public outreach person on the Cassini Mission, with occasional planetary mission proposal writing forays.

Fast forward nearly 8 years and I find myself sitting in the shadows of Kennedy Space Center writing a blog about my own adventures at the launch of the mission which launched my own career at JPL. There will be many blogs, photo essays, and tweets from the 150 Tweetup attendees and many other launch guests. Mojo was one of the lucky 150 attendees at the tweetup and his blog is at <http://mojo.whiteoaks.com/2011/08/11/the-nasa-tweetup-to-launch-juno/>.

My job at the launch was threefold. My first role was at the NASA tweetup itself. I've been the @CassiniSaturn Twitter persona since June 2008, and

*Continued on page 2*

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

*Juno Mission Launch*  
*Continued from page 1*

so I was working the tweetup backing up my outer planetary mission buddy @NasaJuno on Twitter duty the hours leading up to, at and after launch. I was also on hand to talk about NASA's Year of the Solar System and show my What's Up podcast during the hour just before launch at the Tweetup.

My second job was to organize a "star party" for the launch guests and create a flyer for all the attendees. The guests included the Juno mission's invited Goldstone Apple Valley Radio Telescope Program students and educators, who came out to my star party. Each of the several thousand launch goodie bags had that star chart flyer featuring Saturn, the moon, Jupiter and Vesta, with a link to my What's Up for August 2011

podcast and to NASA's Year of the Solar System website outreach material. The podcast and website feature the Juno mission and planetary windy worlds like Saturn and Jupiter this month.

My third role was to participate in the Planetary Science Mission Directorate's "Scientists in Action" webcast, live-streamed to museum audiences remotely. Museum audiences all over the country, and probably the world, watched this and other Juno launch programming.

In addition to the "work," I was also a starry-eyed space girl at the NASA Tweetup, and was beyond excited to see my first launch. Just like the others, I was lapping up all the speaker comments and tweeting from @jhjones like crazy, when I wasn't tweeting from

@CassiniSaturn or @NASAJuno. I was stunned at the amazing bus tour stops, in spite of the sweltering heat. And I soaked up the electric camaraderie and atmosphere of everyone at the Tweetup program.

Although it was a "you had to be there" kind of event, I hope these pictures (<http://jane.whiteoaks.com/2011/08/14/mission-juno-launch-august-5-2011/>) and tales give you a taste of the magic that is NASA. I almost can't believe I get to go to NASA planetary mission launches at Cape Canaveral/Kennedy Space Center for work! And share the excitement of Cassini, Juno, and next month, Grail with informal education outreach! I'm not on cloud nine, I'm above it!



*This image of the Orion Nebula (M42) was taken during the early morning of October 30, 2011. The imager was a Canon Rebel EOS T2i. The telescope is a Meade LX 200 ACF 12". This image is a single 30 second exposure with ISO setting of 3200. It was minimally processed in Photoshop CS2 using a product called "Annie's Actions" sold by Anna Morris. Image by Paul Kohlmeier*

## Winter Moon Dance

Akkana Peck

Jupiter is high in the sky throughout most of this December's evenings, bright and easy to observe.

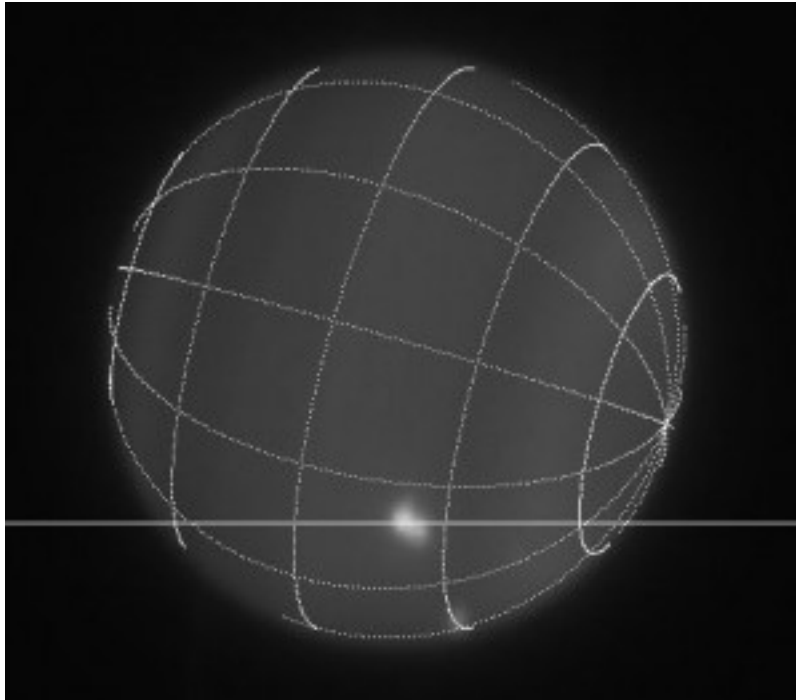
As I wrote last month, this year's Jupiter opposition is an unusually large, close one, and it's even reasonably high in the sky, transiting at 63 degrees. You should be able to see all its major bands, the four Galilean satellites and their shadows, and the great red spot (GRS) with nearly any telescope. On a good night with good optics, crank up the magnification and you can see a lot more. Look for festoons — white swirls of turbulence, especially in the area following the GRS— and barges, unexplained small dark spots.

Double shadow transits — times when two or more of Jupiter's biggest moons are casting their shadows on the planet — are among the easiest and most fun Jovian shows to watch. Unfortunately, they've been rare of late. The only one I could find this month is on Tuesday night, December 27, but it's an exceptionally good show. The fun starts before it's fully dark, a bit at 5:30, when Europa begins a transit of Jupiter's face. The three other moons are all clustered nearby.

About ten minutes later, Ganymede's shadow begins a transit right next to Europa. Transits of the moons themselves are often hard to follow: it's easy to see a moon standing out against the relatively dark limb of the planet, but then you tend to lose track of the moon as it moves in toward the brighter center of Jupiter's disk. In this case, you'll

be able to follow Ganymede's shadow all the way across the disk to help you find Europa.

Shortly after 7:35, Europa's shadow enters the disk's southeast limb, while Europa and Ganymede's shadow continue their allemande over on the southwest edge. Europa and the shadow finally exit the disk around 8 p.m. (Europa first, then Ganymede's shadow). Europa's shadow continues its solo transit for another two hours, until a bit



*Ed. note: On October 26, 2011, a new storm was detected on the Uranus as shown in this infrared image provided by Larry Sromovsky of the University of Wisconsin-Madison. He used the Gemini North telescope. Amateurs were encouraged to take images and hopes are high for some Hubble images but such storms may disappear in a few days. It may represent a cloud formation created by icy methane leading to an anvil cloud shape high in the planet's atmosphere.*

after 10 p.m.

It all looks like an excellent show, of a sort that has become all too rare lately, so check it out if your skies are clear that day. Maybe you can even share a view with friends and relatives visiting over the holidays — or help someone with that Christmas scope they got at the SJAA swap meet last month.

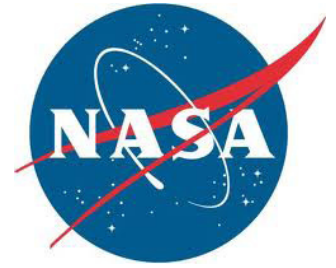
If you get tired of Jupiter (horrors!), you can still catch Uranus and Neptune in December skies. But start early in the evening, as soon as it's fully dark: they begin the evening fairly low in the south and get even lower as the evening progresses. Uranus is Pisces, above Pegasus' withers (at least if you turn your head upside down so that Pegasus isn't lying on his back). Neptune is in Aquarius, near the Capricornus border and about six degrees off Capricornus' left horn.

Venus, too, is in the early evening sky, in gibbous phase; it's relatively close to the sun, so catch it shortly after sunset.

Mercury moves into the dawn sky during the latter half of December, joining Saturn and Mars. Pluto is too close to the sun to observe this month.

December 10th brings us a total lunar eclipse. It is visible in San Jose, but there's a catch: totality lasts from about 6 to 7 am. So those willing to rise early on a Saturday morning will catch a lovely show. Or if you're up late observing on that full-moon Friday night, you can catch the beginning of the eclipse: the penumbral

eclipse starts at about 3:30 am, though it takes a sharp eye to spot any difference during the penumbral phase. The partial (umbral) eclipse starts at 4:45 a.m. Visit [eclipse.gsfc.nasa.gov](http://eclipse.gsfc.nasa.gov) for more detailed timings.



## Re-thinking an Alien World: The Strange Case of 55 Cancri e

Dr. Tony Phillips

Forty light years from Earth, a rocky world named "55 Cancri e" circles perilously close to a stellar inferno. Completing one orbit in only 18 hours, the alien planet is 26 times closer to its parent star than Mercury is to the Sun. If Earth were in the same position, the soil beneath our feet would heat up to about 3200 F. Researchers have long thought that 55 Cancri e must be a wasteland of parched rock.

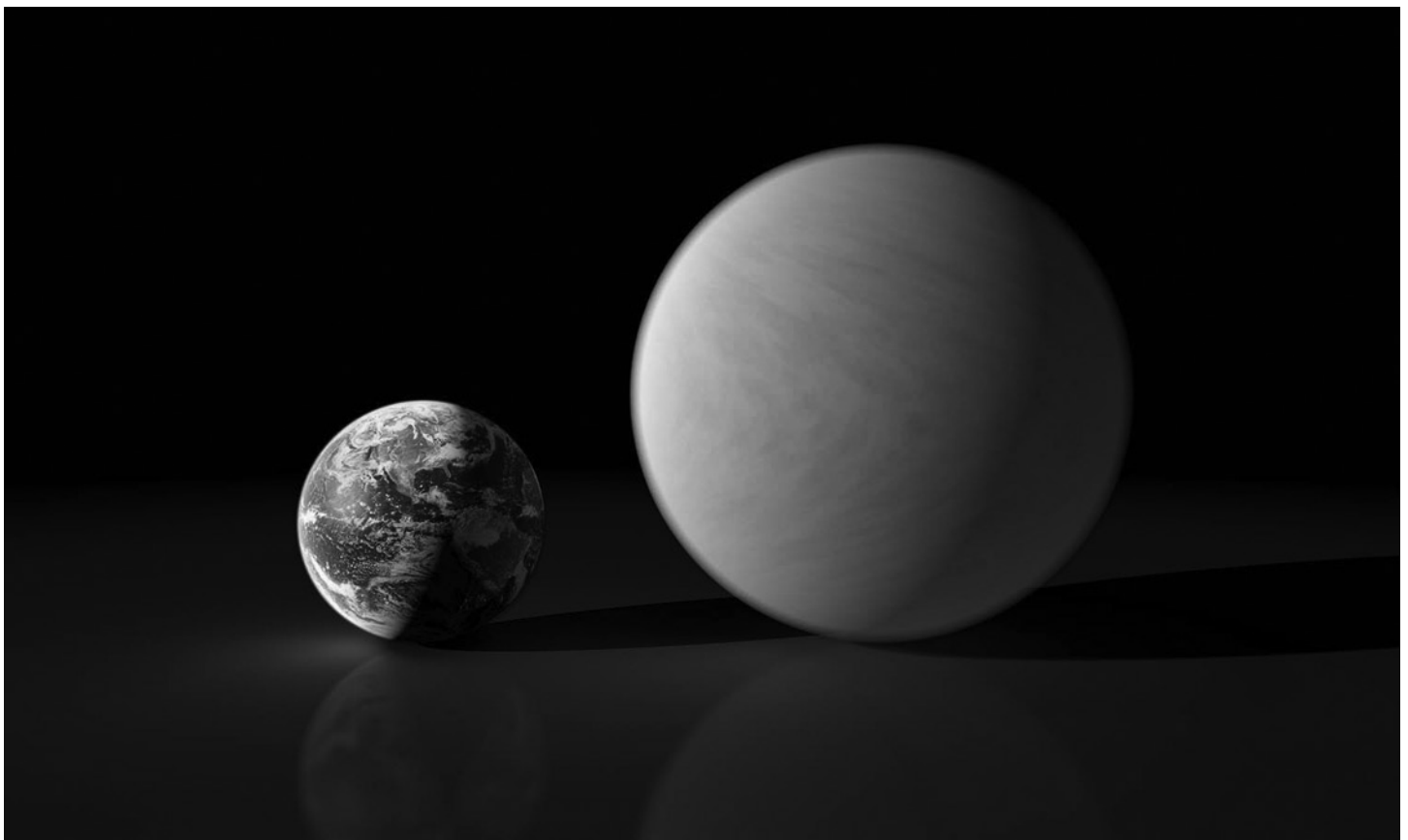
Now they're thinking again. New

observations by NASA's Spitzer Space Telescope suggest that 55 Cancri e may be wetter and weirder than anyone imagined.

Spitzer recently measured the extraordinarily small amount of light 55 Cancri e blocks when it crosses in front of its star. These transits occur every 18 hours, giving researchers repeated opportunities to gather the data they need to estimate the width, volume and density of the planet.

According to the new observations, 55 Cancri e has a mass 7.8 times and a radius just over twice that of Earth. Those properties place 55 Cancri e in the "super-Earth" class of exoplanets, a few dozen of which have been found. Only a handful of known super-Earths, however, cross the face of their stars as viewed from our vantage point in the cosmos, so 55 Cancri e is better understood than most.

When 55 Cancri e was discovered in



Artist's rendering compares the size Earth with the rocky "super-Earth" 55 Cancri e. Its year is only about 18 hours long!

2004, initial estimates of its size and mass were consistent with a dense planet of solid rock. Spitzer data suggest otherwise: About a fifth of the planet's mass must be made of light elements and compounds—including water. Given the intense heat and high pressure these materials likely experience, researchers think the compounds likely exist in a “supercritical” fluid state.

A supercritical fluid is a high-pressure, high-temperature state of matter best described as a liquid-like gas, and a marvelous solvent. Water becomes supercritical in some steam turbines—and it tends to dissolve the tips of the turbine blades. Supercritical carbon dioxide is used to remove caffeine from coffee beans, and sometimes to dry-clean clothes. Liquid-fueled rocket propellant is also supercritical when it emerges from the tail of a spaceship.

On 55 Cancri e, this stuff may be literally oozing—or is it steaming?—out of the rocks.

With supercritical solvents rising from the planet's surface, a star of terrifying proportions filling much of the daytime sky, and whole years rushing past in a matter of hours, 55 Cancri e teaches a valuable lesson: Just because a planet is similar in size to Earth does not mean the planet is like Earth.

It's something to re-think about.

Get a kid thinking about extrasolar planets by pointing him or her to “Lucy's Planet Hunt,” a story in rhyme about a girl who wanted nothing more than to look for Earth-like planets when she grew up. Go to <http://spaceplace.nasa.gov/story-lucy>.

The original research reported in this story has been accepted for publication in *Astronomy and Astrophysics*. The lead author is Brice-Olivier Demory, a post-doctoral associate in Professor Sara Seager's group at MIT.

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



## Last General Meeting

On November 12, 2011, the SJAA General Meeting featured Rogelio Bernal Andreo, astroimager extraordinaire. He has a website at <http://blog.deepskycolors.com/>. The 3 main things I learned from Rogelio were these. First, the application PixInsight works very well with astrophotos. The company is based in Spain where Rogelio was born. The application costs about \$250 less than half the cost of the full version of Photoshop although I got an old copy on EBay for about \$100. Second, the distinction between images that are science and those that are art might be a false dichotomy. Images, whether raw or highly processed, have documentary value. An image of Andromeda made to look like a child's top is artistic but M31 with enhanced colors and greater contrast in the dust lanes still says something about reality. Third, an image becomes memorable because of composition. Rogelio should know, he has had 18 images selected for the website Astronomy Picture of the Day (APOD - <http://apod.nasa.gov/apod/astropix.html>).

Upcoming speakers scheduled include:

**December 10** - Dr. Bruce Margon, his topic: “Glimpsing the Edge of the Universe: Results from the Hubble Space Telescope”.

**January 7** - Dr. Alex Filippenko on “The Birth and Early Evolution of the Universe”.



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## The Last Month In Astronomy

- NOV-10-2011 **Curiosity Ready** The Mars Science Laboratory, aka 'Curiosity', is set to launch on November 25. Its launch window ends on December 18. If all goes well the rover will land near Gale Crater next August. That landing will use a new method involving a Sky Crane to lower the 1 ton rover to the Martian surface. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-347>
- NOV-10-2011 **First stars not so big** Astronomers used to think that the earliest stars were behemoths, more than 100 solar masses. Recent simulations suggest the stars were smaller perhaps less than 50 solar masses. According to Takashi Hosokawa (JPL) the lead author of the study published in the Nov.11 issue of Science, "The first stars were definitely massive, but not to the extreme we thought before. Our simulations reveal that the growth of these stars is stunted earlier than expected, resulting in smaller final sizes." <http://www.jpl.nasa.gov/news/news.cfm?release=2011-348>
- NOV-07-2011 **2005 YU55** The near-Earth asteroid 2005 YU55 came closer to the Earth than the size of the lunar orbit. This was the closest that this asteroid has been for the last 200 years. NASA used the radio telescope at Goldstone to produce a movie of the pass. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-351>
- NOV-05-2011 **Voyager 2 using Backup** Imagine that you have some data backup tape that was created in 1977. And imagine that you are going to use it for the first time in November of 2011. That's not quite a good analogy for Voyager 2 turning on the backup roll control thrusters but it will have to do. After using the roll control thrusters 318,000 times over 34 years the spacecraft has been ordered to switch to the backup. Doing so will save about 12 watts of power. The Voyager 2 power supply is now providing 270 watts. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-341>
- NOV-02-2011 **Mars Always Dry** A new report printed in Nature says that Mars was probably never wet enough or warm enough to support life. True, there might have times when liquid water could be seen on the surface but it was for a very short period only. Lead author Bethany Ahlmann (Caltech/JPL) said "The most stable Mars habitats over long durations appear to have been in the subsurface." So search for life on Mars, even ancient life, will probably require digging implements of some kind. Upcoming missions to Mars include the launch of Curiosity set for late November and Maven with a possible launch in 2013. <http://www.universetoday.com/90587/mars-likely-not-ever-warm-and-wet-enough-for-life-%e2%80%93-at-least-on-surface/>
- NOV-01-2011 **Inverse femtobarn** An inverse femtobarn is a measurement of particle collision events. It comes out to a number of particle collisions that has a magnitude of  $10^{13}$ . The LHC completed a half-year run on October 30, 2011. The total data captured was almost 6 inverse femtobarns. The Higgs particle has quite been nailed down yet but according to a spokesperson "... we have constrained the Higgs particle to the light end of the possible mass range ... this is where both theory and experimental data expected it would be ..." <http://www.universetoday.com/90525/large-hadron-collider-finishes-2011-proton-run/>
- NOV-01-2011 **Mercurial geysers** The MESSENGER spacecraft has found structures on the surface of Mercury that may be geysers of hydrogen. Some of Mercury's crater have features that have a very high albedo (reflectiveness). The hydrogen may have been captured during Mercury's formation. The hydrogen gets released and reacts with iron sulphide which is known to exist on Mercury. The result would be a light dusting of iron and that would be very bright features that are seen. <http://www.universetoday.com/90536/new-features-discovered-on-mercury-could-be-evidence-of-hydrogen-geysers-and-metallic-iron/>
- OCT-25-2011 **Goodbye Elenin** The comet Elenin is gone. This comet was first detected by Russian astronomer Leonid Elenin. It was also given a formal astronomical name, C/2010 X1. Predictably, a number of people took this opportunity to predict all manner of disasters. But the damage was actually done to the comet. As it passed the sun, Elenin disintegrated leaving a faint dust cloud to mark its former grandeur. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-331>
- OCT-20-2011 **Watery planetary disk** The Herschel spacecraft has detected a watery disk around a young star. TW Hydrae is an orange dwarf star, smaller and cooler than the sun. It is surrounded by a disk with a radius of 200 AU. Lead author Michiel Hogerheijde (Leiden Observatory) said "Our observations of this cold vapor indicate enough water exists in the disk to fill thousands of Earth oceans." Previously, scientists found warm water vapor near the central stars of planetary disks. This new study shows that there is a reservoir of water equivalent to thousands of Earth oceans. This water is in the form of ice solids. Water in the form of water vapor is only seen near the star. TW Hydrae is 0.6 solar masses that is 10 million years old. It belongs to a class of young stars called T Tauri stars. It is about 175 light years from the sun. This study further suggests that comets do not form at the further out sections of the solar nebula but instead contain mixtures of ice from all parts of the planet forming disk. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-327>

# It Must Be Astronomical ...

## Upcoming Election

During the February General Meeting the SJAA membership will be asked to elect board members for the 4 positions that are up for election. The incumbents will be running for reelection. They are: Greg Claytor, Rob Jaworski, Robert Armstrong, and Kevin Roberts. In addition, there is one open seat for a partial term. After the new board is elected in February the board selects officers at the March board meeting.

Nominations for the board can be made at the February General meeting but those wishing to be nominated are advised to make themselves known to the club president, Mark Wagner.

## RASC Handbooks and Calendars

RASC Handbooks (\$20) and Calendars (\$15) are available while supplies last. Contact Robert Armstrong to reserve a copy. Copies may still be available at the December General Meeting

## 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.shtml>

## School Star Parties

Completed Events					
	Total Sched.	Good Sky	Partial Success	Cloudy Fail	Cancel at noon
Jul	0				
Aug	1	1			
Sep	1	1			
Oct	6	3			3
Nov	4	2		1	1
<b>Total</b>	<b>12</b>	<b>7</b>		<b>1</b>	<b>4</b>
Scheduled					
Nov	10				
Dec	3				
Jan	3				
Feb	8				
Mar	6				
Apr	1				
<b>Total</b>	<b>31</b>				

*As of November 9, 2011*

## School Star Party Link

For information on school star parties including how to schedule one see <http://www.sjaa.net/school.shtml>. For more detailed information on upcoming star parties go to <http://www.sjaa.net/current.shtml>

### Officers and Board of Directors

**Pres** Mark Wagner  
**VP** Greg Claytor  
**Sec** Rob Jaworski  
**Tres** Robert Armstrong  
**Dir** Lee Hoglan  
**Dir** Rich Neuschaefer  
**Dir** Rod Norden  
**Dir** Kevin Roberts  
**Dir** (Open)

### Ephemeris Staff

**Editors** Paul & Mary Kohlmeier  
**Circulation** Gordon Reade  
**Printing** Accuprint (408) 287-7200

### School Star Party Chairman

Jim Van Nuland (408) 371-1307

### SJAA Email Addresses

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 School Star Parties [schools@sjaa.net](mailto:schools@sjaa.net)  
 Ephemeris [ephemeris@sjaa.net](mailto:ephemeris@sjaa.net)

Other e-mail contacts are available at <http://www.sjaa.net/contacts.html>

Members Email Lists:  
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<http://sanjoseastronomy.blogspot.com/>  
 twitter: [sj\\_astronomy](#)  
<http://www.meetup.com/A-A-N-C/>

### Publication Statement

SJAA Ephemeris, newsletter of the San Jose Astronomical Association, is published monthly.

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

The SJAA Ephemeris is published in three formats: hardcopy, Adobe Acrobat PDF, and HTML. The PDF and HTML versions are found at <http://ephemeris.sjaa.net>.

Articles for publication should be submitted by the 10<sup>th</sup> of the previous month. The PDF version is generally available by the 24<sup>th</sup> 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 (Add \$10 to the dues listed on the left). The newsletter is always available online at <http://ephemeris.sjaa.net>**  
Questions?

Send e-mail to [membership@sjaa.net](mailto: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/membership.shtml>

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**City/ST/Zip:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**E-mail address:** \_\_\_\_\_