



# EPHEMERIS

## March 2012

### SJAA Activities Calendar

Jim Van Nuland

#### (late) February

- 18 Dark-Sky weekend. Sunset 5:50 p.m., 8% moon rises 5:15 a.m.
- 25 Dark-Sky weekend. Sunset 5:57 p.m., 17% moon sets 9:57 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

#### March

- 2 Astronomy Class at Houge Park. 7:00 p.m. The topic: The Moon.
- 2 Houge Park star party. Sunset 6:02 p.m., 61% moon sets 2:25 a.m. Star party hours: 7:00 until 10:00 p.m.
- 4 Solar Observing Session at Houge Park. Hours: 2:00 until 4:00 p.m.
- 10 General Meeting. Board meeting (\*)at 6:30; General Meeting at 8:00. Our speaker is Dr. Graeme Smith of Lick Observatory; his topic "Two Views Of The Moon".
- 11 Daylight Savings Time starts at 2 a.m. Move clocks ahead one hour.
- 16 Houge Park star party. Sunset 7:16 p.m., 28% moon rises 4:14 a.m. Star party hours: 8:15 until 11:15 p.m.
- 17 Dark-Sky weekend. Sunset 7:17 p.m., 18% moon rises 4:51 a.m.
- 24 Dark-Sky weekend. Sunset 7:24

p.m., 6% moon sets 9:44 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

- 30 Houge Park star party. Sunset 7:29 p.m., 54% moon sets 2:46 a.m. Star party hours: 8:30 until 11:30 p.m

#### April

- 7 Possible Board meeting. Hall has been reserved.
  - 8 Auction XXXII - Noon to late afternoon
  - 13 Astronomy Class at Houge Park. 8:30 p.m. The topic: Spring Constellations / Highlight Objects. (outdoors)
  - 13 Houge Park star party. Sunset 7:42 p.m., 42% moon rises 2:52 a.m. Star party hours: 8:45 until 11:45 p.m.
  - 14 Dark-Sky weekend. Sunset 7:42 p.m., 30% moon rises 3:26 a.m.
  - 21 Dark-Sky weekend. Sunset 7:49 p.m., No moon. Henry Coe Park's "Astronomy" lot has been reserved.
  - 27 Houge Park star party. Sunset 7:54 p.m., 38% moon sets 1:22 a.m. Star party hours: 9:00 until midnight.
- (\*) *The Board of Directors meets before each general meeting at 6:30 p.m. All are welcome to attend.*

### Upcoming Speakers

On March 10 our speaker will be Dr. Graeme Smith talking about "Two Views of the Moon". Dr. Smith is from the Lick Observatory.

April is the month of the annual auction. This year it starts at noon on April 8.

On May 5 our speaker will be Marita Beard. She is a high-school teacher who has been chosen for the NASA/SOFIA "Partners in Science Education" program. You may recall that SOFIA is the flying observatory that is finally getting ready to do some serious science.

Then, June 2 is when Dr. Peter Nugent comes to SJAA to talk about the closest type 1A Supernova in decades.

All speakers are scheduled to start at 8 p.m. The talks start after the board meeting which start at 6:30 p.m. Of course, all of these activities take place at Houge Park.

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

## Serpent Storm

Akkana Peck

March brings us a wealth of interesting planets to look at.

Mercury hangs low in the dusk sky, while above it, Jupiter passes Venus on its dive toward the sun. Our two brightest planets pass closest around the middle of the month, within a few degrees. Uranus is there too, but it's below Mercury, so it'll be a tough target in the twilight glow.

Once the twilight opening act has ended, it's time for the real stars—ahem, planets — of March evenings: Mars and Saturn.

Saturn first. It's a late-evening object: it doesn't rise until 9:30 at the beginning of March, an hour earlier by month's end, so it really isn't very high until midnight.

But it's worth taking a look, especially on a night of good seeing. There's a huge storm raging in Saturn's northern hemisphere. It shows up as an extended white area of turbulence — like the area following Jupiter's great red spot, but showing white against Saturn's usual creamy yellow-brown color. It's so long that some are calling it "The Serpent Storm".

The storm has been around for months, but it gets a lot more convenient to observe this month as it moves into the evening sky. Some images show lots of swirling, turbulent shapes; others show just a white band. Either way, it's more detail than we usually see on Saturn's surface, and it won't be there forever, so take a look and see if you can find it and watch it change.

Mars hits opposition on March 3, so it's now officially Mars Observing Season. Its closest approach to Earth happens two days later, on the 5th.

(These don't happen at the same time due to the eccentricity of both planets' orbits.)

Sadly, this will be the most distant opposition since 1996, with Mars showing a small disk not quite 14 arcseconds across. But the compensation is that it's high in the sky, so in those nights of steady air, you'll still be able to see a surprising amount.

Mars' northern hemisphere is tilted toward us, though only by about 20 degrees. That hemisphere is just entering



summer, with the solstice on March 30.

Around opposition, Sinus Sabaeus and Sinus Meridiani will be showing on the south-central part of the disk around 10pm to midnight, with the Tharsis plateau more centrally placed, and Mare Acidalium rotating in to the east.

By the weekend of the 10th, Syrtis Major will dominate the south. That means the south limb of the disk will be taken up by Hellas, an impact crater that

usually shows up so bright that it's easy to mistake for a polar cap. If you think you see a polar cap, bump your scope a little towards north or south and watch which way the view moves. If the "polar cap" you see is on the south side, it's Hellas. The real polar cap is in the north, and it's much smaller than Hellas and probably not very bright since it's nearly summer there.

On the following weekend, the 17th, not many features are visible, but you can still look for that elusive north polar cap, ringed by Mare Boreum. In the south, Mare Cimmerium comes in from the east. Around the center of the disk, try for a faint feature that sports one of my favorite Martian feature names: Trivium Charontis.

The weekend of the 24th presents an even blander view. Centered on the disk is Olympus Mons — a fabulous volcano, but alas not easy to see from Earth. Sometimes you can see evidence of it as lighter, almost bluish patches: clouds formed by winds blowing up the mountain's slopes. You can see a bit of Mare Sirenum in the southwest, and a bit of Mare Boreum in the northeast.

Happily, by the end of the month, features are rotating back in — Acidalium and Chryse in the north, Solis Lacus in the south.

In all this talk about Saturn and Mars I didn't mention Neptune and Pluto. They're both morning objects in March: catchable if you're really dedicated, but the rest of us will probably want to wait a few more months. But considering how much there is to see this month, that shouldn't be a problem! Just don't forget about Daylight Savings Time, which begins on March 11.



**Lynn Rothschild** was the speaker at the February General meeting. Her talk was on Life at the Edge: Life in Extreme Environments on Earth and the Search for Life in the Universe. One of her slides included an animated version of the image that is on page 6. Dr. Rothschild is an astrobiologist at NASA Ames. In addition she is an adjunct professor at Brown University and a consulting professor at Stanford University.

## New Solar Scope

The SJAA has taken possession of a new Lunt solar scope. This scope gives excellent views of the sun. There are several good reasons to consider solar viewing in the next few months. First, there is an increase in solar spot activity as we head toward the most active part of the 11-year solar cycle within the next few years. Second, there is an annular (ring-like) solar eclipse coming on May 20, 2012. The moon will cover just under 90% of the sun as viewed from San Jose (the maximum coverage for this eclipse will be about 95% and you can see that from Redding or Reno). Third, June 5 is the transit of Venus. If you miss this transit, the next one will be in 105 years. Set your day planners accordingly.

Of course, the sun is always an interesting object when viewed through an instrument like this where the filtration can be finely tuned to maximize the views of prominences and sun spots. Solar viewing at Houge Park is available from 2-4 p.m. on March 4, April 1 and May 6, weather permitting.





## The Hidden Power of Sea Salt, Revealed

Last year, when NASA launched the Aquarius/SAC-D satellite carrying the first sensor for measuring sea salt from space, scientists expected the measurements to have unparalleled sensitivity. Yet the fine details it's revealing about ocean saltiness are surprising even the Aquarius team.

"We have just four months of data, but we're already seeing very rich detail in surface salinity patterns," says principal investigator Gary Lagerloef of Earth & Space Research in Seattle. "We're finding that Aquarius can monitor even small scale changes such as specific river outflow and its influence on the ocean."

Using one of the most sensitive microwave radiometers ever built, Aquarius can sense as little as 0.2 parts salt to 1,000 parts water. That's about like a dash of salt in a gallon jug of water.

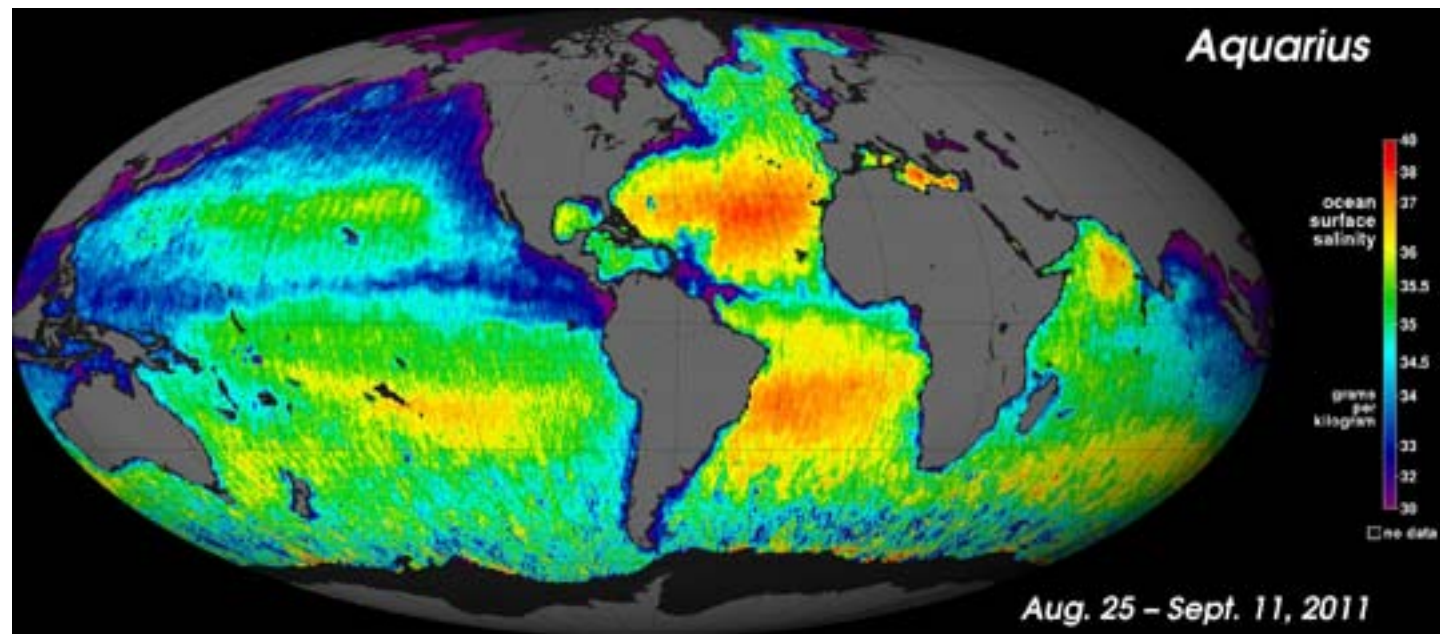
"You wouldn't even taste it," says Lagerloef. "Yet Aquarius can detect that amount from 408 miles above the Earth. And it's working even better than expected."

Salinity is critical because it changes the density of surface seawater, and density controls the ocean currents that move heat around our planet. A good example is the Gulf Stream, which carries heat

to higher latitudes and moderates the climate.

"When variations in density divert ocean currents, weather patterns like temperature and rainfall are affected. In turn, precipitation and evaporation, and fresh water from river outflow and melt ice determine salinity. It's an intricately connected cycle."

The atmosphere is the ocean's partner. The freshwater exchange between the atmosphere and the ocean dominates the global water cycle. Seventy-eight percent of global rainfall occurs over the ocean, and 85 percent of global



Aquarius produced this map of global ocean salinity. It is a composite of the first two and a half weeks of data. Yellow and red represent areas of higher salinity, with blues and purples indicating areas of lower salinity.

evaporation is from the ocean. An accurate picture of the ocean's salinity will help scientists better understand the profound ocean/atmosphere coupling that determines climate variability.

"Ocean salinity has been changing," says Lagerloef. "Decades of data from ships and buoys tell us so. Some ocean regions are seeing an increase in salinity, which means more fresh water is being lost through evaporation. Other areas are getting more rainfall and therefore lower salinity. We don't know why. We just know something fundamental is going on in the water cycle."

With Aquarius's comprehensive look at global salinity, scientists will have more clues to put it all together. Aquarius has collected as many sea surface salinity measurements in the first few months as the entire 125-year historical record from ships and buoys.

"By this time next year, we'll have met two of our goals: a new global map of annual average salinity and a better understanding of the seasonal cycles that determine climate."

Stay tuned for the salty results. Read more about the Aquarius mission at [aquarius.nasa.gov](http://aquarius.nasa.gov).

Other NASA oceanography missions are Jason-1 (studying ocean surface topography), Jason-2 (follow-on to Jason-1), Jason-3 (follow-on to Jason-2, planned for launch in 2014), and Seawinds on the QuikSCAT satellite (measures wind speeds over the entire ocean). The GRACE mission (Gravity Recovery and Climate Experiment), among its other gravitational field studies, monitors fresh water supplies underground. All these missions, including Aquarius, are sponsors of a fun and educational ocean game for kids called "Go with the Flow" at <http://www.spaceplace.nasa.gov/ocean-currents>.

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

## Current Status of Planetary Missions

### Mercury

Messenger is in orbit around Mercury as of March 2011. It was scheduled to end in March 2012 but it has been extended for at least one more year of operations. [http://www.nasa.gov/mission\\_pages/messenger/main/index.html](http://www.nasa.gov/mission_pages/messenger/main/index.html)

### Venus

The Japanese spacecraft AKATSUKI, aka the Venus Climate Orbiter, is expected to enter orbit around Venus in 2015 or 2016. It was launched in May 2010. [http://www.jaxa.jp/projects/sat/planet\\_c/index\\_e.html](http://www.jaxa.jp/projects/sat/planet_c/index_e.html)

### Mars

The Mars Science Laboratory rover, called Curiosity, was launched November 2011 and will land on Mars on August 6, 2012. [http://www.nasa.gov/mission\\_pages/msl/index.html](http://www.nasa.gov/mission_pages/msl/index.html)

### Asteroids

The DAWN spacecraft is currently in orbit around Vesta and it will leave July 2012. It will head to Ceres and start orbiting that asteroid February 2015. <http://dawn.jpl.nasa.gov/mission/timeline.asp>

### Jupiter

The NASA spacecraft Juno will arrive at Jupiter in July 2016. It will then orbit the Jupiter for at least a year. [http://www.nasa.gov/mission\\_pages/juno/overview/index.html](http://www.nasa.gov/mission_pages/juno/overview/index.html)

### Saturn

Cassini continues in orbit around Saturn. It is on its second mission extension which will go until at least 2017. At the time, Cassini will have been in space for 20 years and around the ringed planet for 13 years. <http://saturn.jpl.nasa.gov/mission/introduction/>

### Uranus

Voyager 2 is the only spacecraft to have visited Uranus when it flew by that planet on 1986. ESA is studying a proposal called Uranus Pathfinder. It would launch in 2021 and take at least 8 years to get there. <http://news.discovery.com/space/uranus-pathfinder-mission-to-the-mysterious-ice-giant.html>

### Neptune

Voyager 2 is the only spacecraft to have visited Neptune when it flew by that planet in 1989. There are no current plans to return. <http://voyager.jpl.nasa.gov/science/neptune.html>

### Pluto

The New Horizons spacecraft will fly by Pluto in July 2015. It passed the orbit of Uranus last year and passes the orbit of Neptune in August of 2014. It was launched in 2006. [http://pluto.jhuapl.edu/mission/mission\\_timeline.php](http://pluto.jhuapl.edu/mission/mission_timeline.php)

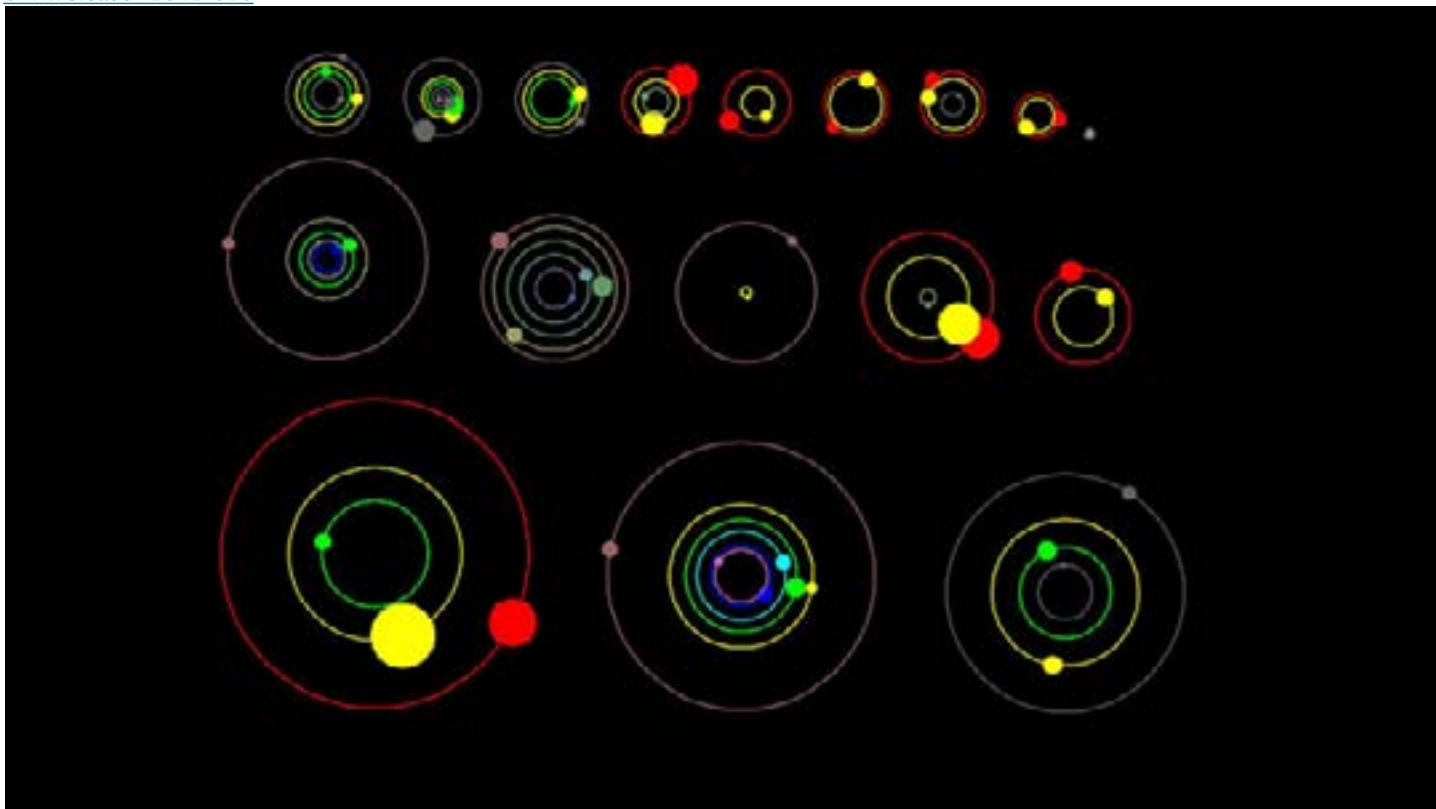
## The Last Month In Astronomy

FEB-08-2012 **MW's black hole eating** The Chandra space telescope has detected X-ray flares coming from the Milky Way's black hole at the rate of about 1 per day. The estimated mass that black hole is consuming suggests that the "food" is about the size of an asteroid (perhaps around 12 miles wide). The result is that there must be a belt of material around the galaxy's central, massive black hole consisting of asteroids and comets. If the rate of consumption sounds too high consider that the sun chows down on a comet about once every 3 days. <http://www.universetoday.com/93451/milky-ways-supermassive-black-hole-is-feasting-on-asteroids/>

FEB-07-2012 **Galex retiring** NASA's Galaxy Evolution Explorer (Galex) has been placed into standby mode. This is the start of decommissioning the spacecraft after 9 years of service. While it was working Galex studied galaxies including young galaxies that yielded clues to how galaxies evolve. It also caught a black hole devouring a star, it confirmed that discovery of so called dark energy, saw a comet-like tail behind one star, and showed a ring of stars around old galaxies. <http://www.jpl.nasa.gov/news/news.cfm?release=2012-034>

JAN-27-2012 **Curiosity curious** The Mars Science Laboratory, aka Curiosity, has detected the radiation that came of a recent solar storm. This event on January 22 was the largest solar particle event in more than 6 years. The rover was not affected. <http://www.jpl.nasa.gov/news/news.cfm?release=2012-028>

JAN-26-2012 **New Kepler Planets** The NASA Kepler mission has discovered 11 new planetary systems, 26 new planets total. This triples the number of planetary systems that Kepler has discovered and brings the total number of Kepler-discovered planets to 60. More than 2300 planet candidates are still under scrutiny. In the image below, a number of different planetary systems are displayed showing a wide diversity. (Image credit: NASA Ames/UC Santa Cruz) <http://www.jpl.nasa.gov/news/news.cfm?release=2012-026>



JAN-11-2012 **Exoplanets Galore** A recent statistical study shows that the Milky Way contains at least 100 billion planets. That comes out to 1 planet for every 2 stars in the galaxy. Or, using Drake equation factors,  $f_p$  - percentage of stars with planets, could be 10% if each such star averages 5 planets each. <http://www.jpl.nasa.gov/news/news.cfm?release=2012-010>

JAN-18-2012 **Infrared Eagle** The ESA spacecraft Herschel has taken some amazing images of the Eagle Nebula. Hubble took a famous picture of this area in 1995 leading to the name "The Pillars of Creation". Herschel images in the infrared. The red areas correspond to material that has a temperature of 10 Kelvin or a wavelength of 250 microns. The blue areas are at 40 Kelvin — wavelength of 70 microns. <http://www.jpl.nasa.gov/spaceimages/details.php?id=pia15260>

It is always interesting to compare astronomical images taken at multiple wavelengths. A movie showing 5 different apparati and many different bands of the electromagnetic spectrum can be found at <http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=49873>



Image credit: Far-infrared: ESA/Herschel/PACS/SPIRE/Hill, Motte, HOBYS Key Programme Consortium; X-ray: ESA/XMM-Newton/EPIC/XMM-Newton-SOC/Boulangier

# It Must Be Astronomical ...

## Board Elections

At the February General meeting there were no nominations from the floor so the 4 incumbents were reelected to the board. They are: Robert Armstrong, Greg Claytor, Rob Jaworski, and Kevin Roberts. They will serve 2 year terms.

## Astronomy.FM

Have you heard of Astronomy.FM? It's a "radio" station that is a compilation of other astronomical podcasts. It bills itself as the only 24 hour/day station dealing only with astronomy. Check it out at: <http://astronomy.fm/>

*"Besides learning to see, there is another art to be learned - not to see what is not"*

— Maria Mitchell

## 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	13	9		1	3
Dec	4	4			
Jan	4	0	1		3
Feb	1	1			
<b>Total</b>	<b>30</b>	<b>19</b>	<b>1</b>	<b>1</b>	<b>9</b>
Scheduled					
Feb	10				
Mar	7				
Apr	2				
May	1				
Jun	1				
<b>Total</b>	<b>21</b>				

As of February 2, 2012

## School Star Party Link

For information on school star parties including how to schedule one see <http://www.sjaa.net/school.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** Michael Packer

### School Star Party Chairman

Jim Van Nuland (408) 371-1307

### SJAA Email Addresses

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 Ephemeris [ephemeris@sjaa.net](mailto:ephemeris@sjaa.net)

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

Members Email Lists:  
<http://www.sjaa.net/majordomo.html>

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## ADDRESS SERVICE REQUESTED

## San Jose Astronomical Association Membership Form

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

New  Renewal (Name only if no corrections)

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)

### 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.)

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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