



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

March (late)

- 19 Houge Park star party. Sunset 7:19 p.m., 19% moon sets 11:34 p.m.
Star party hours: 8:15 until 11:15.
- 27 **General Meeting** at 8 p.m. Our speaker is Dr. Constance Rockosi of UC Lick, speaking on The Structure of the Milky Way.

April

- 9 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA.
- 9 Houge Park star party. Sunset 7:38 p.m., 26% moon rises 4:34 a.m.
Star party hours: 8:30 until 11:30.
- 10 Dark Sky weekend. Sunset 7:38 p.m., 10% moon rises 4:59 a.m.
- 17 Dark Sky weekend. Sunset 7:45 p.m., 15% moon sets 11:33 p.m.
Henry Coe Park's "Astronomy" lot has been reserved.
- 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.

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>

The Shallow Sky

Saltation Excitation

Akkana Peck

Saturn has just passed opposition and is entering its prime viewing time in April. The ring tilt goes from just under 3 degrees at the beginning of the month to under 1 degree at month's end — almost the edge-on view we got last year! It'll stay that way through the end of May, so if you didn't get enough of edge-on rings last year, you have lots more time to look.

Crescent Mercury and gibbous Venus share the evening sky during the first week or two of April — nice to have a pair of evening planets back.

Jupiter, Uranus and Neptune and Pluto are all visible in the predawn sky, for those hardy souls willing to brave the cold mornings.

But of course we're still in thrall to Mars, a few months past opposition and still well placed for viewing. It's high in the sky by nightfall and visible most of the evening. But it's receding from us rapidly now, and has shrunk to 8", less than 60% of its size at opposition a few months ago. It will be noticeably gibbous by now, its eastern limb darkened.

Syrtis Major is up against that dark eastern limb around 9pm as April opens. Hellas, nestled against the south end of Syrtis Major, is right on the limb, looking more than ever like a bright polar cap in the southeast, almost opposite the real polar cap in the north. Strung out along the rest of the southern temperate zone are Maria Tyrrenum and Cimmerium. Along the equator toward the western limb, look for the subtle dark smudges of Cerberus and Trivium Charontis, and the nearby brighter Elysium. In the north, look for a dark fringe around the polar cap, but it's tough to see detail there in the area stretching from Mare Boreum through Utopia.

By the weekend of the 10th, all the easy dark features have rotated away, and we see a bright,

Continued on page 2

nearly featureless expanse. Cimmerium is barely visible along the south edge of the east limb, with Cerberus and Trivium Charontis closer to the equator and more challenging to see. In the southwest, Mare Sirenum is starting to be visible, while the middle-west and northwest shows Olympus Mons and a little of the Tharsis plateau. Not that you can see much there, besides a few clouds if you're lucky. In the north, you can probably see the darkness of Mare Boreum contrasting with the polar cap. Can you make out the dark smudge of Propontis and Erebus, farther from the pole?

Fast-forward another week and Tharsis is dead center around 9pm. Still no detail there. But in the south, Solis Lacos and the Eye of Mars are starting to be visible. Since the southern hemisphere is tilted away from us, the Eye area will be foreshortened and it might be tough to see it as an eye. What shape do you see? Meanwhile, dark Acidalium is peeking out in the northwest.

By April 24th there's plenty to see, with Erythraeum and the many finger-like bays of Margaritifer in the south, looming Acidalium in the north. Sinus Meridiani and Sabaeus peek over the western limb to round out the view.

Finally, by the very end of the month, Meridiani and Sabaeus are just south of center, Acidalium still visible on the northeast limb and Syrtis Major showing up in the southwest.

So, lots of detail at the beginning and end of April. But

what do you do for those couple of weeks when we're seeing mostly blank space?

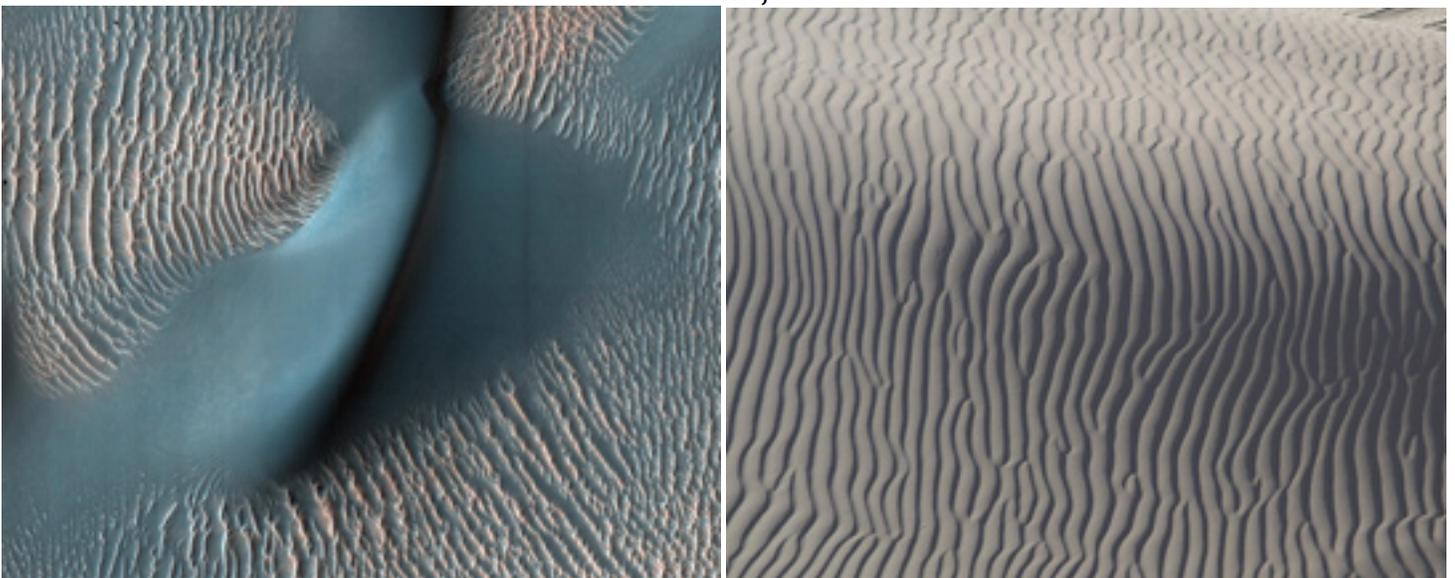
Think about the dunes of Mars!

A new paper announced a few months ago, analyzes Martian sand dunes. They look remarkably like the ones here on Earth: for example, like the Kelso dunes in the Mojave desert a few hundred miles south of here. The ones at Kelso are formed by wind: it blows the sand grains along the surface of a dune, making them hop in a process that's called "saltation". If you've ever visited Mojave National Preserve and climbed up the big star dune at Kelso, or visited the similar dune fields in Death Valley or Imperial Dunes, you've experienced the blowing sand and seen the saltation that keeps those big dune fields alive.

But Mars has such a thin atmosphere that it's hard to understand how Martian winds could excite enough saltation to create the elaborate dunes seen by the Mars orbiters. Of course, Mars has slightly lower gravity than Earth, but not enough to compensate for the extremely thin air. So it was thought that the Martian wind shouldn't be able to blow sand grains off the ground very often.

But a new computer model shows that as one grain gets pushed a little by the wind, it can land and knock several other grains into motion. They call the process "splashing". When a sand grain splashes, Mars's low gravity means that the sand grains it hits can kick as much as a meter into the air, where they get caught in stronger wind, speed up and then splash down to knock more particles into the air.

That's enough to build huge dune fields, the equal of anything on Earth. So think about that as you're contemplating Mars in your telescope, or the next time you drive through the Mojave.



On the left is a picture of the sand dunes within Proctor Crater on Mars. This photo was taken using the HiRISE camera on the Mars Reconnaissance Orbiter. (Photo courtesy of NASA/JPL-Caltech/University of Arizona). On the right is a picture of sand dunes in the Mojave desert taken. (Photo courtesy of Akkana Peck). In the MRO image, "the larger, darker bedforms are dunes composed of sand, most likely of fine size. Ripples tend to move slower than dunes. Because of this, over time, ripples get covered with dust, possibly explaining the bright tone visible here. The dunes are dark probably because they are composed of basaltic sand (derived from dark, volcanic rock) that is blown by the wind enough that dust does not sufficiently accumulate to change their color." (NASA)

Exploring the universe is a bit like groping around a dark room. Aside from the occasional pinprick of starlight, most objects lurk in pitch darkness. But with the recent launch of the largest-ever infrared space telescope, it's like someone walked into the room and flipped on the lights. Suddenly, those dark spaces between stars don't appear quite so empty. Reflected in the Herschel Space Observatory's 3.5-meter primary mirror, astronomers can now see colder, darker celestial objects than ever before—from the faint outer arms of distant galaxies to the stealthy "dark asteroids" of our own solar system. Many celestial objects are too cold to emit visible light, but they do shine at much longer infrared wavelengths. And Herschel can observe much longer infrared wavelengths than any space telescope before (up to 672 microns). Herschel also has 16 times the collecting

area, and hence 16 times better resolution, than previous infrared space telescopes. That lets it resolve details with unprecedented clarity. Together, these abilities open a new window onto the universe.

"The sky looks much more crowded when you look in infrared wavelengths," says George Helou, director of the NASA Herschel Science Center at Caltech. "We can't observe the infrared universe from the ground because our atmosphere blocks infrared light, and emits infrared itself. Once you get above the atmosphere, all of this goes away and suddenly you can look without obstruction." Herschel launched in May from the Guiana Space Centre in French Guiana aboard a European Space Agency Ariane 5 rocket. Since then, it has expanded the number of distant galaxies observed at far infrared

wavelengths from a few hundred to more than 28,000. And with the instrument testing and system check-out phases finally completed, the discoveries are only now beginning. Beyond simply imaging these dark objects, Herschel can identify the presence of chemicals such as carbon monoxide and water based on their spectral fingerprints. "We will be able to decipher the chemistry of what's going on during the beginnings of star formation, in the discs of dust and gas that form planets, and in the lingering aftermath of stellar explosions," Helou says.

And those are just the expected things. Who knows what unexpected discoveries may come from "flipping on the lights?" Helou says "we can't wait to find out."

Herschel is a European Space Agency mission, with science instruments provided by a consortium of European-led institutes and with important participation by NASA. See the ESA Herschel site at sci.esa.int/science-e/www/area/index.cfm?fareaid=16. Also, see the NASA sites at herschel.jpl.nasa.gov, www.herschel.caltech.edu, and www.nasa.gov/mission_pages/herschel. Kids can learn about infrared light by browsing through the Infrared Photo Album at The Space Place, spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml.



The Herschel Space Observatory has 3.5-meter primary mirror, allowing astronomers to see colder, darker celestial objects than ever before.

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

SJAA Honored

The San Jose Astronomical Association was honored recently by the City of San Jose “for outstanding commitment to building a stronger community and a vibrant city.” Sheila Sanchez wrote an article about the award for the March issue of the Cambrian Times. The picture below (courtesy of the City of San Jose) shows Jim Van Nuland on the left and Gordon Reade on the right. In the center is San Jose District 9 councilwoman (and vice mayor) Judy Chirco. The award was given on February 18 as part of 10 awards presented during Mayor Chuck Reed’s State of the City address. The article mentions the 60 school star parties, the program run by Jim Van Nuland for many years, and the Houge Park star parties. Photo on the right is courtesy of Jim Van Nuland.



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.

NASA Gives Kids Their Own Guide to Climate Change

Laura K. Lincoln

A blinking red-eyed tree frog and flitting butterfly greet visitors to the new NASA Climate Kids website. Targeting grades 4 – 6, this kid-friendly guide demystifies one of the most important science issues of our time. The site answers the “Big Questions” about global climate change using simple illustrations, humor, interactivity, and age-appropriate language. For example, one interactive feature is the Climate Time Machine, which reveals how global changes have affected or will affect our planet over time. “Climate Tales” has animal cartoon characters coping— more or less good humoredly—with the effects humans are having on their habitats. A collection of Earth-science-related games offers such experiences as “Wild Weather Adventure” and “Missions to Planet Earth.” A Green Careers section profiles real people doing jobs that help slow climate change. Visit Climate Kids at <http://climate.nasa.gov/kids>.



Lick Observatory Historical Collections Project, From Eyeballs to Electrons, Part I AANC

“From Eyeballs to Electrons” is the first online exhibit from the Lick Observatory Historical Collections Project. The exhibit draws on artifacts and images from Lick’s collections to illustrate the evolution of light detection in astronomy, with special attention to Lick Observatory’s role. Part One begins with astronomy’s first detector, the human eye, and ends with photography’s long reign as the principal means for recording starlight. Part Two, coming this spring, will describe the development of electronic detectors, culminating in the digital age. Please visit the exhibit at:

http://collections.ucolick.org/exhibits_on_line/E2E.1/

The Historical Collections Project is a work in progress. It was created to preserve and make accessible the observatory’s historical holdings through cataloging, online databases, and exhibits. Please visit the Project website at:

http://collections.ucolick.org/archives_on_line/

A word of warning: Our server is small, and has been known to freeze. This message being the first public announcement of our website, we’re not certain how it will bear up under what we hope will be a good many visitors. If you are unable to reach the exhibit or project websites, our apologies in advance — and please try again later.



Physics for Poets

Andrew Fraknoi

This spring quarter, Foothill College will again offer Physics for Poets, the course that won the Innovation of the Year award for community colleges. This is the first time that Andrew Fraknoi’s Physics 12 course (sometimes affectionately called “Everything You’ve Wanted to Know about Einstein but Were Afraid to Ask”) is being presented in Foothill’s newly refurbished lecture hall 5015 (with its superb new audio-visual facilities.)

Although Albert Einstein died in 1955, his work continues to capture the imagination of scientists and the public. In the last few years, astronomers have found new confirmation of some of Einstein’s most bizarre ideas — including giant black holes, time itself slowing down under the right circumstances, and gravity acting like the distorting mirrors of an amusement park. In February 2010, the most accurate measurement of the slowing of time ever made was announced by a team that included the U.S. Secretary of Energy, Nobel laureate Steven Chu. In the Foothill course, Fraknoi — who was named California Professor of the Year in 2007 — explains all these ideas and discoveries in everyday language — using analogies, visuals, and humor instead of math.

Physics 12 will be offered on Tuesday and Thursday evenings from 6 to 8:30 p.m., April 6 to June 22, 2010. Pre-registration is advised, but, if there is room, you can come hear the first lecture and then register if you like the approach. The class is held on the main campus of Foothill College in Los Altos Hills, just off Freeway 280.

For registration information for the Spring Quarter see: <http://www.foothill.edu/reg/>

Physics 12 emphasizes key ideas that form the basis of our modern concepts of space, time, matter, and energy:

- * The theory of how atoms work
- * Energy, heat, and the arrow of time
- * The special theory of relativity: what happens when you travel close to the speed of light
- * The general theory of relativity: gravity, space-time warps, and black holes
- * Quantum mechanics: the bizarre rules that govern the world inside the atom

In addition to examining the physics and physicists involved with these areas, the course will also look briefly at the effects that such physics ideas have had on the humanities, including poetry, fiction, music, and the public view of scientists.

The quarter concludes the course with a look at the work of Stephen Hawking, whose innovative ideas combine many of these areas and take some of Einstein’s ideas to the outermost limits of cosmic possibility.

For a course syllabus in pdf format, see: <http://www.foothill.edu/psme/Physics.12.Web.pdf>

The Last Month In Astronomy

MAR-11-2010 **Earth knocked for a loop** The 8.8 magnitude earthquake that hit Chile in February was so strong that it might have shifted the axis of Earth. The change in the axis is about 8 cm according to Richard Gross of JPL. "The figure axis defines not how Earth is tilted, but rather how it is balanced." Is this a big deal? Well, the "figure axis" moves about 10 cm per year as a result of the Ice Age rebound, a change in the crust and mantle of the Earth since last ice age ended 11,000 years ago. http://science.nasa.gov/headlines/y2010/11mar_figureaxis.htm

MAR-11-2010 **No differentiation in Titan** Cassini's low swoops over Titan have generated a set of gravity maps of the Saturnian moon. The results show that Titan has not differentiated. Scientists say that the interior of Titan was (and is) too cold to split into separate layers of rock and ice. This in turn suggests that Titan formed rather slowly. <http://www.jpl.nasa.gov/news/news.cfm?release=2010-084&rn=news.xml&rst=2516>

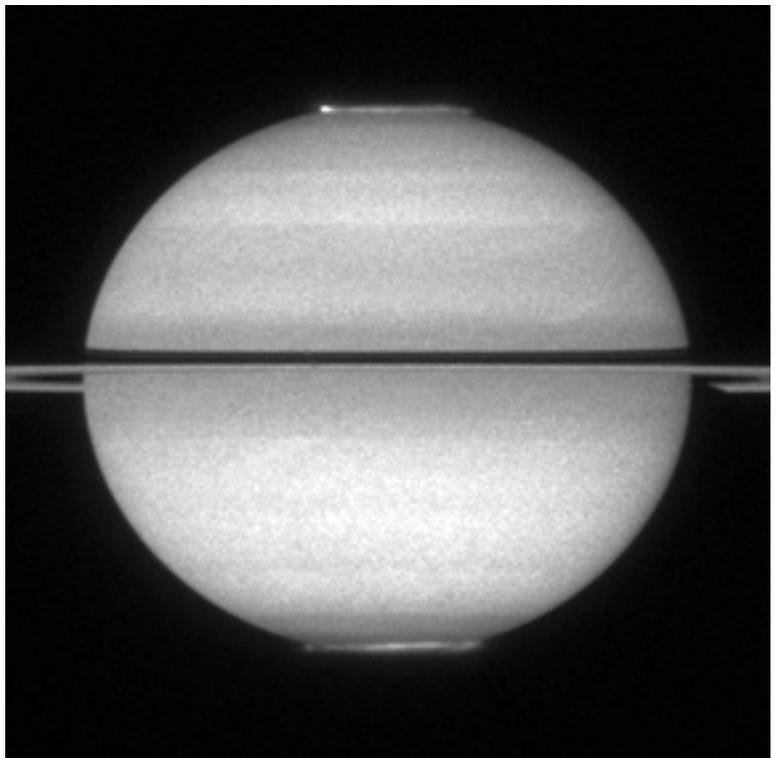
MAR-10-2010 **Water on Moon** Larry Taylor once said that if water is found on the Moon he would eat his shorts. The latest evidence of that water is found in research done by ... Larry Taylor. To celebrate, his colleagues baked a cake decorated with boxer shorts, white with pink polka dots. The new research goes farther than the recent water discoveries. This research shows the moon has probably always held water and that comets play a bigger role in water delivery than was previously supposed. <http://www.nature.com/news/2010/100309/full/464150a.html> or try <http://xenophilus.wordpress.com/2010/03/10/>

MAR-09-2010 **Fastest stellar pair** What is the shortest known orbital period of any pair of stars? If it takes you more than 5.4 minutes to answer, one orbit of HM Cancri will be complete. This pair was discovered 10 years ago but it took careful study of the spectra to measure the speed. "This type of observation is really at the limit of what is currently possible. Not only does one need the biggest telescopes in the world, but they also have to be equipped with the best instruments available" according to Paul Groot of the Radboud University Nijmegen in the Netherlands. These measurements were done at Keck. http://keckobservatory.org/index.php/news/keck_telescope_confirms_smallest_known_star_duo/

MAR-03-2010 **Primitive Star Found** Astronomers have found a star that dates back to the second generation of stars formed after the Big Bang. The star is in the dwarf galaxy Sculptor which is 290,000 light-years away. The presence of this star supports the theory that galaxies form by swallowing up dwarf galaxies. That's because this primitive star has a similar chemical make-up to the oldest stars in the Milky Way. The star is S1020549 and it has a metallicity that is 6000 times lower than the sun. It is 5 times lower than any star previously found in a dwarf galaxy. <http://www.cfa.harvard.edu/news/2010/pr201003.html>

FEB-21-2010 **STS-130 Lands** The shuttle Endeavour completed a successful mission with a landing at KSC. This mission installed the Tranquility Node and a cupola for making observations of Earth. The next mission for Endeavour is set for late July when it will deliver the Alpha Magnetic Spectrometer. That mission will also be the last for Endeavour. The next shuttle mission is Discovery's next to last mission currently scheduled for April 5. <http://spaceflightnow.com/shuttle/sts130/status.html>

FEB-15-2010 **Saturn Edge-On** Hubble took some pictures of Saturn edge-on last year and they have just been released. The image shown above show aurorae in both the north and south poles. The blue color is probably due to Rayleigh scattering, the same effect that makes a midday clear sky appear to be blue. <http://hubblesite.org/newscenter/archive/releases/2010/09/image/a/>



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

Dr. David Morrison, April 21, 7 p.m. at Foothill College speaking on *Doomsday 2012 and the Rise of Cosmophobia* as part of the Silicon Valley Astronomy Lectures at Foothill College. <http://www.foothill.edu/ast/SVL.htm>

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/>

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

Elections 2010

The elections for the SJAA board were held at the general meeting in February. The following members, all incumbents, were reelected: Robert Armstrong, Greg Claytor, Kevin Roberts, Rob Jaworski. Officers are elected during the March board meeting.

Q & A

Q: The sun is a constant reminder of $E=Mc^2$. But just how much mass is being turned into energy?

A: Every second, the Sun takes 700 million tons of hydrogen and turns it into 695 million tons of helium. The "missing" 5 million tons is turned into energy. 5 million tons represents 0.00000000000000000025 percent of the sun's total mass. ("Death From the Skies", Phil Plait, pg. 37)

"Our species needs, and deserves, a citizenry with minds wide awake and a basic understanding of how the world works" - 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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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".

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