



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late October)

27 **General meeting at Houge Park.** 8 p.m. Peter Dunckel on amateur/professional cooperative research. Board of directors meets at 6 p.m.

November

- 2 Astronomy Class at Houge Park. "Winter observing – clothing, astro gear, etc.," 7:30 p.m.
- 2 Houge Park star party. Sunset 6:09 p.m., 35% moon rises 1:40 a.m. Star party hours: 7:00 to 10:00 p.m.
- 3 Dark sky weekend. Sunset 6:08 p.m., 26% moon rises 2:42 a.m.
- 4 DST ends. Retard clock at 2 a.m. -> 1 a.m.
- 10 Dark sky weekend. Sunset 5:02 p.m., 2% moon sets 5:12 p.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 16 Houge Park star party. Sunset 4:57 p.m., 43% moon sets 10:47 p.m. Star party hours: 7:00 to 10:00 p.m.
- 17 **General meeting at Houge Park.** 8 p.m. Michael Connolly will speak on The Formation of Binary Stars.
- 18 **Fall Swap at Houge Park.** Noon until late afternoon. See page 7.
- 30 Astronomy Class at Houge Park. "The Local Group – A 3D view of what is around the Milky Way", 7:30 p.m.
- 30 Houge Park star party. Sunset 4:51 p.m., 53% moon rise 2:01 a.m. Star party hours: 7:00 to 10 p.m.

December

- 1 Dark Sky weekend. Sunset 4:51 p.m., 43% moon rises 0:34 a.m.
- 8 Dark Sky weekend. Sunset 4:50 p.m., <1% moon Not Visible. Henry Coe Park's "Astronomy" lot has been reserved.
- 14 Houge Park star party. Sunset 4:51 p.m., 27% moon sets 9:45 p.m. Star party hours: 7:00 until 10:00 p.m.
- 22 General Meeting at Houge Park. 8 p.m.. Our own Dr. Lee Hoaglan will speak on Night Myopia.
- 28 Houge Park star party. Sunset 4:58 p.m., 69% moon rise 10:21 p.m. Star party hours: 7:00 until 10:00 p.m.
- 29 Dark Sky weekend. Sunset 4:59 p.m., 61% moon rise 11:22 p.m.

Revised SJAA Cancellation Policy

Rob Hawley

As winter weather approaches Houge Park events will again be subject to weather. A thick cloud cover will cancel the event just as thoroughly as a monsoon! If the cloud cover is thin enough so we can see the moon, planets, or bright stars we will try to show something. Unfortunately, none of us have cloud filters and our scopes don't have umbrellas.

Instead of making everyone come to Houge to learn the event is canceled, SJAA will now begin notifying people via the web site (and if possible via phone hot line). We will also try to send messages via sjaa-announce and TAC; however due to limitations with our website, the former may not arrive before the event.

The status will be posted in the "Schedule of Events" at the top of the SJAA web site a minimum of Two Hours before a Houge Star Party as one of the following:

Green	The star party will occur as scheduled. Expect a full complement of visitors and scopes. Note if the weather is obviously clear then we may not post this.
Yellow	The event will occur as scheduled, but due to questionable weather there may be fewer scopes than are normally at Houge.
Red	The event is canceled. Please stay home and enjoy some hot chocolate (or whatever).

If the cell containing "Schedule of Events" is white it means no one has posted status. Assume the party is on. Canceling the star party does not affect the beginner's class. The beginner's astronomy class is held regardless of the weather.

If you can't access the web before coming to Houge then we suggest a simple rule

If the Lights are on, the party is off

SJAA always shuts the parking lot lights off at or near sunset. If there are clouds in the sky and the lights in the parking lot are still lit, go home. There may be someone there, but generally it means we canceled the party two hours ago.

We are looking at putting a cancellation sign at Houge, but the lights are a sure signal that SJAA is not there.

**24 hour news and information hotline:
(408) 559-1221**

DEEP SKY OBSERVING

by Mark Wagner

November 2007 third quarter to new moon observing list. The list begins in the north and moves southward. Objects are within roughly a two hour section of right ascension that is at a comfortable elevation to the east at astronomical dark. This list is just a sampling of the full list which is at <http://www.resource-intl.com/Deep.Sky.Nov.07.html>.

Object	Const.	Type	Size	Mag	R.A.	Dec.
NGC 40	Cep	PN	70'x60"	10.7	00 13 00	72 31 19
	Very regular circular appearance with very bright central star. Some hint of structure in outer circular portion suggestive of shells.					
N7762	Cep	OC	11.0'	10.2	23 49 54	68 01 00
	About 100 stars in a 20' field including many mag 12-13 stars. Very large, fairly coarse but there is a rich region near the center consisting of six tight stars.					
NGC 225	Cas	OC	12.0'	7	00 43 30	61 47 00
	At 49x, this cluster reminds me a lot of the letter W. The cluster is pretty sparse, with perhaps 15-20 stars visible. Most of these are of similar magnitude.					
NGC 381	Cas	OC	6.0'	9.3	01 08 18	61 35 00
	Easiest is NGC 381, NGC 358 and 366 form pair of clusters.					
M103	Cas	OR	6.0'	7.4	01 33 22	60 39 30
	Lovely isosceles triangle just about a degree SE of delta Cas.					
NGC 129	Cas	OC	21.0'	6.5	00 29 54	60 13 00
	Easy star hop location. Very large, fills eyepiece at 100x.					
NGC 7789	Cas	OC	15.0'	6.7	23 57 26	56 43 14
	Justifiably named the Magnificent Cluster. Swirling dark lanes and endless tons of stars.					
M76	Per	PN	167"	12.2	01 42 19	51 34 45
	M76 at high power showed off an extended halo (about twice the size of the two familiar brighter lobes).					
NGC 185	Cas	GX	11.9'x10.1'	10.1	00 38 57	48 20 14
	Pretty bright, pretty much extended north-south. Concentrated nucleus, but not stellar. Satellite of M31.					
NGC 278	And	GX	2.2'x2.2'	11.5	00 52 04	47 33 00
	Has a nucleus that is concentrated but not quite stellar. Hints of mottling or structure in the halo.					
M110	And	GX	21.9'x10.9'	8.9	00 40 22	41 41 22
	Elongated, almost rectangular, and brightens GRADUALLY towards the central, elongated core. Elongation is almost perpendicular to M31.					
M31	And	GX	192'x62.2'	4.4	00 42 44	41 16 08
	Two dust lanes, two satellite galaxies, globular clusters, blue supergiant knots, what a great galaxy.					
M32	And	GX	8.7'x6.4'	9	00 42 41	40 51 56
	Round galaxy with bright core, appears as an unresolved globular.					

Note: Source catalogs are Messier, Arp, Abell Planetary, Abell Galaxy Cluster (AGC), Hickson Compact Galaxy (HCG), Herschel 400-I, Herschel 400-II. Herschel 400-I are identified as NGCXXXX, Herschel 400-II as NXXXX.

Mars Going Backwards

Akkana Peck

Mars begins retrograde motion on November 15. That means it's moving backward.

If you plot the path of Mars (or any outer planet) on a star chart each day, you'll find that most of the time planets, like the sun, move eastward compared to the stars. But every now and then, planets loop back the other way for a little while: retrograde motion.

When a planet is retrograde, it will make a loop or an "S" on the star chart, moving westward for a while before turning back to its normal eastward course. Back in the early days of astronomy, this caused endless problems. If the planets are attached to crystal spheres moving in perfect circles around the Earth, why would they ever change direction? Ptolemy and others came up with ever more complicated explanations for retrograde motion, like "epicycles" (the planets aren't attached firmly to that crystal sphere, but instead swing around on a little wheel, and it's

the center of the wheel, not the planet itself, that's orbiting the earth in a perfect circle). Then it turned out those didn't quite match the planets' motion, so the epicycles had to be adjusted some more. But when you find yourself needing to add patches upon patches to your explanation, it's often a sign that your basic theory is wrong.

When Copernicus and Kepler came along, the theory got a whole lot simpler, and at the same time more accurate. Turns out retrograde motion is simply a time when the Earth, inside an outer planet's orbit, is "catching up" with the planet.

The diagram should help in understanding what's happening. We're looking down on the solar system (not to scale) from the north.

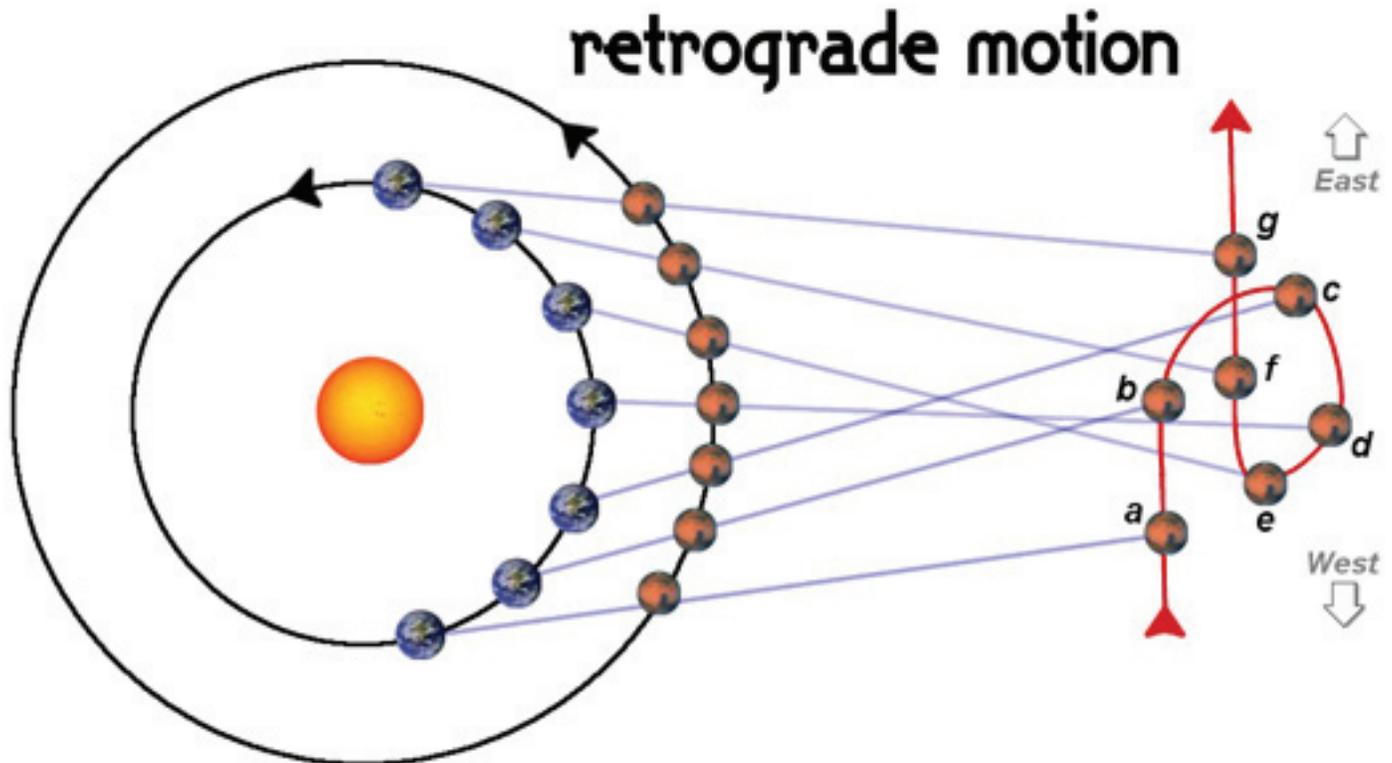
At first (a and b) we see Mars moving in its normal eastward direction against the background stars. But at (c), Earth is catching up with Mars, and from our

perspective, Mars appears to stop its eastward motion (an ephemeris like the Observer's Guide will note that as "Mars Stationary", and this November it happens on the 15th). At (d), it has reversed course and is moving westward in retrograde motion. At (e) it's stationary again, and at (f) and (g) it's back to its normal easterly motion.

(Whether it makes a loop, as in the diagram, or an S depends on the inclinations of the two planets' orbits. But that would require a three-dimensional diagram that would be much harder to draw! Maybe some future month.)

You may notice from the diagram that a planet's retrograde motion happens near its opposition. In November, Mars is still more than a month short of opposition – that won't happen until Christmas – but it's close enough now, and bright enough, that a telescope will show quite a bit of detail if you're willing to stay

Continued on page 4



Graphic courtesy of the author.

The Shallow Sky
Continued from 3

up late. Happily, this year Mars transits quite high in the sky – 77 degrees now, and nearly 80 by opposition – so although it's not as big as it appeared a few years ago, you should be able to crank up the magnification and see quite a lot of detail. So break out those short eyepieces and start practicing for the opposition next month!

Meanwhile, there are a few planets to watch. Jupiter is a sunset object: you can catch it in the evening twilight, but don't expect a lot of detail. On the night of November 4th you can catch a double shadow transit, Io and Europa and both of their shadows, starting just after sunset at 5:28. Jupiter will be low in the sky but still several hours from setting. Double shadow transits are common in some years, but this year they've been surprisingly rare in our time zone, so this is a nice chance to

catch one before Jupiter disappears into the sun's glare for the rest of the winter.

And by the way, when you look at these times, remember that we're finally back in Pacific Standard Time. The first Sunday in November is our new ending time for Daylight Savings Time, a week later than usual.

Saturn rises a bit after midnight and is visible, though low, for the rest of the evening.

Venus and Mercury both shine in the morning sky throughout November.

But if you're not an early riser, try this daytime challenge on November 5: find the moon (a thick post third quarter crescent), then swing about three and a half degrees (that's about 7 moon diameters) upward and try to spot Venus. Amaze your friends by finding a planet in the daytime! You may be surprised at just how bright Venus is

once you find it: you can probably see it with the naked eye if the sky is clear of clouds.

The asteroid (1) Ceres is at opposition on the 9th. At magnitude 7.2 it's not quite bright enough to see with the naked eye – (4) Vesta is the only asteroid that bright, but it should be easy to see in any telescope, or even in binoculars if you're patient. The same rules you'd use for Pluto apply for asteroid hunting: you won't be able to resolve it as a disk, so you'll need a good star chart to help you figure out which of those pinpoint of light is the one you're after. Then go back a night or two later, look at the same field and see how far the target has moved.

On Friday, November 2-3, the third quarter moon will occult Regulus in the wee hours of the morning. We haven't had many occultations visible here this year, so if you're up late that Friday, check it out.

Silicon Valley Astronomy Lecture Series

New Horizons at Jupiter - November 13, 2007

Andrew Fraknoi

On Tuesday, Nov. 13th, 2007, at 7 p.m., Astronomer Jeff Moore of NASA's Ames Research Center will give a non-technical, illustrated talk on: New Horizons at Jupiter (and Some Saturn News) as part of the Silicon Valley Astronomy Lectures in the Smithwick Theater, Foothill College, El Monte Road and Freeway 280, in Los Altos Hills, California.

Free and open to the public. Parking on campus costs \$2. Call the series hot-line at 650-949-7888 for more information and driving directions.

No background in science will be required for this talk.

In February, NASA's New Horizons

spacecraft swung by the giant planet Jupiter on its way to Pluto. Its instruments recorded images and other data about Jupiter's wild weather (including observations of an infant

storm 2/3 the size of Earth), its ring, and its giant moons. Dr. Moore will show the wonderful new photos of the Jupiter system and discuss some of the discoveries made by New Horizons.

He will also talk about one of the most exciting discoveries of the Cassini mission around Saturn – the new understanding and exploration of water geysers on the moon Enceladus.

Jeff Moore is Research Scientist

at NASA's Ames Research Center, specializing in the evolution of the surfaces of planets and icy moons (including Mars and the moons of Jupiter). He is the leader of the Imaging Node for the New Horizons mission.

The lecture is co-sponsored by:

- * NASA Ames Research Center
- * The Foothill College Astronomy Program
- * The SETI Institute
- * The Astronomical Society of the Pacific.

Please note that this one time, the lecture is on a Tuesday, not Wednesday.

Past Silicon Valley Astronomy Lectures are now available in MP3 format at: <http://www.astrosociety.org/education/podcast/index.html>

Satellite technology designed to catch ballistic missile launches may soon help doctors monitor the health of people's eyes.

For the last 15 years, Greg Bearman and his colleagues at JPL have been working on a novel design for a spectrometer, a special kind of camera often used on satellites and spacecraft. Rather than snapping a simple picture, spectrometers measure the spectrum of wavelengths in the light coming from a scene. From that information, scientists can learn things about the physical properties of objects in the photo, be they stars or distant planets or vegetation on Earth's surface.

In this case, however, the challenge was to capture snapshots of short-lived events—like missile launches! The team of JPL scientists designed the new spectrometer, called a computed tomographic imaging spectrometer (CTIS), in collaboration with the Ballistic Missile Defense Organization as a way to

detect missiles by the spectral signatures of their exhaust.

But now the scientists are pointing CTIS at another fast-moving scene: the retina of an eye.

Blood flowing through the retina has a different spectral signature when it is rich in oxygen than when it is oxygen deprived. So eye doctors can use a spectrometer to look for low oxygen in the retina—an indicator of disease. However, because the eye is constantly moving, images produced by conventional spectrometers would have motion blurring that is difficult to correct.

The spectrometer that Bearman helped to develop is different: It can capture the whole retina and its spectral information in a single snapshot as quick as 3 milliseconds. "We needed something fast," says Bearman, and this spectrometer is "missile-quick."

CTIS is even relatively cheap to build,

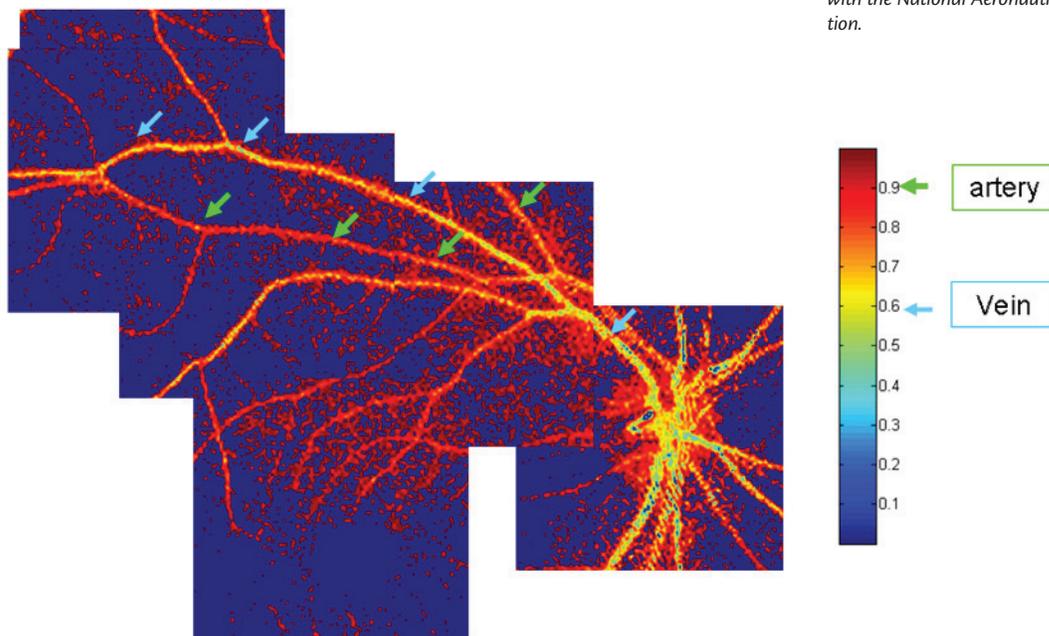
consisting of standard camera lenses and a custom, etched, transparent sheet called a grating. "With the exception of the grating, we bought everything on Amazon," he says.

The grating was custom-designed at JPL. It has a pattern of microscopic steps on its surface that split incoming light into 25 separate images arranged in a 5 by 5 grid. The center image in the grid shows the scene undistorted, but colors in the surrounding images are slightly "smeared" apart, as if the light had passed through a prism. This separation of colors reveals the light's spectrum for each pixel in the image.

"We're conducting clinical trials now," says Bearman. If all goes well, anti-missile technology may soon be catching eye problems before they have a chance to get off the ground.

Information about other NASA-developed technologies with spin-off applications can be found at <http://www.sti.nasa.gov/tto>.

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



This three-color composite image from the computed tomographic imaging spectrometer shows the oxygenation of the blood in the arteries and veins of a human retina. (Arteries appear red, veins appear yellow.)

The Last 31 Days In Astronomy

The news seen between September 10 and October 11, 2007.

SEP-26-2007 **Opportunity ready for Victoria Crater science** The Mars rover Opportunity has reached its first science location inside of Victoria Crater. The rover is at an angle of 25 degrees which requires some safety testing before attempting to use some of the scientific apparatus on board. <http://www.jpl.nasa.gov/news/news.cfm?release=2007-109>

SEP-27-2007 **DAWN rises** The Dawn spacecraft finally is on its way to study Vesta and Ceres. The spacecraft will use ion propulsion and become the first spacecraft to orbit two different solar system objects (not counting the Earth and the Sun). A test of the ion engine on Oct. 9 was successful. <http://www.jpl.nasa.gov/news/news.cfm?release=2007-110>

OCT-01-2007 **NASA Detects Arctic Sea Ice Reduction** A NASA-led study has found that the arctic year-round ice cover has sustained a 23% loss over the last two years. This represents an area the size of Texas and California combined. <http://www.jpl.nasa.gov/news/news.cfm?release=2007-112>

OCT-04-2007 **M42 Older and Closer** Radio astronomical measurements taken by the VLBA facility shows that M42 is both closer and older than was previously thought. The measurements used parallax by comparing the location of the Orion Nebula when viewed from opposite points of the Earth's orbit around the sun. The background "stars" used in this measurement were actually a couple of pulsars. The new distance to M42 is 1270 light years and the age of the stars that can be seen in the nebula are 2 million years. The previously best measurements had the nebula 1565 light years away and the stars appeared to be one million years old. <http://www.nrao.edu/pr/2007/oriondistance/>

OCT-08-2007 **Mercury Images** Astronomers at the University of North Carolina have imaged Mercury using a technique called lucky imaging. In this technique, many images are taken and only the sharpest are kept to produce the result. The 4 meter SOAR telescope at Cerro Pechon in Chile was stopped down so that it became a 1.35 meter, f/38 telescope. They then recorded up to 140 frames per second. A computer picks the sharpest images. The resulting images of Mercury show unprecedented detail. <http://www.skyandtelescope.com/news/10317557.html>

OCT-10-2007 **New Crew at the ISS** A new crew is on the way to the International Space Station. The Soyuz arrived at the ISS on the 12th. On the 19th, Expedition Crew 16 officially takes over and Peggy Whitson will be the first woman commander on the ISS. When the next Shuttle arrives at the ISS, it will be the first time that both shuttle and ISS crews are commanded by women. <http://www.space.com/news/cs-071012-expedition16-personal.html>

OCT-11-2007 **ATA-42 Starts** The Allen Telescope Array at Hat Creek, California celebrated its inauguration. The array of 42 telescopes were put through their paces after Paul Allen pushed the button set up for this occasion. <http://www.nytimes.com/2007/10/11/science/11seti.html>

OCT-11-2007 **Weird CO₂ found** Astronomers were stuck. European astronomers looking at data from the Venus Express thought they had discovered some previously unknown organic molecule. Meanwhile scientists at NASA-Goddard thought they saw methane on Mars which shouldn't be because methane breaks down under Martian conditions. Turns out that both groups were confused by a strange form of CO₂ that includes a rare isotope of oxygen. The discovery is interesting because this new CO₂ molecule can absorb some wavelengths that normal CO₂ cannot and thus it adds a small but important part of the runaway greenhouse effect on Venus. On Mars, it accounts for how there can be so much apparent methane on a relatively warm planet that does not get methane replenished by bovine flatulence. <http://www.skyandtelescope.com/news/10452322.html>

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(see elsewhere this page)

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Submit

Submit articles for publication in the SJAA *Ephemeris*. Send articles to the editors via e-mail to ephemeris@sjaa.net. **Deadline, 10th of previous month.**

Astronomical Swap Meet

November 18, 2007

Join us for SJAA's annual astronomical swap meet on Sunday afternoon, November 18, 2007. It will again be held in our regular meeting room at Houge Park in San Jose. (See our web site for directions: www.sjaa.net/directions.html). The doors open at noon for sellers to set up, selling starts around 1 PM and generally lasts until 3 or 4 PM. Don't be too late, the good stuff sells quickly.

If it's related to astronomy, you might find it here! Telescopes, binoculars, eyepieces, mounts, mirrors, lenses, clock drives, books, camera equipment, star charts, finders, tubes, diagonals, photographs, space art... you name it. You never know what goodies you can find. Check your garage and closets for anything astronomical you would like to sell. Anyone can buy and sell, it's fun and easy! Get your holiday shopping done early this year!

There is no table fee nor an entrance fee. The SJAA asks a 10% donation on all sales, more if you feel generous. This is a club fund raiser after all. The SJAA is a 501(c)3 corporation, donations are tax deductible.

Do you have only one or two items to sell? A consignment table will be there for your convenience. We'll handle it for you, so you can go shop at the swap and not have to sit there with just a couple of items. Please, no more than three items per seller. Please be available for any questions or bargaining.

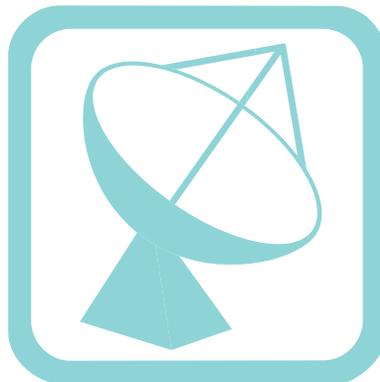
Part of the swap's success depends on people knowing about it. So, pass the word especially to those who are new to astronomy.

Questions may be e-mailed to swap@sjaa.net. The SJAA reserves the right to turn away illegal or inappropriate items for the swap.

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.



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

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<http://ephemeris.sjaa.net> Questions?

Send e-mail to membership@sjaa.net

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 Junior (under 18) — \$10
 Junior with Sky & Telescope — \$43

Bring this form to any SJAA Meeting
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subscriptions through the club program. Allow 2 months lead time.)

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