SJAA Activities Calendar

Jim Van Nuland

(late) January
24 Dark Sky weekend. Sunset 5:24 p.m., 1% moon rises 6:59 a.m. Henry Coe Park’s “Astronomy” lot has been reserved.
30 Houge Park star party. Sunset 5:31 p.m., 21% moon sets 10:09 p.m. Star party hours: 7:00 until 10:00.

February
7 General Meeting at Houge Park. 8 p.m. Elections for the Board of Directors. Our speaker is Dr. Christopher McKay of NASA/Ames, “What We Have Learned From the Mars Phoenix Lander”
14 Dark Sky weekend. Sunset 5:47 p.m., 66% moon rises 11:48 p.m.
20 Astronomy Class at Houge Park. 7:30 p.m. The topic will be Advanced Chart Reading.
20 Houge Park star party. Sunset 5:53 p.m., 12% moon rises 4:59 a.m. Star party hours: 7:00 until 10:00.
21 Dark Sky weekend. Sunset 5:54 p.m., 7% moon rises 5:32 a.m. Henry Coe Park’s “Astronomy” lot has been reserved.

March
6 Astronomy Class at Houge Park. 7:30 p.m. The topic will be Galaxies.
6 Houge Park star party. Sunset 6:07 p.m., 84% moon sets 4:20 a.m. Star party hours: 7:00 until 10:00.
7 General Meeting at Houge Park. 8 p.m. Our speaker is Dr. Kevin Zahnle of NASA Ames. Topic: Earth After the Moon-Forming Impact
8 DST begins. 2:00 a.m. Advance clocks 1 hour.
20 Spring begins at 4:44 a.m. PDT
20 Houge Park star party. Sunset 7:20 p.m., 25% moon rises 4:30 a.m. Star party hours: 8:30 until 10:30.
21 Dark Sky weekend. Sunset 7:21 p.m., 17% moon rises 5:01 a.m.
28 Dark Sky weekend. Sunset 7:27 p.m., 8% moon sets 10:12 p.m. Henry Coe Park’s “Astronomy” lot has been reserved.

The Board of Directors meets before each general meeting. Call the hotline for the exact time.

February General Meeting
Christopher McKay
February 7, 2009 8 p.m.

Our February general meeting speaker will be Dr. Christopher McKay of NASA/Ames. He will speak on the subject, “What We Have Learned From the Mars Phoenix Lander.”

Chris McKay, a Planetary Scientist with the Space Science Division of NASA’s Ames Research Center, is a co-investigator for the Phoenix Lander, as well as for the Mars Science Laboratory. He specializes in the exploration of Mars and Titan, the search for life, and the evolution of the solar system. He has been involved in research in Mars-like earth environments including the Antarctic dry valleys, Siberia, the Canadian Arctic, and the Atacama desert. Dr. McKay was co-investigator on the Titan Huygen’s probe in 2005 and is actively involved in planning future Mars missions.

Photo courtesy of NASA
The Mars rovers know which rocks are worth studying. The rovers have “Autonomous Exploration for Gathering Increased Science” software, proven on New Millennium Program’s Space Technology 6 project. What is NASA seeking on Mars? (spaceplace.nasa.gov/en/kids/mars_rocket4.shtml)

<table>
<thead>
<tr>
<th>SUNDAY</th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
<th>SATURDAY</th>
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<td></td>
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<td>Groundhog Day: The groundhog should consult the GOES satellites, not its shadow!</td>
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<td>National Weatherperson’s Day. Honor it by going on a Wild Weather Adventure!</td>
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<tr>
<td>Boy Scouts founded this day in 1910. See how The Space Place can help Cubs with achievements and electives.</td>
<td>Random Acts of Kindness Week. It would be kind to print Space Place coloring pages for a younger friend.</td>
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<td>Valentine’s Day</td>
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<td>Birthday in 1564 of Galileo Galilei, discoverer of Jupiter’s four largest moons. See what they look like and how they compare in size to our Moon.</td>
<td>Presidents’ Day</td>
<td></td>
<td>Pluto discovered in 1930. We’re on our way at last! Read about Pluto and the New Horizons mission.</td>
<td>Nicolaus Copernicus born in 1473. He thought the center of the Universe was near the Sun. Wrong! But where is it?</td>
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<tr>
<td>Thinking Day. Give your brain a workout and go Vec→Touring today!</td>
<td></td>
<td>Quiet Day. Even the most violent events in space make no sound—unless it is the Black Hole Game on the Space Place.</td>
<td></td>
<td></td>
<td></td>
<td>Plant the Seeds of Greatness Month. Watch Space Place Live! interviews to find out how!</td>
</tr>
</tbody>
</table>

Month of February: spaceplace.nasa.gov/en/kids/live
Feb. 5: spaceplace.nasa.gov/en/kids/goes/wwa
Feb. 7: spaceplace.nasa.gov/en/kids/stardust/aerogel.shtml
Feb. 8: spaceplace.nasa.gov/en/kids/cubscouts
Feb. 18: spaceplace.nasa.gov/en/kids/pluto
Feb. 19: spaceplace.nasa.gov/en/kids/phonemar deciduous3_003_june.shtml
Feb. 25: spaceplace.nasa.gov/en/kids/blackhole

THE SPACE PLACE CALENDAR IS FOR EDUCATIONAL PURPOSES ONLY AND IS NOT TO BE SOLD
In February, Venus continues its spectacular and high pass. It's been putting on a great show this year, and as the month progresses, Venus will draw closer to the sun while expanding into a large, thin crescent. It's always fun to watch Venus' phases. At a public star party, if you point a telescope toward a crescent Venus, you'll always get a few people who ask "Is that the moon?" even if the moon is clearly hanging right there, gibbous or nearly full, on the other side of the sky, or isn't there at all. I always wonder whether they think Earth actually has two moons (they just don't tell you that if you don't have a telescope, so you don't get disappointed), or maybe that telescopes can look backward or forward in time.

Saturn continues to move toward its early March opposition. Its rings have already opened from truly edge-on, but their angle of about a degree and half still isn't much and may well still look edge-on in most telescope views. Keep an eye on it as the rings widen throughout this month and the following months: when do they become easily visible?

It should also be fun to see Saturn's moons without any distraction from the rings.

Use a planetarium program to see when good candidates might occur. For instance, XEphem shows me that on Saturday Feb 7 at around 10 p.m., both Tethys and Dione and their shadows will be in transit. Saturn isn't very high then, only about 23 degrees, so it's a balance between waiting for it to rise into steadier air and the ends of the transits (by 11 p.m., Saturn will be up to 35 degrees but Tethys and both shadows will already be finished transiting).

On Saturday the 21st (a third quarter Saturday), Tethys and its shadow will again be transiting, but by then Saturn will be higher in the sky and into steadier air. The transit starts around 8:30, though Tethys will already be in transit against the rings before then. Will the transit against the rings be visible? I doubt it, but it doesn't hurt to look!

The shadow exits the planet's globe about 11 p.m., with Saturn a respectable 45 degrees up.

If you can stay up until 3 a.m. on the morning of the 9th (unfortunately that's also a full moon evening), you can see the beginning of a Rhea transit (Rhea is Saturn's second largest moon), with tiny Mimas and its shadow beginning a transit an hour or so earlier. Enceladus follows on Rhea's heels.

But the real prize comes in the wee hours of Tuesday, Feb 24, with a very rare Titan transit. It's a new moon, so the sky will be dark. Titan's shadow begins its transit at a hair before 2 a.m., and the planet itself touches Saturn's limb an hour and a half later. Titan is big enough that its shadow should be easy to see. Titan transits only happen when the planet's ring (and moon) plane are close to edge-on, as they are now. There will be another one on Mar 12 at 4 a.m., then by the end of March Saturn's tilt has grown too great. Later in the year when the ring angle closes up again, Saturn will be too close to the sun for us to see anything.

Anyway, these aren't the only transits, just a couple that I noticed were happening on weekend evenings. If you're interested, fire up some software that shows moon transits and check out times when you think you might be up late. I expect these transits will be tough to see unless you have very steady skies and first-rate optics, but don't let that stop you from trying. Remember: you won't see what you don't look for!

Early morning risers get a great show in February as well. From the 20th through the first few days of March, Mercury, pulling away from the sun, shoots past first Jupiter and and then Mars. First Mars passes Jupiter, on the 17th; then on the 24th, Mercury passes Jupiter; finally, on March 2, Mercury passes Mars. Each of these encounters involves a separation of less than a degree and should be a nice view in any telescope.

That's the good news. The bad news is that this all happens quite low to the horizon, so you'll want a decent eastern horizon to catch it. Jupiter is bright enough that it should remain visible even as the sky brightens (though it does get more difficult to find), but Mercury and Mars will probably fade out fairly quickly.

Another show — sort of — for morning people is a penumbral lunar eclipse on the 9th. A penumbral eclipse isn't much to see, unfortunately; it's so subtle that you might not even notice one was happening if you didn't already know. But now you do know, so if you find...
It sounds like an impossible task: Take a star a hundred times larger in diameter and millions of times more luminous than the Sun and hide it in our own galaxy where the most powerful optical telescopes on Earth cannot find it.

But it is not impossible. In fact, there could be dozens to hundreds of such stars hiding in the Milky Way right now. Furiously burning their inner stores of hydrogen, these hidden superstars are like ticking bombs poised to ‘go supernova’ at any moment, possibly unleashing powerful gamma-ray bursts. No wonder astronomers are hunting for them.

Earlier this year, they found one.

“It’s called the Peony nebula star,” says Lidia Oskinova of Potsdam University in Germany. “It shines like 3.2 million suns and weighs in at about 90 solar masses.”

The star lies behind a dense veil of dust near the center of the Milky Way galaxy. Starlight traveling through the dust is attenuated so much that the Peony star, at first glance, looks rather dim and ordinary. Oskinova’s team set the record straight using NASA’s Spitzer Space Telescope. Clouds of dust can hide a star from visible-light telescopes, but Spitzer is an infrared telescope able to penetrate the dusty gloom.

“Using data from Spitzer, along with infrared observations from the ESO’s New Technology Telescope in Chile, we calculated the Peony star’s true luminosity,” she explains. “In the Milky Way galaxy, it is second only to another known superstar, Eta Carina, which shines like 4.7 million suns.”

Oskinova believes this is just the tip of the iceberg. Theoretical models of star formation suggest that one Peony-type star is born in our galaxy every 10,000 years. Given that the lifetime of such a star is about one million years, there should be 100 of them in the Milky Way at any given moment.

Could that be a hundred deadly gamma-ray bursts waiting to happen? Oskinova is not worried.

“There’s no threat to Earth,” she believes. “Gamma-ray bursts produce tightly focused jets of radiation and we would be extremely unlucky to be in the way of one. Furthermore, there don’t appear to be any supermassive stars within a thousand light years of our planet.”

Nevertheless, the hunt continues. Mapping and studying supermassive stars will help researchers understand the inner workings of extreme star formation and, moreover, identify stars on the brink of supernova. One day, astronomers monitoring a Peony-type star could witness with their own eyes one of the biggest explosions since the Big Bang itself.

Now that might be hard to hide.

Find out the latest news on discoveries using the Spitzer at www.spitzer.caltech.edu. Kids (of all ages) can read about “Lucy’s Planet Hunt” using the Spitzer Space Telescope at http://spaceplace.nasa.gov/en/kids/spitzer/lucy.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.
Almaaz is a star that you may know as Epsilon Aurigae, part of a triangle of stars that is sometimes called the Kids. It is located southwest of Capella and its magnitude is just about 3. Capella is the Latin name for “she-goat” and Almaaz is Arabic for “he-goat”. It is an F class star though some classify it as an A8. It is located about 2000 light years away but that distance is uncertain. It’s diameter is just about 1 AU with a mass more than 15 times that of the sun. But the really strange thing about Almaaz is the way that it is eclipsed by it’s partner. While the prototypical eclipsing binary Algol goes through a cycle once every 2.87 days, Almaaz goes through a cycle once every 27.1 years. Remember how large this star is? Its eclipsing partner is larger! It seems unlikely that a star could be unseen and yet bigger than Almaaz so the assumption is that the eclipsing star includes a large dust cloud - perhaps a protoplanetary system. What is the evidence of that? First, the eclipse lasts so long that the most likely candidate is a star orbiting Almaaz at a distance of 30AU and the dust cloud is 20 AU in diameter. Second, the eclipsed star brightens a bit right in the middle of the eclipse - as if there was a hole in dust. The last eclipse of Almaaz started in 1982 and when you add 27 to that you get, hey, 2009. Indeed, the study of Almaaz is one of the highlights of the IYA 2009. The idea is that amateurs can help professional astronomers by taking astrometrical measurements before, during and after the eclipse. The eclipse should start in August and continue until early 2011.

As always with this irregular column, star information is easily found by entering the star’s name and “Kaler” in your favorite Internet search engine. In this case see http://www.astro.uiuc.edu/~kaler/sow/almaaz.html.
The Last Month In Astronomy

JAN-08-2009  **Oxygen on moon**  Future lunar explorers may find the oxygen they need on the moon itself. Nearly half of the moon (by weight) is oxygen. NASA is testing technology that could extract that oxygen at a test site on Mauna Kea in Hawaii. [http://www.space.com/scienceastronomy/090108-am-pisces-hawaii.html](http://www.space.com/scienceastronomy/090108-am-pisces-hawaii.html)

JAN-07-2009  **Stars go ballistic**  The Hubble telescope has found 14 stars that tear through space at a speed of more than 110,000 miles per hour compared to the gas surrounding the star. This is about 5 times more than normal. It’s only about half of the speed of our sun in its orbit around the galaxy but nearly everything around us is going the same speed. [http://www.jpl.nasa.gov/news/news.cfm?release=2009-002](http://www.jpl.nasa.gov/news/news.cfm?release=2009-002)

JAN-06-2009  **30 new gamma-ray pulsars**  The Fermi space telescope has found 12 new gamma-ray only pulsars and 18 other pulsars that emit some energy in the gamma-ray part of the electromagnetic spectrum. The new observations add evidence to the idea that the gamma-rays emit from a location above the neutron star’s surface rather than on the surface itself. [http://www.astronomy.com/asy/default.aspx?c=a&id=7799](http://www.astronomy.com/asy/default.aspx?c=a&id=7799)

JAN-06-2009  **Brown Dwarfs Exclusive**  The number of brown dwarfs has always seemed a bit small. This has been called the brown dwarf desert. It turns out that brown dwarfs tend to hang out with their own kind. This was one result of a survey done of nearby (within 10 parsecs) stars. This survey is called RECONS (Research Consortium on Nearby Stars) and it found 239 red dwarf stars (about 20% of solar mass) but only 12 brown dwarfs. [http://www.astronomy.com/asy/default.aspx?c=a&id=7800](http://www.astronomy.com/asy/default.aspx?c=a&id=7800)

JAN-05-2009  **MW = Andromeda**  Scientists using the VLBA (Very Long Baseline Array) have been remaking the map of the Milky Way. What they have found is that our galaxy has as much mass as Andromeda. We’re not number two in the local group anymore. [http://www.nrao.edu/pr/2009/mwrotate/](http://www.nrao.edu/pr/2009/mwrotate/)


DEC-22-2008  **First antenna at ALMA**  The ALMA (Atacama Large Millimeter Array) has received it’s first of 66 antennae. The 40 foot diameter is now in place at the 3 mile high site in Chile. This antenna was built by Mitsubishi but antennae from America and Europe will arrive soon. [http://www.astronomy.com/asy/default.aspx?c=a&id=7766](http://www.astronomy.com/asy/default.aspx?c=a&id=7766)

DEC-22-2008  **Swiss Cheese vs. Dark Energy**  In the decade since it was discovered that the expansion of the universe is accelerating, a mysterious force labeled “dark energy” has been proposed to account for this. This study was done by Alex Filippenko (UC-Berkely) and others. Some (from Fermi Labs) have proposed that the universe is actually a lot like Swiss cheese with large voids that act a bit like concave lenses causing distant supernovae to appear to be farther away. In other words, “object may be closer than they appear”. But Ali VanderVeld at JPL has shown that such voids are not sufficient to eliminate dark energy. She says “The lumpiness of the universe could still be tricking us into thinking it’s accelerating, but we did not find this to be the case with our best, current models of the universe”. [http://www.jpl.nasa.gov/news/features.cfm?feature=1988](http://www.jpl.nasa.gov/news/features.cfm?feature=1988)

DEC-18-2008  **Kepler readied for launch**  The Kepler spacecraft is headed to Cape Canaveral. Kepler will monitor 100,000 stars looking for transits by, hopefully, earth-like planets. Kepler is scheduled to launch on March 5. [http://www.nasa.gov/centers/ames/news/releases/2008/08-111AR.html](http://www.nasa.gov/centers/ames/news/releases/2008/08-111AR.html)

Shallow Sky

Continued from page 3

yourself up in the wee hours of February 8, take a look and see what you see. The moon starts to enter the penumbra at 4:38 a.m.; by the time it sets, at 7:02, it’s past mid-eclipse but still almost entirely within the penumbra. Official sunrise is one minute later, but the sky will already be fairly bright by that point, making the eclipse even harder to see.

Ceres is at opposition on Feb 25, in Leo, hanging over the lion’s haunches. That’s a curiously empty part of Leo: the nearest deep-sky object is NGC3344, about 3.5 degrees directly above Ceres.

This is an unusually close opposition (a little over 1.5AU) and it won’t get closer than this again until the year 4164.

The outer planets don’t put on much of a show this month. Uranus is barely visible in the early evening; Neptune and Pluto remain hidden in the Sun’s glare.
Telescope Loaner Program

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. It is one of the real jewels of being a member of the club. Scopes are available for all experience levels.

The inventory is constantly changing. The following list is a sample.

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<thead>
<tr>
<th>Scope Number</th>
<th>Scope Description</th>
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<tr>
<td>42</td>
<td>11x80 Binoculars</td>
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<tr>
<td>49</td>
<td>3.5&quot; Orion StarBlast</td>
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<td>43</td>
<td>4.5&quot; f/8 Orion XT Dob</td>
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<td>44</td>
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<td>37</td>
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<td>35</td>
<td>8&quot; f/6 Meade Newt on EQ Mount</td>
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<tr>
<td>40</td>
<td>8&quot; Celestron Super C8+ S/C</td>
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<td>10&quot; f/5 Dob (Earletron)</td>
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<td>12&quot; Meade Lightbridge</td>
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<td>7</td>
<td>12.5&quot; f/7 Homemade Dob</td>
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<td>39</td>
<td>17&quot; f/4.5 Zeiders Truss Dob</td>
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<td>Star Spectroscope</td>
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For up to date information please see the loaner program web page: http://www.sjaa.net/loaners
San Jose Astronomical Association
P.O. Box 28243
San Jose, CA 95159-8243

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)

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 $10 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

☐ I’ll get the Ephemeris newsletter online
http://ephemeris.sjaa.net  Questions?
Send e-mail to membership@sjaa.net

Bring this form to any SJAA Meeting or send to the club address (above).

Please make checks payable to “SJAA”.

You can join or renew online:
http://www.sjaa.net/SJAAmembership.html

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E-mail address: _____________________________________