



SJAA EPHEMERIS

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.

24 hour news and information hotline:

(408) 559-1221

<http://www.sjaa.net>

February General Meeting

Christopher McKay

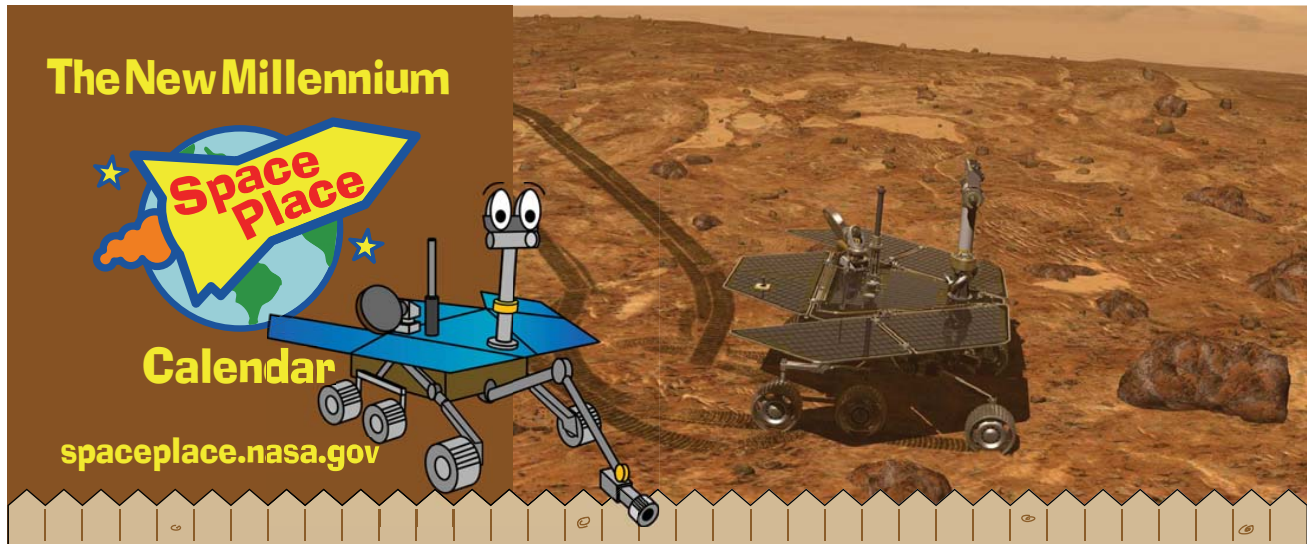
February 7, 2009 8 p.m.

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 now 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)

FEBRUARY 2009

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	FIRST QUARTER 2 Groundhog Day. The groundhog should consult the GOES satellites, not his shadow!	3	4	5 National Weatherperson's Day. Honor it by going on a Wild Weather Adventure!	6	7 Stardust spacecraft launched this day in 1999. See how it captured comet samples and brought them home.
8 Boy Scouts founded this day in 1910. See how The Space Place can help Cubs with achievements and electives.	FULL MOON 9 Random Acts of Kindness Week. It would be kind to print Space Place coloring pages for a younger friend.	10	11	12	13	14 Valentine's Day
15 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.	LAST QUARTER 16 Presidents' Day	17	18 Pluto discovered in 1930. We're on our way at last! Read about Pluto and the New Horizons mission.	19 Nicolaus Copernicus born in 1473. He thought the center of the Universe was near the Sun. Wrong! But where is it?	20	21 Introduce a Girl to Engineering Day. Show her the amazing stuff on our Space Technology page.
22 Thinking Day. Give your brain a workout and go Vec—>Touring today!	23	NEW MOON 24 	25 Quiet Day. Even the most violent events in space make no sound—unless it is the Black Hole Game on the Space Place.	26	27	28
1	2	3	4	5	6	7 Plant the Seeds of Greatness Month. Watch Space Place Live! interviews to find out how!

Month of February: spaceplace.nasa.gov/en/kids/live
 Feb. 2: spaceplace.nasa.gov/en/kids/goes/goes_poes_orbits.shtml
 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. 9: spaceplace.nasa.gov/en/kids/coloring_book

Feb. 15: spaceplace.nasa.gov/en/kids/sse_flipflop.shtml
 Feb. 18: spaceplace.nasa.gov/en/kids/pluto
 Feb. 19: spaceplace.nasa.gov/en/kids/phonedrmarc/2003_june.shtml
 Feb. 21: spaceplace.nasa.gov/en/kids/cs_space_tech.shtml
 Feb. 22: spaceplace.nasa.gov/en/kids/st7/vectouring
 Feb. 25: spaceplace.nasa.gov/en/kids/blackhole

Saturnian moon transits, and other subtle events

Akkana Peck

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. With Saturn's ring plane pointing so nearly at the sun (the sun-ring angle is less than three degrees this month), there are lots of transits of Saturn's moons and their shadows. I've never seen a shadow transit on Saturn; have you? Saturn's moons (except Titan) are quite small and faint compared to Jupiter's Galilean satellites; a Saturnian moon transit is a subtle, challenging event. They've been imaged in amateur telescopes, but I haven't heard of anyone seeing one visually. But maybe that's because no one has tried!

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 11pm, 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 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

Continued on page 6

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."

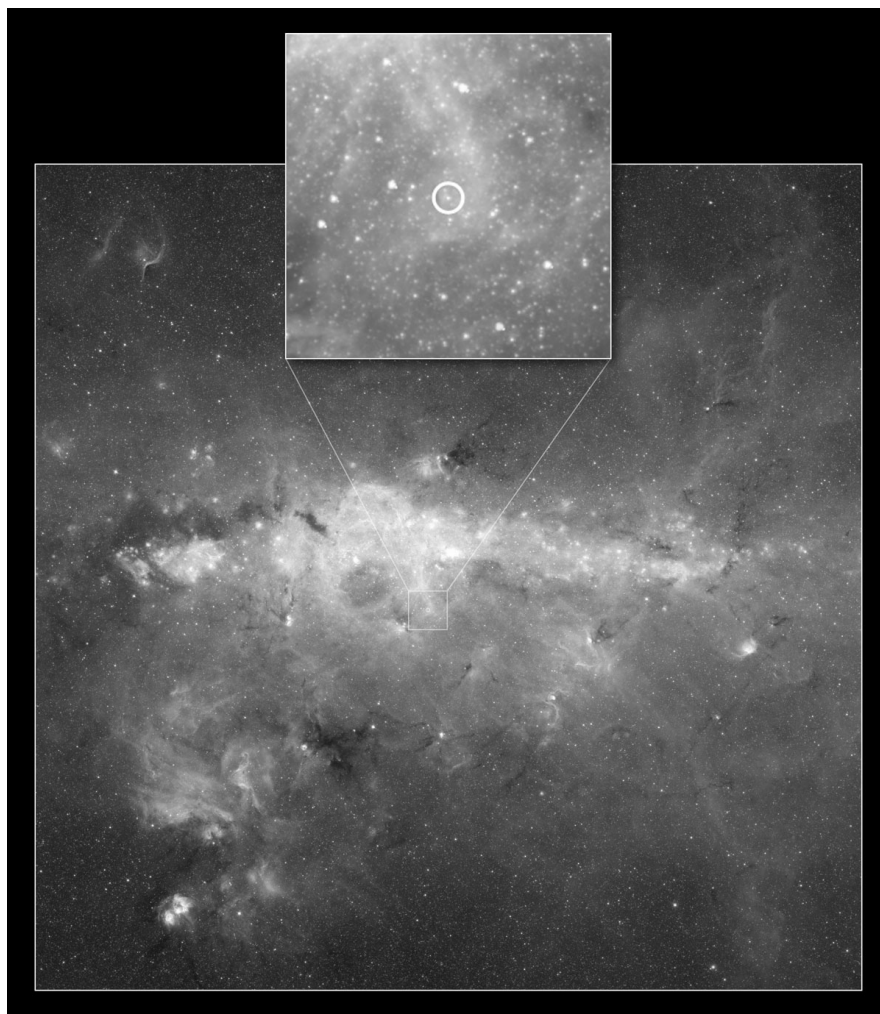
Nevertheless, the hunt continues. Mapping and studying supermassive stars will help researchers understand the inner workings of extreme star

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.



The "Peony Nebula" star is the second-brightest found in the Milky Way Galaxy, after Eta Carina. The Peony star blazes with the light of 3.2 million suns.

Almaaz

Paul Kohlmiller

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. Its 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 its 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>.

Board Elections

At the February General Meeting, the membership of the SJAA elects its board of directors. In odd numbered years we vote for an odd number of directors - 5 to be exact. The other four directors are elected in even numbered years. A nominating committee attempts to identify qualified candidates for the positions. This year the nominating committee has put forth these names:

Rich Neuschaefer
Mark Wagner
Gordon Reade
Mark Johnston
Rod Norden

When the board meets in March, the officers are chosen.

One candidate statement was received last month and the editors decided to include that statement in this month's Ephemeris. However, that candidate has withdrawn.



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.

Board Outlook

Mark Wagner

With new board elections this month, perhaps this is a good time to look back to who has helped, and ahead to our new board members.

Two board members and officers have recently left. Rob Hawley, who was club president resigned last month. Gary Mitchell was the club treasurer until his resignation last July. Both deserve thanks and respect for the time and effort they volunteered to make the SJAA a better place for all its membership and those in the bay area interested in astronomy. Gary continues to volunteer in the club's outstanding school star party program. Rob has continued as Membership Chair.

We welcome new board members Greg Claytor who fills Gary's seat, and Kevin Roberts, filling Rob's seat. Greg and Kevin are regular observers at the likes of Houge Park star parties, Henry Coe and Coyote Lake.

The board also hopes to welcome bay astronomy enthusiasts Rod Norden, and Mark Johnston to the board at the general meeting elections, filling two open seats. We feel the makeup of the upcoming board will be one of friendliness and cohesion. Everyone expects lots of good things to result.



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>

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>

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>

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>

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/>

JAN-03-2009 **5 years for Rovers** January marks the 5th anniversary of the landings of the two Martian rovers. Both of them are still functioning. <http://www.jpl.nasa.gov/news/news.cfm?release=2008-243>

DEC-29-2008 **Epoxi gets boost** The Epoxi spacecraft, headed for a flyby of comet Hartley 2 in November of 2010, gets a speed boost from the Earth. This maneuver is sometimes a slingshot effect but a better analogy is a ping pong ball thrown at an overhead fan. <http://www.jpl.nasa.gov/news/features.cfm?feature=1993>

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>

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>

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>

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.

Scope Number	Scope Description
42	11x80 Binoculars
49	3.5" Orion StarBlast
43	4.5" f/8 Orion XT Dob
44	4.5" f/8 Orion Skyview Newt
37	4" Celestron Flourite Refractor
51	120mm Orion 120ST
13	6" f/8 Orion XT Dob
34	8" f/10 Dynamax S/C
14	8" f/8.5 Homemade Dob
35	8" f/6 Meade Newt on EQ Mount
40	8" Celestron Super C8+ S/C
12	8" f/6 Orion XT Dob
45	10" f/5 Dob (Earletron)
33	10" f/4.5 Orion DSE Dob
47	12" Meade Lightbridge
7	12.5" f/7 Homemade Dob
39	17" f/4.5 Zeiders Truss Dob
10	Star Spectroscope

For up to date information please see the loaner program web page: <http://www.sjaa.net/loaners>

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

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