



EPHEMERIS

March 2013

SJAA Activities Calendar

Jim Van Nuland

March

- 1 Houge Park star party. Sunset 6:02 p.m, 79% moon rises 10:34 p.m. Star party hours: 7:00 until 10:00 p.m.
- 2 Dark-Sky weekend. Sunset 6:03 p.m, 68% moon rises 11:40 p.m.
- 3 Observing H-alpha flares and sunspots at Houge Park. Also our Telescope Tune-up Time. Sun party and tune-up hours: 2:00 - 4:00 p.m.
- 9 Dark-Sky weekend. Sunset 6:10 p.m, 2% moon rises 5:28 a.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 10 DST begins. At 2 a.m. advance clocks to 3 a.m.
- 15 Beginner Astronomy Class at Houge Park 7:15 p.m.
- 15 Houge Park star party. Sunset 7:15 p.m, 19% moon sets 11:38 p.m. Star party hours: 8:15 until 11:15 p.m.
- 16 First quarter Moon outdoor meeting at Houge Park: Advanced topics. Meeting hours: 7:30 - 9:00 p.m.
- 24 Auction XXXIII. Noon to 5:00 p.m. See page 6.
- 24 Observing H-alpha flares and sunspots at Houge Park. Sun party and tune-up hours: 2:00 - 4:00 p.m.

April

- 5 Beginner Astronomy Class at Houge Park 8:15 p.m.
- 5 Houge Park star party. Sunset 7:34 p.m, 19% moon rises 4:28 a.m. Star party hours: 8:30 until 11:30 p.m.
- 6 Dark-Sky weekend. Sunset 7:35 p.m, 11% moon rises 5:02 a.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 7 Observing H-alpha flares and sunspots at Houge Park. Also our Telescope Tune-up Time. Sun party and tune-up hours: 2:00 until 4:00 p.m.
- 12 Hall and grounds reserved for SJAA use from 6 p.m. to 10 p.m.
- 19 Houge Park star party. Sunset 7:47 p.m, 66% moon sets 3:12 a.m. Star party hours: 8:45 until 11:45 p.m. This is part of SJAA's Astronomy Day observation.
- 27 **General Meeting.** Board meeting at 6:00; Social Time at 7:30; General Meeting at 8:00. Our speaker is Dr. Nathalie Cabrol, NASA; "A Decade of Revolution in Astrobiology: How our vision of habitability and life potential in the Solar System has changed".

Two Bright Comets for 2013

Michael Packer

This year we have two comets that are predicted to be naked-eye observations. ISON, full name C/2012 S1 ISON is the brightest of the two and possibly visible during the day in November! November is a way off you say but imaging and observing comets for detail requires a learning curve. And you may just have a chance to learn in March with Comet PanSTARRS (C/2011 L4 PanSTARRS) which is predicted to be magnitude 2.0 or brighter according to the latest light curves by comet observer Jakub Cerny. Below is the sky chart for comet



Credit: Sky and Telescope

PanSTARRS and will have a chart for ISON in a future issue.

Note: Planetarium software such as Starry Night or Sky Safari is updated with these comet positions so you can track them.

In 1997 sixty nine percent of US population (that's 194 million of your

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

Comets

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neighbors) saw comet Hale-Bopp. Together with long-tailed comet Hyakutake, the duo commanded the night sky and spiked an interest in astronomy worldwide that has clearly rippled to the present. For some of our readers, these comets are why they are SJAA members now.



Hyakutake with its tail that stretched 80 degrees across the sky had a visual magnitude of 0. Photo credit: Stefan Binnewies



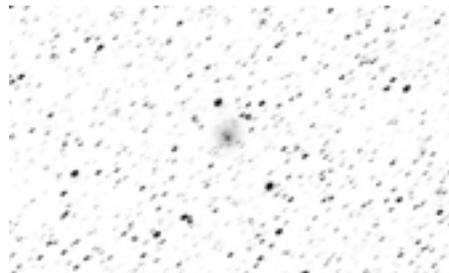
Comet Hale-Bopp with its blue ion and white dust tail was brighter than magnitude 0 for 8 weeks. Photo credit: R. Scott Ireland

Before you read on let me share the first characteristic you should know about comets: they are notoriously unpredictable. Where comets Hale-Bopp and Hyakutake exceeded predictions more comets fail to dazzle the public. To quote amateur comet hunter David Levy, "Comets are like cats: they have tails, and they do precisely what they want." Nevertheless amateurs astronomers with telescopes often feel the dazzle precisely because they have a telescope.

For some veterans of our hobby Hale-Bopp and Hyakutake turned them outside-in. After witnessing these comets naked-eye and then following their departure from the inner solar system,

deep-deep sky aficionados, who search for galaxies out beyond our local group some 65 million light years away, started to scan the shallow skies to get their comet fix. Why deal with withdrawal if you don't have to? It didn't matter if the comet's magnitude was 12 or fainter – that's within the magnitudes they work in anyway. The distance however is another story. The origins of most comets can be traced to icy Oort cloud which extends out to 50,000 AU from the sun. That may be quite a distance for a NASA satellite to cover but to an astronomer with a telescope, it's just shy of one measly light year.

In 2008 amateur astronomers Xing Gao and Tao Chen (China) discovered a 12th magnitude comet with a digital SLR camera attach to their scope. They found comet, now named C/2008 Chen-Gao, in the constellation Cepheus during their novae search. It was missed by the professional community doing asteroid



C/2008 Chen-Gao: As with all comets, Chen-Gao was named after its discoverors. Image credit: Matin P. Moberley

surveys because it was within a star-rich area they tend to avoid. Too much clutter.

Comets are not always that faint of course. Some of you may have had the pleasure to observe comets Machholz or Holmes when they were quite bright. Comet Machholz was discovered by amateur astronomer Don Machholz from Colfax, CA in 2004. It reached naked eye brightness in January 2005. In 2007 Comet Holmes unexpectedly brightened from a magnitude of about 17 to about 2.8 in a period of only 42 hours. For myself and my friend, we heard about comet Holmes but did not bother to read the details of where it was or how bright it got. We were on a lunar photography trip. Our mission was

to catch a full-moon set at dawn over a field of a couple thousand of Sandhill Cranes. Our goal was to image a real shot of an ET (Earth Terrestrial) flying in front of a full moon and we logically picked cranes because of their mass break of dawn fly-outs to nearby grazing fields. On our pre-dawn drive to the site, the moon was hidden behind some



Comet Holmes looking like a fish egg embryo. Photo credit Rick Scott

foothills so we made a quick stop to do some observing. I was scanning the skies around Perseus with my binoculars when I stopped at something very strange. The star arrangement was all wrong. Either a new star had suddenly brightened to rival Algol or we actually have an ET! Naturally my friend and I could not believe either so we put our scope on the object. A fuzzy blue green sphere was in the field of view and within a few long seconds of gear grinding we realized to our delight we discovered Comet Holmes. Well, OK we didn't actually discover the comet but you know what we mean – we discovered it for ourselves. We upped the eyepiece power to view its structure with the right amount of contrast and magnification and we dispensed with the idea that it was perfectly round as was our first observation. The head of the comet inside its bubble of gas was slightly off center. Moreover we could get the hint of a comet tail, short but just poking out of the gas shell. All-in-all our best description of the comet was that it looked like a glowing blue transparent salmon egg. You could see the salmon embryo inside and in fact its tail was sticking out. It was about to hatch. To learn more about observing comets visit Martin McKenna's webpage at <http://www.nightskyhunter.com/AnObservingGuideToComets.html>. For

weekly information on all the bright comets visit Seiichi Yoshida's webpage at <http://www.aerith.net/comet/weekly/20130112n.html>.

By the way we did finally get our shot of ET flying in front of the moon. A final note on comet research: A number of recent space missions have ventured to comets. NASA's Deep Impact collided an impactor into Comet Tempel 1 in 2005 and recorded the dramatic explosion that revealed the interior composition and structure of the nucleus. In 2009, NASA announced samples the Stardust mission returned from Comet Wild 2 revealed a building block of life. The European Space Agency's Rosetta is scheduled to orbit Comet Churyumov-Gerasimenko in 2014 and deploy a probe to make the first landing on a comet.



The Shallow Sky

This March, planetary viewing is all about Jupiter. Saturn rises a little before midnight, so you can catch it if you stay up late, but even if you wait until 4am, it transits at less than 40 degrees.

And the rest of the planets are hiding in daylight skies where they'll be tough to find.

But Jupiter is perfectly placed for evening viewing this month.

It transits around nightfall, high in the sky (73 degrees), and stays high for most of the evening. Its turbulent atmosphere has lots to look at this year — plenty of detail around and even inside the Great Red Spot, some dark junior red spots nearby. White ovals!

Festoons! Everything a Joviphile might want.

Well, nearly everything — although there are plenty of double transits of the Galilean moons and their shadows this month, they're all in the predawn or daylight hours. But there are plenty of single moon and shadow transits to watch — plus another sort of moon event that you might not have seen.

A few months ago, I got email from a novice Jupiter observer calling my attention to

an interesting phenomenon of Jupiter's moons that I hadn't

seen before. The person who mailed me wasn't quite sure what he had seen, but he knew it was unusual, and after some further discussion we pinned it down.

He was observing Jupiter at 11/11/12 at 00.25 UT (which would have been mid-afternoon here in San Jose). Three of the moons were visible, with only Ganymede missing. Then Ganymede appeared: near Jupiter's limb, but not right on it. As he watched over the next

Whac-a-Moon

Akkana Peck

few minutes, Ganymede seemed to be moving backward — in toward Jupiter rather than away from it. Eventually it disappeared behind the planet.

It turned out that what he was seeing was the end of an eclipse.

Jupiter was still a few months away from opposition, so the shadow thrown by the planet streamed off to one side as seen from our inner-planet vantage point on Earth. At 0:26 UT on that evening, long before he started observing, Ganymede, still far away from Jupiter's limb, had entered Jupiter's shadow and disappeared into eclipse. It took over two hours for Ganymede to cross Jupiter's shadow; but at 2:36, when it left the shadow, it hadn't yet disappeared behind the planet. So it became visible again. It wasn't until 2:50 that Ganymede finally disappeared behind Jupiter.

So it was an interesting effect — bright Ganymede appearing out of nowhere, moving in toward Jupiter then disappearing again fourteen minutes later. It was something I'd never seen, or thought to look for.

It's sort of like playing Whac-a-mole — the moon appears only briefly, so you've got to hit it with your telescope at just the right time if you want to catch it before it disappears again.

A lot of programs don't show this eclipse effect — including, I'm sad to say, my own Jupiter's moons web page. (I intend to remedy that.) The open source program Stellarium shows the effect; on the web, Sky and Telescope's Jupiter's Moons page shows it, and even prints out a table of times of various moon events, including eclipses. I've used these tables to predict a few upcoming "Whac-a-moon" events.

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The Shallow Sky

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They're not all that uncommon — but only when the sun angle is just right. During late February and early March this year, I found several events for Ganymede and Europa (though, sadly, many of them were during our daytime). By mid-March, the angles have changed so that Europa doesn't leave Jupiter's shadow until after it's disappeared behind the planet's limb; but Ganymede is farther out, so we can see Ganymede appearances all the way through March and for months after.

The most interesting view, it seems to me, is right on the boundary when the moon only appears for a short time before disappearing again.

And with that in mind, the best upcoming event happens on Sunday night, March 10.

Reporting on that one got a little tricky — because that's the day we switch to Daylight Savings time. I have to confess that I got a little twisted up trying to compare results between programs that use UTC and programs that use local time — especially when the time zone converter I was using to check my math told me "That time doesn't exist!"

Darnit, if we'd all just use UTC all the time, astronomy calculations would be a lot easier! Anyway, here's the scoop.

On Sunday night, March 10, at 7:40 pm PDT, Europa peeks out from behind Jupiter's northeast limb. The sky will still be bright — the sun sets at 7:12 that night — but Jupiter will be 66 degrees up and well away from the sun, so it shouldn't give you too much trouble.

Once Europa pops out, keep a close eye on it — because if Sky & Tel's calculations are right, it will disappear again just four minutes later, at 7:44, into eclipse in Jupiter's shadow. It will remain invisible for almost three hours, finally reappearing out of nowhere, well off Jupiter's limb, at around 10:24 pm.

If you're reading this article early, in February, there's a slightly longer Europa Whac-a-moon event on Wednesday, Feb 20. Europa appears from behind Jupiter's limb at 11pm, then enters the eclipse shadow at 11:08. If you're staying up late, Europa will exit the eclipse at 1:46am.

As for Ganymede, this month's best Whac-a-mede happens on March 26, where the moon appears from behind the limb at 7:12 — which unfortunately is about 15 minutes before our local sunset — then disappears into the eclipse shadow at 9:36, not to emerge again until twelve minutes past midnight. The Ganymede whacking interval will gradually get shorter over the next few months, so I'll keep you posted on any likely dates in future columns..

Meanwhile, go out and whack some moons!

Directions to Houge Park

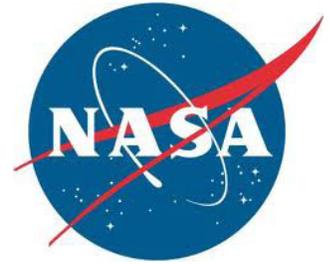
Houge (rhymes with "Yogi") Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three 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.

Silicon Valley Astronomy Lectures

The Silicon Valley Astronomy Lectures have restarted following a year long sabbatical while the Smithwick Auditorium was renovated. The talks are always free but parking at Foothill College is 3 dollars. As we go to press, the March lecture is not yet announced. On April 17, Gibor Basri (UC Berkeley) will talk about Brown Dwarfs and Free-floating Planets. Then on May 15, Lori Fenton (SETI Institute) will present a talk discussing What It's Like on the Surface of Mars.

Past lectures can be found online at <http://astrosociety.org/silicon-valley-astronomy-lectures/>



Tackling the Really BIG Questions

Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, New Worlds, New Horizons in Astronomy and Astrophysics was completed in 2010.

It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will “set the nation firmly on the path to answering profound questions about the cosmos.” It defines space- and ground-based research activities in the large, midsize, and small budget categories.

The recommended activities are meant to advance three science objectives:

1. Deepening understanding of how the first stars, galaxies, and black holes formed,
2. Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
3. Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slitless spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system.

Naturally, NASA's strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also address the Decadal Survey science objectives for WFIRST would remain a high priority.

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Clusters of galaxies collide in this composite image of “Pandora’s Cluster.” Data (in red) from NASA’s Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory’s Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

For a summary of NASA's plans for seeking answers to the big astrophysics questions and to read the complete Astrophysics Implementation Plan (dated December 2012), see <http://science.nasa.gov/astrophysics/>. For kids, find lots of astrophysics fun facts and games on The Space Place, <http://spaceplace.nasa.gov/menu/space/>.

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

Announcing the Annual SJAA Auction Auction XXXIII

The annual SJAA auction will be held on March 24th. Doors open at noon. Bidding starts at 1 p.m.

Location: The Hall at Houge Park

Images from last year's auction can be found at <http://ephemeris.sjaa.net/1206/d.html>

The Last Month In Astronomy

FEB-09-2013

First Martian Drill

The NASA Mars rover called Curiosity has finally used its drill. It cut a hole 2.5 inches deep. The rover will analyze the new sample looking for signs of past water. The chief engineer of the rover's sample system is Louise Jandura (JPL). She said "To get to the point of making this hole in a rock on Mars, we made eight drills and bored more than 1,200 holes in 20 types of rock on Earth." <http://www.jpl.nasa.gov/news/news.php?release=2013-052>

FEB-06-2013

Earth analog nearby

A solid Earth candidate has not been found but it may be relatively close. That's the conclusion from a study of 95 planet candidates from the Kepler catalog. These 95 candidates were chosen from those that orbit red dwarf stars. Why red dwarfs? Most nearby stars are red dwarfs. The habitable zone around such stars is closer and it is easier to detect planets closer to their sun. According to Natalie Batalha, Kepler mission scientist at NASA Ames "We don't know if life could exist on a planet orbiting a red dwarf [but it leaves] me wondering if the cosmic cradles of life are more diverse than we humans have imagined." The planet candidates highlighted in a recent study have sizes ranging from 90 to 170% the size of Earth with orbits ranging from 20-56 days. <http://www.jpl.nasa.gov/news/news.php?release=2013-048>

JAN-25-2013

NGC 411

NGC is supposed to stand for New General Catalog but it might mean Not a Globular Cluster. The 411 on NGC 411 is that it is an open cluster located in the Small Magellanic Cloud. It is not as old as most globulars with most of its stars much younger than the sun. See the image below. Photo credit: ESA/Hubble & NASA. http://www.nasa.gov/mission_pages/hubble/science/ngc411.html



JAN-22-2013

Betelgeuse Crash

Alpha Orionis, Betelgeuse, is destined to run into a bar of material in about 5K to 12.5K years. The Herschel Space Observatory can find this material that was previously thought to be the result of one of the red giant's burps. But this material now appears to be completely distinct from the star and it is heading for a collision. The star is traveling at a speed of 67,000 mph. <http://www.jpl.nasa.gov/news/news.php?release=2013-031>

It Must Be Astronomical ...

Upcoming Elections

The annual elections for the SJAA Board of Directors will take place at the February General meeting. It is not a requirement but those wishing to be nominated are recommended to contact Mark Wagner, head of the nominating committee. (see page 5 of the December issue)

“We, all of us, are what happens when a primordial mixture of hydrogen and helium evolves for so long that it begins to ask where it came from” - Jill Tartar

Loaners

The telescope loaner program has been revamped. The program now includes QuickSTART, program geared to those new to astronomy. Please check it out at <http://www.sjaa.net/loaners.shtml>.

School Star Parties

Completed Events					
	Total Sched.	Good Sky	Partial Success	Cloudy Fail	Cancel at noon
Jul	2	2			
Aug	1	1			
Sep	1	0	1		
Oct	7	3			4
Nov	11	4			7
Dec	13	4			9
Jan	5	4		1	
Total	40	18	1	1	20
Scheduled - for the 2012/2013 school year					
	Total	Firm	Working		
Jan	3	3	0		
Feb	9	9	0		
Mar	5	3	2		
Apr	1	0	1		
May	1	0	1		
Total	19	15	4		

As of January 22, 2013

School Star Party Link

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

Officers and Board of Directors

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Sec Rob Jaworski
Tres Michael Packer
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Dir Rich Neuschaefer
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Publication Statement

SJAA *Ephemeris*, newsletter of the San Jose Astronomical Association, is published monthly.

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

The SJAA *Ephemeris* is published in three formats: hardcopy, Adobe Acrobat PDF, and HTML. The PDF and HTML versions are found at <http://ephemeris.sjaa.net>.

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 (Add \$10 to the dues listed on the left). The newsletter is always available online at <http://ephemeris.sjaa.net>
Questions?

Send e-mail to membership@sjaa.net

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:

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