



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late) November

- 14 Dark Sky weekend. Sunset 4:58 p.m., 2% moon rises 5:48 a.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 20 Houge Park star party. Sunset 4:54 p.m., 17% moon sets 8:13 p.m. Star party hours: 7:00 until 10:00 p.m.
- 28 **General Meeting** at 8 p.m. Our speaker is Gordon Reade. He will talk about the history and development of planetariums.

December

- 11 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA
- 11 Houge Park star party. Sunset 4:50 p.m., 16% moon rises 3:39 a.m. Star party hours: 7:00 until 10:00.
- 12 Dark Sky weekend. Sunset 4:51 p.m., 9% moon rises 4:43 a.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 19 **General Meeting and Holiday Party** at 8 p.m. Our speaker is TBA
- 21 Winter begins at 9:47 a.m. PST

January

- 8 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA
- 8 Houge Park star party. Sunset 5:07 p.m., 30% moon rises 2:36 a.m. Star party hours: 7:00 until 10:00.
- 9 Dark Sky weekend. Sunset 5:08 p.m., 22% moon rises 3:39 a.m.
- 16 Dark Sky weekend. Sunset 5:15 p.m., 3% moon sets 6:52 p.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 22 Houge Park star party. Sunset 5:22 p.m., 49% moon sets 12:44 a.m. Star party hours: 7:00 until 10:00.
- 30 **General Meeting** at 8 p.m. Our speaker is TBA

The Board of Directors meets before each general meeting at 6:30 p.m. All are welcome to attend.

24 hour news and information hotline:

(408) 559-1221

<http://www.sjaa.net>

December General Meeting

Holiday Party

December 19, 2009 8 p.m.

Bring your favorite dessert or appetizer to share. Contributions of food or drink are appreciated but not necessary. No alcohol, please.

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.



Brian Day from NASA Ames gave a talk on the LCROSS mission at the AANC Star-B-Q last July. Sorry, can't see Brian in this picture, nice sunset though. More pictures from the Star-B-Q are on page 5. Photo by Paul Kohlmeier.

A Master's Degree in Astronomy

Paul Kohlmler

On October 22nd it became official. I now have a Masters Degree in Astronomy. Is it worth it? Now what? Four days later my son turned the same age that I was when he was born. How did that happen? I'll hold those questions for later.

The idea of getting a Master's Degree started when I heard that Marni Berendsen from the ASP had done so. I did some research and found that there were a very small number of universities that offered real programs that led to a Masters Degree in Astronomy that could be taken online. Notice how that word "online" seems to discount the entire idea. I get a steady stream of spam that includes subject lines like "get your degree without the work" or "call now for your degree" or "get your degree now". These come-ons are just the Internet versions of the "paper mills" that have been around for a while.

The Master's Degree at Swinburne University (Melbourne, Australia) is no paper mill. I took one or two classes per semester for 4.5 years, a total of 12 classes. I wrote an article for the Ephemeris when I was half done. See <http://ephemeris.sjaa.net/0708/i.html>.

The classes that I took all had the same structure. For each class there was a set of PowerPoint slides or PDF pages. For example, when I took the course "Exploring the Galaxies and the Cosmos", there were 37 PowerPoint files with about 50 slides in each.

There were also assigned readings usually from one textbook per class. Some of the books were relatively inexpensive but some were very serious textbooks at very serious prices. I probably averaged around \$100 in books per class but that included some secondary texts. I must admit that I didn't do all of the readings but that's been my history as a student all my life. Those of you who remember the Advanced Placement classes in high

school will also recall not seeing me in them.

For each class there was an e-mail newsgroup that was managed through a system called Blackboard. This system drove me crazy at times but it is workable. You were required to make two e-mail posts in every two week section of the class (classes are 12 weeks long). One e-mail should be a question and one an answer to someone else's question. Of course, most students do a lot more than that. Each two week section would end up with 100-300 e-mails – a lot to read when the missives are often technical and long. The reason that some are long is that this is part of your grade. In particular, three of your epistles are chosen (by you) for extra consideration.

You have to write two papers per class. The first is limited to 2000 words and you dare not exceed that. You can choose from a list of 3-5 topics in most classes. These papers are expected to be scientifically literate and well-researched (meaning something other than Wikipedia). The second paper is 10-12 pages long and you work with a project supervisor (not the class instructor) to develop an outline, get some ideas for research, find the particular angle you are going to use, and to just generally help you on the project. My experience is that the interest level and enthusiasm of the project supervisor varies greatly but you have little control over this. In the current schedule at Swinburne, you complete the project two weeks after the 12 week class has ended.

Besides the papers, the slides, the readings and the e-mails, there are two tests. These tests are open book of course, it would be difficult to do anything different online. But these

tests can be difficult regardless and some instructors try for "gotcha" questions. In one test during a class on astrophotography I answered a question in terms of an astrophotographer but the question only said "observing", not implying photography at all. Ya got me!

For most amateur astronomers that I know, the first 3 classes at Swinburne will be a breeze. Every class has its black belts and its white belts and you will be a black belt for a while. The later classes on relativity, particle physics, radio astronomy, and astrophotography may be quite challenging if you are not

familiar with these topics. Classes on the history of astronomy and astrobiology will be great if you have interests in those areas. The good thing about Swinburne is that

Is it worth the time and money? You never know what happens.

you can choose your 12 classes from a list of 17. Not all classes are taught each semester and some classes have to be taken in a specified order.

Now for the delayed questions. Is it worth it? That's hard to say. There will be some nights where you will be writing papers, taking tests, or reading e-mail when you would rather be outside actually doing some astronomy. Each class costs about \$900 with the current exchange rate and that comes out to \$1000 per class with books. You should strongly consider a better Internet connection if you are still using dial-up. I didn't do this program expecting to get reimbursed in a financial way. But you never know what happens.

Now what? There are rumors about an online Ph.D. program but nothing seems to happen. The one criticism of this program that I hear is that the student is not ready for independent research, i.e. writing a defensible thesis that adds new

Continued on page 3

Free Spirit — Following the Rovers

Akkana Peck

December's early evening skies are ruled by Jupiter, getting lower in the sky but still well worth observing. And on three consecutive days in December it puts on shows involving other bodies.

On the 19th it makes a close pass (less than a degree) with Neptune, hanging off the left tip of Capricornus. Should be an interesting sight, and also an easy way of finding Neptune if you have trouble with that rather dim planet. Uranus follows them by a couple of hours and is another good early evening target.

The following night, Dec 20, Jupiter shows a double shadow transit, Io and Callisto, starting shortly after sunset. Then the following morning, the crescent moon can guide you to re-find Jupiter during daylight. The planet is a few degrees south of the moon and should be obvious in binoculars and probably fairly easy with the naked eye. Set up in shade to reduce glare from the sun, and also to eliminate any risk of accidentally catching the sun in binoculars or telescope.

Mercury lurks in the evening sky, highest (farthest from the Sun) on the

18th. Then for the rest of the month, it sinks back toward the sun as it dwindles to a thin crescent by the end of the year.

Mars rises in mid-evening and is at its best after midnight as it moves toward its opposition at the end of next January. More on that in next month's column.

“I joined Twitter a while back, and figured out pretty quickly that it was useful for more than finding out what certain people had for dinner.”

Saturn rises a bit after midnight and is visible throughout the latter half of the evening. The rings are tilted about four and a half degrees — not edge on but still quite slim. Venus and Pluto are too close to the sun to be seen this month.

Aside from the sky, I've been watching the planets another way. I joined Twitter a while back, and figured out pretty quickly that it was useful for more than finding out what certain people had for dinner. (What is it about people who want to keep everyone up to date on every meal they have? Un-follow!)

This morning, I signed in and immediately saw a tweet from @MarsRovers. Apparently Spirit is still stuck, but there's a live teleconference

on Thursday to try to figure out how to free her. I can't tell you how that will come out, because this article will already be on its way by then — but you can track it by following @MarsRover and searching on #freespirit to find out what happens. You can also hear about all the meteorites Opportunity has been finding. I love those little Mars rovers — can you believe they're still running after all these years? Cross your fingers for Spirit!

Of course, there are lots of other Twitter accounts for space fans. Just about every space mission has a Twitter site — you can follow the latest news from @CassiniSaturn, check on whether @MarsPhoenix has awakened from its cold sleep, see neat pictures from @NASA_EO, check on whether they've turned on the LHC at @CERN, or see what's going on at @NASA_Ames or @NASAJPL. You can also follow lots of science news sites, like @KQEDScience, @scifri, @newscientist, @sciam, @calacademy, @dailygalaxy and so on.

And none of them will tell you what they had for dinner. Well, hardly ever.

And just after this column's deadline (but maybe they'll let me sneak it in late), the Twittiverse went wild with the latest news: signs of “significant” water found in the LCROSS plume! I'm sure by the time you read this you'll have read the details, but it's fun to see the breaking news right away.

*A Master's Degree in Astronomy
Continued from page 2*

knowledge to the science. I'm not sure that critique is valid. I think someone who has gone through this program could take on research if given access to data and provided with direction. It is not necessary to obtain time for Hubble observations or something like that. I think the hard part would be to find an area where no astronomer has gone

before. Most of the projects that I did in this program covered well trod territory but a couple of projects might have been starting points for a thesis.

However, I did give a 10 minute presentation at the last ASP conference and proudly put “M.S.” after my name on the opening slide. And the supervisor for my last project (the noted astronomer Pamela Gay who gave me

a great grade by the way) was sitting in the front row. Is that cool or what!

As to how did I get to be this age, that's probably just dumb luck.

There's something mesmerizing about watching a thunderstorm. You stare at the dark, dramatic clouds waiting for split-second bursts of brilliant light — intricate bolts of lightning spidering across the sky. Look away at the wrong time and (FLASH!) you miss it.

Lightning is much more than just a beautiful spectacle, though. It's a window into the heart of the storm, and it could even provide clues about climate change.

Strong vertical motions within a storm cloud help generate the electricity that powers lightning. These updrafts are caused when warm, moist air rises. Because warmth and lightning are inextricably connected, tracking long-term changes in lightning frequency could reveal the progress of climate change.

It's one of many reasons why scientists want to keep an unwavering eye on lightning. The best way to do that? With a satellite 35,800 km overhead.

At that altitude, satellites orbit at just the right speed to remain over one spot on the Earth's surface while the planet rotates around its axis — a "geostationary" orbit. NASA and NOAA scientists are working on an advanced lightning sensor called the Geostationary Lightning Mapper (GLM) that will fly onboard the next generation geostationary operational environmental satellite, called GOES-R, slated to launch around 2015.

"GLM will give us a constant, eye-in-the-sky view of lightning over a wide portion of the Earth," says Steven Goodman, NOAA chief scientist for GOES-R at NASA's Goddard Space Flight Center. Once GLM sensors are flying on GOES-R and its sister GOES-S, that view will extend 18,000 km from New Zealand, east across the Pacific Ocean, across the Americas, and to Africa's western coast.

With this hemisphere-scale view, scientists will gather an unprecedented amount of data on how lightning varies from place to place, year to year, and even decade to decade. Existing lightning sensors are either on the ground — which limits their geographic range — or on satellites that orbit much closer to Earth. These satellites circle the Earth every 90 minutes or so, quickly passing over any one area, which can leave some awkward gaps in the data.

Goodman explains: "Low-Earth orbit satellites observe a location such as Florida for only a minute at a time. Many of these storms occur in the late afternoon, and if the satellite's not overhead at that time, you're going to miss it."

GLM, on the other hand, won't miss a thing. Indeed, in just two weeks of observations, GLM is expected gather more data than NASA's two low-Earth orbiting research sensors did in 10+ years.

The new data will have many uses beyond understanding climate change. For example, wherever lightning flashes are abundant, scientists can warn aircraft pilots of strong turbulence. The data may also offer new insights into the evolution of storms and prompt improvements in severe weather forecasting.

Staring at (FLASH!) Did you miss another one? The time has come for GLM.

Want to know how to build a weather satellite? Check the "how to" booklet at http://scijinks.gov/weather/technology/build_satellite.

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



The Geostationary Lightning Mapper (GLM) on the next generation of GOES satellites will detect the very rapid and transient bursts of light produced by lightning at near-infrared wavelengths. This image was taken from the International Space Station and shows the Aurora Australis and lightning.



Star-B-Q 2009

On July 25, the annual AANC Star-B-Q was held at Fremont Peak State Park.

Clockwise from upper left: Sam Sweiss prepares for the raffle; Suzy Gurton of the ASP educates; some of the crowd chowing down; a bad place to start a diet. All photos by Paul Kohlmiller.



The Last Month In Astronomy

NOV-09-2009 **Hayabusa bruised** The Japanese asteroid mission is having problems with its Ion engines. Three of the four engines have failed. Thruster C was shut down earlier because it looked like it might be damaged also. Now, that engine will have to fire up to bring the spacecraft to a landing in the Australian desert by June 2010. The engines have logged nearly 40,000 hours of burn time since the probe was launched in 2003. If successful, samples of asteroid Itokawa are onboard the spacecraft. <http://www.spaceflightnow.com/news/n0911/09hayabusa/>

NOV-06-2009 **Rapid Supernova** A 7 year old supernova may be a new class of exploding star. SN2002bj is the fastest evolving supernova seen thus far. The supernova disappeared in 20 days, probably 3 times faster than other supernovae. But it isn't just the speed that was different. The element vanadium was seen for the first time in a supernova spectrum. "We think this may well be a new physical explosion mechanism, not just a minor variation of ones already known" according to Alex Filippenko, one of the co-authors. <http://www.sciencedaily.com/releases/2009/11/091105143718.htm>

NOV-05-2009 **Neutron Star has Atmosphere** An atmosphere has been found around a neutron star in the supernova remnant Cassiopeia A. The atmosphere is made out of carbon. The intense gravity at the surface of a neutron star, 10 times the pressure at the center of the Earth, compresses this atmosphere to a depth of about 4 inches. The result is that the carbon is as dense as it is in a diamond. <http://www.sciencedaily.com/releases/2009/11/091104132808.htm>

OCT-22-2009 **Most Distant Galaxy Cluster** The record for the most distant galaxy cluster yet observed has been broken. The new record holder has a lookback distance of 10.2 billion light years. This means we are seeing this cluster at a time when the universe was only one-fourth its current age. The object is known as JKCS041. The actual observation date is November 23, 2007. The redshift (z) value is 1.9. The observation includes data from Chandra as well as the VLT. The cluster was originally detected by the United Kingdom Infrared Telescope (UKIRT) in 2006. <http://chandra.harvard.edu/photo/2009/jkcs041/>

OCT-19-2009 **32 New Exoplanets** The ESO spectrograph known as HARPS (High Accuracy Radial velocity Planet Searcher) has found a total of 32 new exoplanets. HARPS has now found 75 of the just over 400 exoplanets discovered thus far. Many of these planets have a relatively small mass. Many of these are in multi-planet systems. "By targeting M dwarfs and harnessing the precision of HARPS we have been able to search for exoplanets in the mass and temperature regime of super-Earths, some even close to or inside the habitable zone around the star," according to Xavier Bonfils, one of the paper's co-authors. <http://www.eso.org/public/outreach/press-rel/pr-2009/pr-39-09.html>

OCT-14-2009 **Image of Barnard's Galaxy** NGC6822, a galactic neighbor known as Barnard's galaxy, has recently been imaged as shown in a new photo. The image was taken by the 2.2 meter scope at ESO's La Silla observatory in northern Chile. See the image on this page. <http://www.sciencedaily.com/releases/2009/10/091014102018.htm>

OCT-05-2009 **Herschel finds necklace** The ESA Herschel telescope discovered a "cosmic pearl necklace" in the area of the Southern Cross. The Herschel telescope is part of an infrared galactic-plane survey that found this formation which shows stars in nearly all phases of stellar evolution. http://www.asi.it/en/news_en/herschel_discovers_a_cosmic_pearl_necklace_0



Barnard's Galaxy

NGC6822

Credit: ESO

It Must Be Astronomical ...

Loaners

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. For more information please see the loaner program web page: <http://www.sjaa.net/loaners>

Astro Jobs

As this issue went to press in mid-November, we were aware of two available positions in astronomy.

The Astronomical Society of the Pacific is looking for an **Astronomy Outreach Project Coordinator**. "The Astronomy Outreach Project Coordinator will work with the Sharing the Universe (STU) education team to coordinate activities associated with the development of services for amateur astronomy clubs." For information go to: <http://www.astrosociety.org/about/career.html#outreach>

Apparently, the current Lick Observatory **Operations Director** has retired and a replacement is needed. However, this position is not yet posted at <http://www.ucolick.org/employment/index.html> but you might try again. We were unable to obtain more information before our deadline.

Q: What is the most distant object that can be seen with the naked eye?

A: The Andromeda Galaxy (M31) is the most distant object that can be seen with the naked eye if you have a decently dark sky. (RASC 2009 Calendar, November).

Hot Dates

December 13, 9 p.m. Geminid meteor shower. The 2009 RASC Observer's Handbook suggests this may surpass the Leonids.

December 19, 8 p.m. SJAA Holiday Party at Houge Park.

December 21, 2012 Really, not that much happening. As for the galactic plane passing thing, see <http://www.idialstars.com/egp.htm>

"I'm definitely a product of the first moon landings,...I think I told my mom I wanted to be the first female astronaut—although that tells you more about my household than it does about me."
- Dr. Andrea Ghez, UCLA

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