



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late June)

- 23 Mirror-making workshop at Houge Park. 7:30 p.m.
 30 **General meeting at Houge Park.** 8 p.m. John Dillon, science historian, will tell us of the search for the first telescope.

July

- 5 Mirror-making workshop at Houge Park. 7:30 p.m.
 6 Astronomy Class at Houge Park. 7:30 p.m.
 6 Houge Park star party. Sunset 8:31 p.m., 55% moon rise 0:20 a.m. Star party hours: 9:30 to midnight.
 7 Dark sky weekend. Sunset 8:31 p.m., 44% moon rise 0:48 a.m.
 14 Dark sky weekend. Sunset 8:28 p.m., 1% moon sets 9:07 p.m.
 20 Houge Park star party. Sunset 8:24 p.m., 33% moon sets 11:41 p.m. Star party hours: 9:30 to midnight.
 21 Coyote Lake Park star party. Sunset 8:23 p.m., 49% moon sets 12:04 a.m. Star party starts at 9:30.
 21 Mirror-making workshop at Houge Park. 7:30 p.m.
 28 **General meeting at Houge Park.** 8 p.m. Bryant Grigsby, staff astronomer at Lick Observatory, will tell of Developing Adaptive Optics for Lick Observatory.

August

- 2 Mirror-making workshop at Houge Park. 7:30 p.m.
 3 Astronomy Class at Houge Park. 7:30 p.m.
 3 Houge Park star party. Sunset 8:13 p.m., 69% moon rise 10:52 p.m. Star party hours: 9:00 to midnight.
 11 Dark sky weekend. Sunset 8:05 p.m., 1% moon rises 5:57 a.m.
 17 Houge Park star party. Sunset 7:57 p.m., 25% moon sets 10:07 p.m. Star party hours: 9:00 to midnight.
 18 Coyote Lake Park star party. Sunset 5:55 p.m., 33% moon sets 10:32 p.m. Star party starts at 9:00.
 18 Mirror-making workshop at Houge Park. 7:30 p.m.
 25 **General meeting at Houge Park.** 8 p.m. Dr. Graeme Smith, UC Professor of Astronomy will tell us of his research on globular Clusters.

The Board of Directors meets at 6:00 p.m. preceding each general meeting. All are welcome.

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

Big Bend Star Parties

Don Machholz

(Here's a note from Don Machholz about a series of dark sky star parties that he is putting together.) Big Bend is a ranger station 30 miles above Colfax, along Hwy 80. These 90-minute sky tours take you through about 30 sky wonders using telescopes owned and operated by other astronomers and myself. This is our 11th year of conducting the Big Bend sky tours.

These star parties are different from most in two ways. First, there is no moon in the sky. We take advantage of the dark skies of Big Bend and show objects that you need to get away from the city lights to see well. You will see things that we can't show in the city. Secondly, these are 90-minute tours that display about three dozen objects, from bright stars, to planets, to double stars, clusters, nebula and galaxies.

We move rather briskly through the universe. Therefore, I ask that you arrive on time for the 10-minute orientation talk and plan to stay for the full 90 minutes. You won't be disappointed!

In case of poor weather the session is canceled. Bring plenty of warm clothes; even in the summer it gets cold at 5800 feet elevation. This is a family friendly event. Restrooms are nearby.

To get there take Interstate 80 towards Reno and go beyond Colfax, Blue Canyon and Emigrant Gap. The Big Bend exit is the first one past Cisco Grove. At the bottom of the off-ramp turn left, and travel one-half mile and past the USFS Visitor Center. Look for the Loch Leven trailhead parking lot and the stargazing signs. We set up in that parking lot. Residents in the Grass Valley area can take Highway 20 to Interstate 80 eastbound, and then exit at Cisco Grove.

(See the remaining 2007 schedule below or check out:<http://www.geocities.com/donmachholz/index.html>)

Date and Time	Things We'll See
Saturday, July 7 9:00 to 10:30 PM	Venus, Jupiter, Saturn, stars, clusters, galaxies.
Saturday, August 11 8:30 to 10:00 PM	Jupiter, Uranus, Neptune, stars, clusters, galaxies.
Saturday, Sept. 8 8:00 to 9:30 PM	Jupiter Uranus, Neptune, stars, clusters, galaxies.

DEEP SKY OBSERVING

by Mark Wagner

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

Primary	Type	Size	Mag	R.A.	Dec.
NGC 6826	PN	38.0"	9.8	19 44 48	50 31 31
	Blinking Planetary. Nice double, dim galaxies nearby.				
N6888	BN	18.0' x 8.0'		20 12 01	38 23 00
	Crescent Nebula - dark sky and OIII filter				
N6857	BN	38.0"	11.4	20 01 47	33 31 32
	Small emission nebula may be mistaken for PN				
M56	GC	8.8'	8.4	19 16 35	30 11 05
	Poorly concentrated for Messier globular				
M57	PN	1.8'x1.4'	9.7	18 53 35	33 01 44
	Ring Nebula - filters will "brighten" object.				
M27	PN	6.7'	7.6	19 59 36	22 43 13
	Easily visible without filters, filters enhance structure				
NGC 6905	PN	72.0" x 37.0"	11.9	20 22 23	20 06 16
	Blue Flash. Bright bluish unevenly illuminated disk.				
M71	GC	7.2'	8.4	19 53 46	18 46 42
	Bright, rich, loose globular can be mistaken for OC				
NGC 6781	PN	1.8'	11.8	19 18 28	06 32 15
	Bright, circular, annular - enhanced by UHC filter.				
NGC 6755	OC	14.0'	7.5	19 07 48	04 14 00
	This cluster stands out well from the Milky Way.				
M11	OC	13.0'	5.3	18 51 06	-06 16 00
	Beautiful rich cluster - many stars of even magnitude.				
M26	OC	14.0'	8	18 45 12	-09 23 00
	Compact, distinct cluster.				
NGC 6818	PN	48.0"	9.9	19 43 57	-14 09 10
	Little Gem - blue, OIII kills color, enhances annularity.				
M25	OC	32.0'	4.6	18 31 45	-19 07 00
	Two E/W streams divided by starless lane.				
M22	GC	32'	5.2	18 36 24	-23 54 12
	Gorgeous large loose globular. Rich MW star field.				
M55	GC	19.0'	6.3	19 39 59	-30 57 44
	Fine, bright, well resolved globular.				
M54	GC	12.0'	7.7	18 55 03	-30 28 42
	Bright, but unresolved!				
M70	GC	8.0'	7.8	18 43 12	-32 17 31

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

Giant Planets, Dwarf Planets

Akkana Peck

Jupiter is visible all night throughout July, transiting a bit before midnight. It only gets up to about 30 degrees at its highest point, though. So this isn't a great year for Jupiter watchers looking for those tiny subtle details in the bands.

This has been a great year for Venus watchers. It's hard to believe, when the evening star has been so high late into the night for so long, but in July we'll finally lose it, as Venus slips between us and the sun. At first it will get brighter since it's moving closer to us: brightest on the 12th. Since it's getting closer to us, its disk as viewed in a telescope will get much larger as its phase shrinks to a slim crescent. At the same time, Venus is sinking lower in the sky, ever closer to the sun. It's also fairly far south, so by the end of July it will be tough to find it at all.

Saturn, too, is visible in the early evening, drawing closer to the sun and becoming increasingly hard to find as July progresses.

Mars continues to edge marginally higher in the morning sky. It's joined this month by Mercury, which makes an appearance just before dawn in the second half of the month.

Uranus (in Aquarius) and Neptune (in Capricornus) rise a little after sunset and are visible all night. Neither one gets very high, but they should be fairly easy targets if you're out observing late at night and want to take a break from small green disks of planetary nebulae to see small green disks of planets. They'll only get better over the next few months.

Finally, if you've ever thought about

chasing down an asteroid, the next few months offer a great time to look for (4) Vesta or (1) Ceres. Why? NASA is about to launch a mission, called "Dawn", to explore these two large and bright asteroids, and they're soliciting amateur sketches and images. Dawn is scheduled to launch sometime in early July.

Asteroids are generally referred to both by number (in order of discovery) and name (chosen by the discoverer). So (1) Ceres was the first asteroid ever discovered, and its discoverer Giuseppe Piazzi decided to name it after the

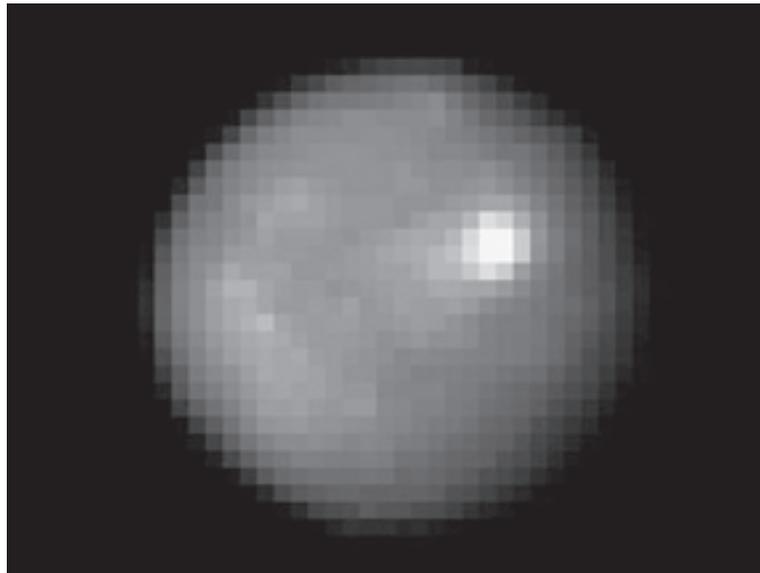
It sometimes gets bright enough to see with the naked eye, though this month it's a bit past opposition now, and only magnitude 6.6. That's still brighter than Neptune. It spends the month of July conveniently located just above the head of Scorpius. It should be possible to see its motion over a period of a few days or a week if you make sketches of it against a pattern of background stars. If you do make sketches, images, or animations, send them to the NASA Amateur Observers' Program at <http://dawn-aop.astro.umd.edu>.

(1) Ceres, the largest asteroid, is large enough to be considered a "dwarf planet" (depending on whose definition you use). It's in Cetus this month, and it's quite a bit fainter than Vesta at about magnitude 9. But if you try for it and strike out, don't lose hope: it'll brighten steadily from now until its 7th magnitude opposition in November.

And don't lose heart if you don't manage to see Vesta or Ceres this month. You'll have plenty of time to catch them before Dawn makes its first encounter with Vesta, in September

of 2011. It won't get to Ceres until February 2015. You can find out more about the Dawn mission at <http://dawn.jpl.nasa.gov>.

Ed. Note: See more about the Dawn mission on page 4.



Ceres is the first asteroid discovered (1801) and it was considered to be a planet for more than 50 years. Besides its spherical appearance, it also fit a relationship called Bode's law which predicted where new planets would be found. This law, actually a numerical sequence, successfully predicted where Uranus would be found and where the asteroid belt would eventually be located. This photo is from Hubble and represents the best picture of Ceres to date. Photo courtesy of NASA.

goddess of the harvest. (4) Vesta was the fourth asteroid to be discovered, by Heinrich Wilhelm Olbers, who named it after the goddess of the hearth, perhaps because of its brightness. More recently discovered asteroids have been given all sorts of names, like (9885) Linux, (3834) Zappafank or my favorite, (22338) Janemojo, named after two SJAA members.

(4) Vesta is the brightest of all asteroids.

The Ions of Dawn

Patrick L. Barry

This summer, NASA will launch a probe bound for two unexplored worlds in our solar system's asteroid belt—giant asteroids Ceres and Vesta. The probe, called Dawn, will orbit first one body and then the other in a never-before-attempted maneuver.

It has never been attempted, in part, because this mission would be virtually impossible with conventional propulsion. "Even if we were just going to go to Vesta, we would need one of the largest rockets that the U.S. has to carry all that propellant," says Marc Rayman, Project System Engineer for Dawn at JPL. Traveling to both worlds in one mission would require an even bigger rocket.

This is a trip that calls for the unconventional. "We're using ion propulsion," says Rayman.

The ion engines for the Dawn spacecraft proved themselves aboard an earlier, experimental mission known as Deep Space 1 (DS1). Because ion propulsion is a relatively new technology that's very different from conventional rockets, it was a perfect candidate for DS1, a part of NASA's New Millennium Program, which flight-tests new technologies so that missions such as Dawn can use those technologies reliably.

"The fact that those same engines are now making the Dawn mission possible shows that New Millennium accomplished what it set out to," Rayman says.

Ion engines work on a principle different from conventional rockets. A normal rocket engine burns a chemical fuel to produce thrust. An ion engine doesn't burn anything; a strong electric field in the engine propels charged atoms such

"They're remnants from the time the planets were being formed," Rayman says. "They have preserved a record of the conditions at the dawn of the solar system."

Find out about other New Millennium

Program validated technologies and how they are being used in science missions at <http://nmp/TECHNOLOGY/infusion.html>. While you're there, you can also download "Professor Starr's Dream Trip," a storybook for grown-ups about how ion propulsion enabled a scientist's dream of visiting the asteroids come true. A simpler children's version is available at <http://spaceplace.nasa.gov/en/kids/nmp/starr>.



Artist's rendering of Dawn spacecraft, with asteroids. Largest are Vesta and Ceres. Credits: Dawn spacecraft—Orbital Sciences Corporation; background art—William K. Hartmann, courtesy UCLA.

as xenon to very high speed. The thrust produced is tiny—roughly equivalent to the weight of a piece of paper—but over time, it can generate as much speed as a conventional rocket while using only about 1/10 as much propellant.

And Dawn will need lots of propulsion. It must first climb into Vesta's orbit, which is tilted about 7 degrees from the plane of the solar system. After studying Vesta, it will have to escape its gravity and maneuver to insert itself in an orbit around Ceres—the first spacecraft to orbit two distant bodies. Dawn's up-close views of these worlds will help scientists understand the early solar system.

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

Recycled Sign materials needed!

Please contact Steven Nelson - director, if you can donate some "election sign" type wire legs or some "real estate" type plastic A-frames (2'x2'). E-mail: [nelsonastro \(at\) aol.com](mailto:nelsonastro@aol.com) or call Steven (see phone numbers on page 7).

M81

The new picture of M81 from Hubble is cause to revisit this great galaxy. It is located in Ursa Major. It is thought that M81 collided with nearby galaxy M82 and also with another galaxy NGC 3077. If the galaxies are will placed in the sky, one of my favorite things to do with my goto telescope at a star party is show someone M81 and then slew to M82 while they are still looking through the scope. In the space of a few instants they see two galaxies. If one appears to be vertical the other will appear horizontal. If it is true that M82 and M81 collided, M82 took the worst of it.(<http://apod.nasa.gov/apod/ap000404.html>)

M81 is known for being photogenic.

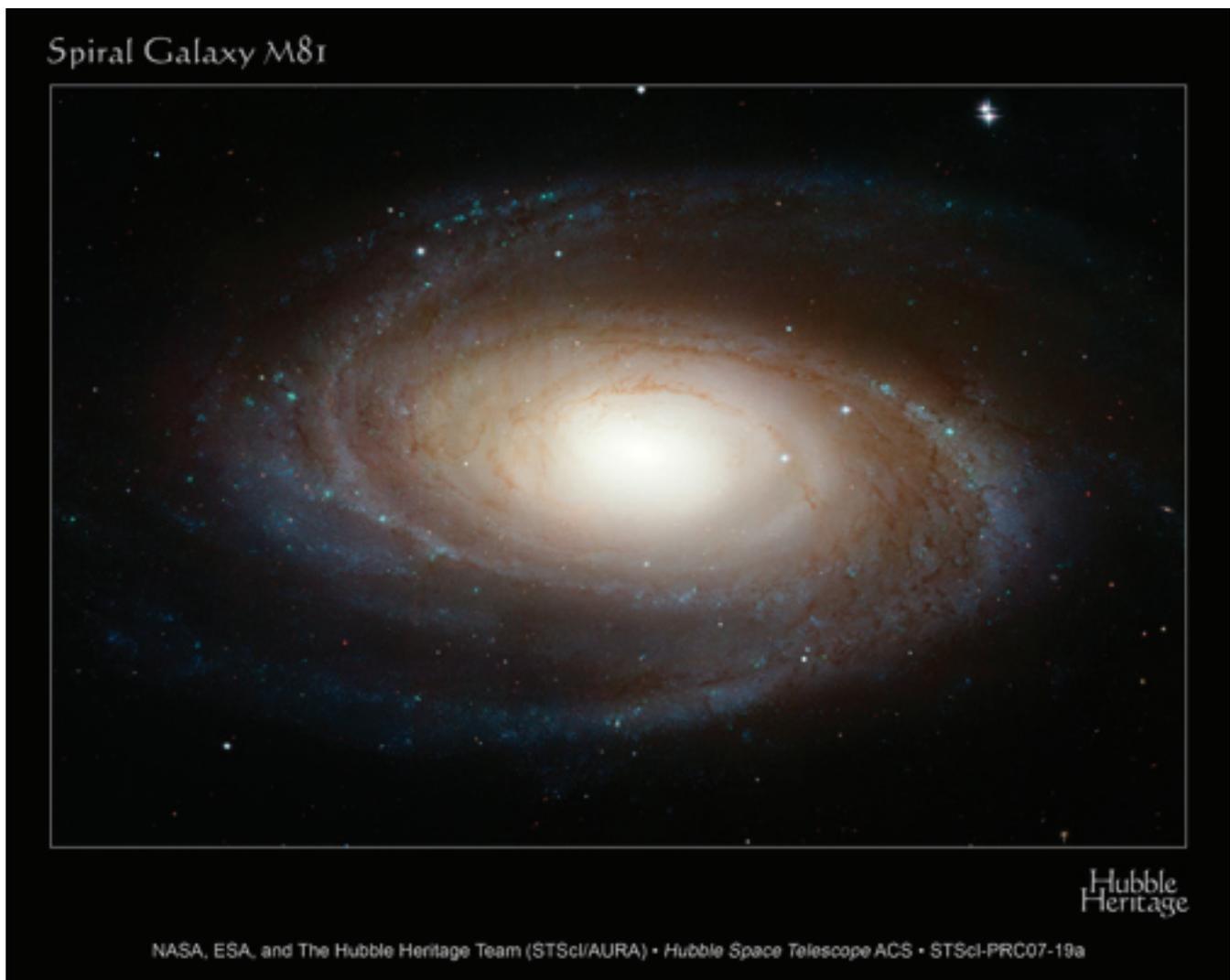
Tony Hallas's photo of M81 was on the APOD website in April. Check it out at <http://apod.nasa.gov/apod/ap070427.html>.

The galaxy group that M81 belongs to is called the M81 group (so there's no excuse for forgetting that). This group of galaxies is one of the closest groups next to the Milky Way's group which is called the Local Group (lots of imagination in these names, huh?).

Recall that one of the strongest indicators for dark matter is that galaxies like the Milky Way rotate as if they had more mass – rotating closer to the way that a solid disk would with the outer

parts not slowing down as expected using Keplerian type orbits. But M81 does rotate more like we would expect a galaxy to rotate if it did not have dark matter. Did the collisions with M82 and NGC 3077 strip off large parts of dark matter leading to the starbursts in those galaxies?

M81 is also known as Bode's Galaxy. Johann Bode discovered M81 and M82 on New Year's Eve in 1774. It was Bode who offered the name Uranus for the new planet discovered by William Herschel in 1781. Herschel wanted to name it Georgium Sidus to honor his benefactor, the king of England. Fortunately, Bode's idea won out.



The Last 31 Days In Astronomy

The news seen between May 11 and June 11, 2007.

May 21, 2007 **Strongest Evidence Yet for a Wet Mars** The strongest evidence so far that Mars was wetter in the past than it is now has been discovered by the Mars Rover Spirit. Stephen Squyres said "You could hear people gasp in astonishment ... the fact that we discovered something so new and so different after 1200 days on Mars ... makes you wonder what else is out there." What is this evidence? A patch of dirt so rich in silica (90%) that water is probably the only it could have been produced. The area is called Gertrude Weise after one of the players in the All-American Girls Professional Baseball League. The discovery was aided by the fact that one of Spirit's wheels is no longer rotating. The scuff marks created by the wheel expose otherwise unnoticed areas. <http://www.jpl.nasa.gov/news/news.cfm?release=2007-061>

May 29, 2007 **New types of extrasolar planets** Astronomers have used ground-based telescopes including those at Lick to find extrasolar planets around type A stars- more specifically, old A type stars that are at the end of their hydrogen-burning phase. These brighter, larger stars are not usually studied for extrasolar planets because the variance in spectrographic measurements are more likely to be due to variability in the star rather than the wobble caused by planets. Nine A-type stars have been found with planets. Also, a transiting "hot Neptune" planet was found around Gliese 436. The result shows that the minimum mass, as determined when the planet was first discovered using the wobble method, is actually its actual mass. http://www.skyandtelescope.com/news/Retired_A_Star_Planets.html <http://www.skyandtelescope.com/news/7751322.html>

May 29, 2007 **M81 looking better than ever** A new and stunning image of M81 has been released (see page 5). This Hubble image shows the spiral galaxy which is larger than the Milky Way. It is between 11 and 12 million light-years away. The black hole at the center of M81 is about 15 times larger than the one at the center of the Milky Way. <http://www.skyandtelescope.com/news/7730677.html>

June 1, 2007 **Most massive star discovered** Astronomers from the University of Montreal have identified the most massive star ever weighed. This binary star weighs 114 times the mass of the Sun, with its companion star weighing 84 solar masses. http://www.space.com/scienceastronomy/070607_massive_star.html

June 5, 2007 **Messenger sails past Venus** The Messenger spacecraft passed Venus on its way to Mercury. The first flyby of Mercury will be January of 2008 and it will enter into an orbit around Mercury in 2011. http://www.nasa.gov/mission_pages/messenger/timeline/index.html

June 5, 2007 **Looking MACHO** A new method is being used to try to find dark matter. An object has been found that bends light coming from the Small Magellanic Cloud. The object bending or lensing the light would need to be about 10 solar masses and about 1600 light years away. But a star or binary star at the distance or location would be visible. Since it isn't, it is thought to be a MAssive Compact Halo Object or MACHO.

June 7, 2007 **Launch date set for Hubble repair** A launch date has been set for the Space Shuttle Atlantis to head toward the Hubble Space Telescope to make repairs and add capabilities. The launch date is Sept. 10, 2008. This will be the last Space Shuttle mission that has a destination other than the ISS. http://www.space.com/news/070607_hubble_launchdate.html

June 7, 2007 **Most distant black hole found** The Canada-France-Hawaii Telescope (CFHT) using a new survey for distant quasars called the Canada-France High-z Quasar Survey (CFHQs) located a black hole 13 billion light-years from earth. This could provide information about the early evolution of the universe. http://www.space.com/scienceastronomy/070607_distant_blackhole.html

June 10, 2007 **Shuttle Launches and Docks** The Space Shuttle Atlantis took off from Cape Canaveral on June 8 and docked with the ISS on June 10. By the time you read this, the Shuttle should have landed. Upon her return, Sunita Williams will hold the record for the longest single duration in space by a woman. When this was mentioned at a post-launch press conference on June 8, shuttle program manager Wayne Hale said "records are made to be broken" and someday this record will be broken also. She already holds the record for most time spent in EVA by any woman. <http://www.ndtv.com/convergence/ndtv/story.aspx?id=NEWEN20070014192> http://www.space.com/missionlaunches/070608_sts117_postlaunch.html

Officers and Board of Directors

Pres Rob Hawley (408) 997-6526
VP Rich Neuschaefer
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Tres Gary Mitchell (408) 265-2336
Dir David Smith (408) 978-5503
Dir Lee Hoglan
Dir Gordon Reade
Dir Steven Nelson (650) 968-4733

Ephemeris Staff

Editors Paul & Mary Kohlmler
(408) 848-9701

Circulation
(Volunteers needed.)

Printing Accuprint (408) 287-7200

School Star Party Chairman

Jim Van Nuland (408) 371-1307

Telescope Loaner Program

(temporarily suspended)

Web Page

Paul Kohlmler pkohlml@best.com

SJAA Email Addresses

Board of Directors board@sjaa.net
Membership ?'s membership@sjaa.net
Chat List chat@sjaa.net
Ephemeris ephemeris@sjaa.net
Circulation circulation@sjaa.net
Telescope Loaners loaner@sjaa.net
Members Email Lists:
<http://www.sjaa.net/mailman/listinfo>

From The Editors

Please note that the submission deadline for the September 2007 issue will be August 8th instead of the 10th.

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

Submit

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

From the President of the club

Changes to the Telescope Loaner Program

Mike Koop, who has run the loaner program for over 10 years, has resigned. The loaner program has been one of the club's great assets. We will miss Mike.

The board has decided not to immediately appoint a replacement. Instead, the board wants to take this time to understand the program and its inventory. From that we will determine where to make future investments.

We have already embarked on this improvement program. One of the leading telescope designers, Albert Highe, agreed to rebuild one of the large Coulter scopes into a modern, lightweight design. The club greatly appreciates his donation.

If you currently have a scope on loan I should have already contacted you. If you have loaned scopes or equipment and I have not contacted you then please let me know. Please continue to keep (and hopefully use) the scope for now. The program depends on club members providing distributed storage for the scopes in the program. At the moment we have no ability to receive returned scopes.

For the moment we are also unable to make new scope loans.

We will let the members of the club know when we are ready to resume making loans and/or when we will be prepared to accept returns.

If you have any questions (or are willing to provide storage or assistance running the program) please contact loaner@sjaa.net.

Rob Hawley
President, SJAA

What's Up

Jane Houston Jones on your I-Pod

Former SJAA *Ephemeris* editor and long-time friend of the SJAA, Jane Houston Jones, is now a Senior Outreach Specialist for the Cassini mission at JPL. She's put together a series of videos that you can see on your I-Pod or computer. Jane says "The video is only 2 minutes long and is packed with great amateur images of planets and more. You'll find some simple (aimed at the general public) downloadable sky charts, links to NASA amateur astronomy networks, and this is where the What's Ups are archived. There are several different download options for museum, planetarium, astronomy club, classroom and scouts, after school and summer programs, and National Parks, too! And you can download these right onto your video iPOD, too. If you use them in any way, let me know!" Check it out at <http://education.jpl.nasa.gov/amateurastronomy/index.html>

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

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

Send e-mail to membership@sjaa.net

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- Regular — \$20
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- Junior (under 18) — \$10
- Junior with Sky & Telescope — \$43

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