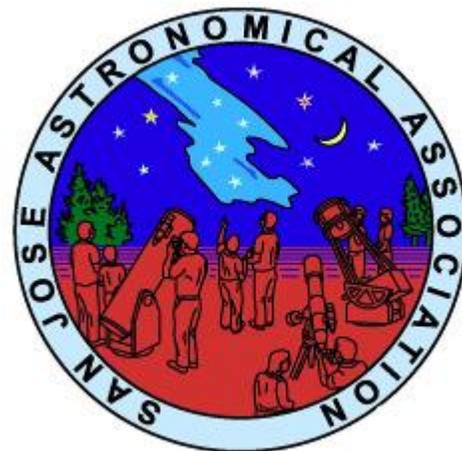


# The Ephemeris

October 2014

Volume 25 Number 10 - The Official Publication of the San Jose Astronomical Association

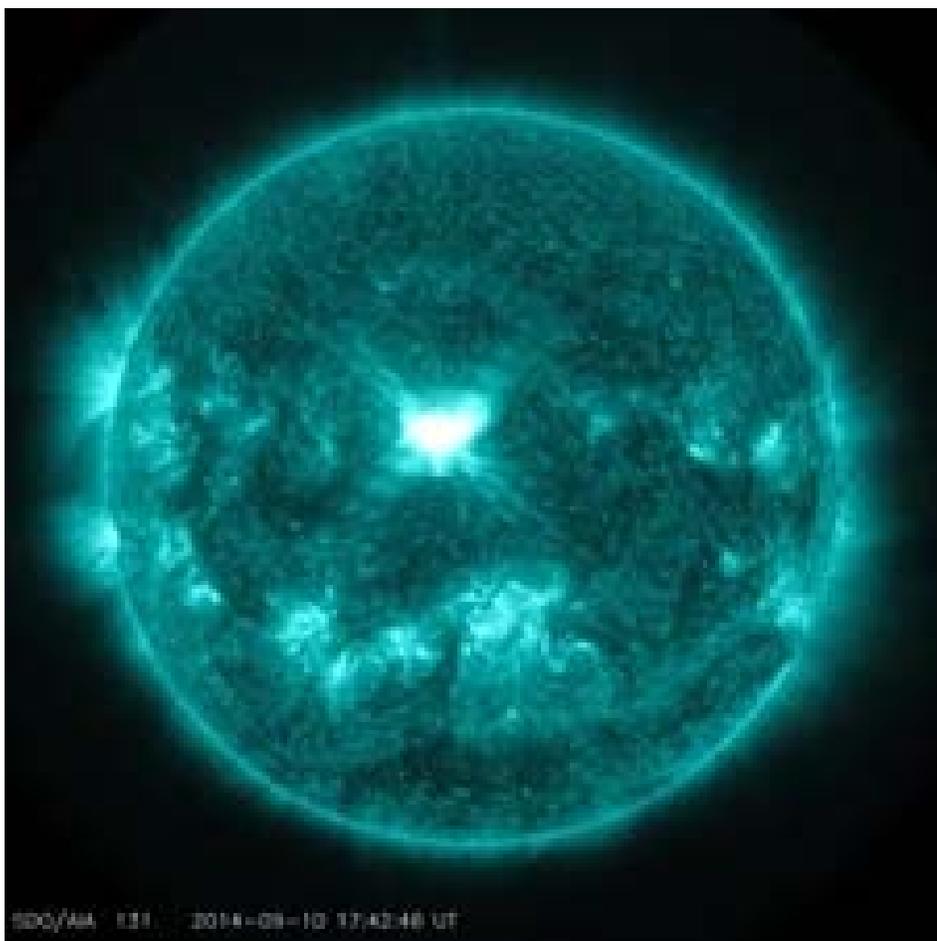


## A Significant Solar Flare on Sept 10, 2014

A solar flare is an intense burst of radiation coming from the release of magnetic energy associated with sunspots. Flares are our solar system's largest explosive events. They are seen as bright areas on the sun and they can last from minutes to hours. We typically see a solar flare by the photons (or light) it releases, at most every wavelength of the spectrum. The primary ways we monitor flares are in x-rays and optical light. Flares are also sites where particles (electrons, protons, and heavier particles) are accelerated.

The sun emitted a significant solar flare, peaking at 1:48 p.m. EDT on Sept. 10, 2014. NASA's Solar Dynamics Observatory captured images of the event. Harmful radiation from a flare cannot pass through Earth's atmosphere to physically affect humans on the ground. However -- when intense enough -- they can disturb the atmosphere in the layer where GPS and communications signals travel.

This flare is classified as an X1.6 class flare. "X-class" denotes the most intense flares, while the number provides more information about its strength. An X2 is twice as intense as an X1, an X3 is three times as intense, etc.



An X1.6 class solar flare flashes in the middle of the sun on Sept. 10, 2014. This image was captured by NASA's Solar Dynamics Observatory and shows light in the 131 Angstrom wavelength, which is typically colorized in teal.  
Image Credit: NASA/SDO

Credit: NASA.com

## October 2014 Events

### Friday, Oct 03

In-Town Star party (Houge): 7:45 - 9:45pm

### Sunday, Oct 05

Solar observing: 2-4PM

Fix-It Day: 2-4PM

### Saturday, Oct 11

Board Meeting: 6 -7:30pm

General Mtg: 7:30-10pm

### Friday, Oct 17

Binocular Stargazing (RCDO)

### Friday, Oct 17

Beginner Astronomy Class: 7-8pm

In-Town Star party (Houge): 7-9pm

### Saturday, Oct 18

Starry Nights Star Party: 7:30-9:30pm

Ranch Cañada del Oro (RCDO)

### Saturday, Oct 25

Henry Coe - Dark-Sky Weekend

### Sunday, Nov 02

Solar observing: 2-4PM

Fix-It Day: 2-4PM

### Saturday, Nov 08

Board Meeting: 6 -7:30pm

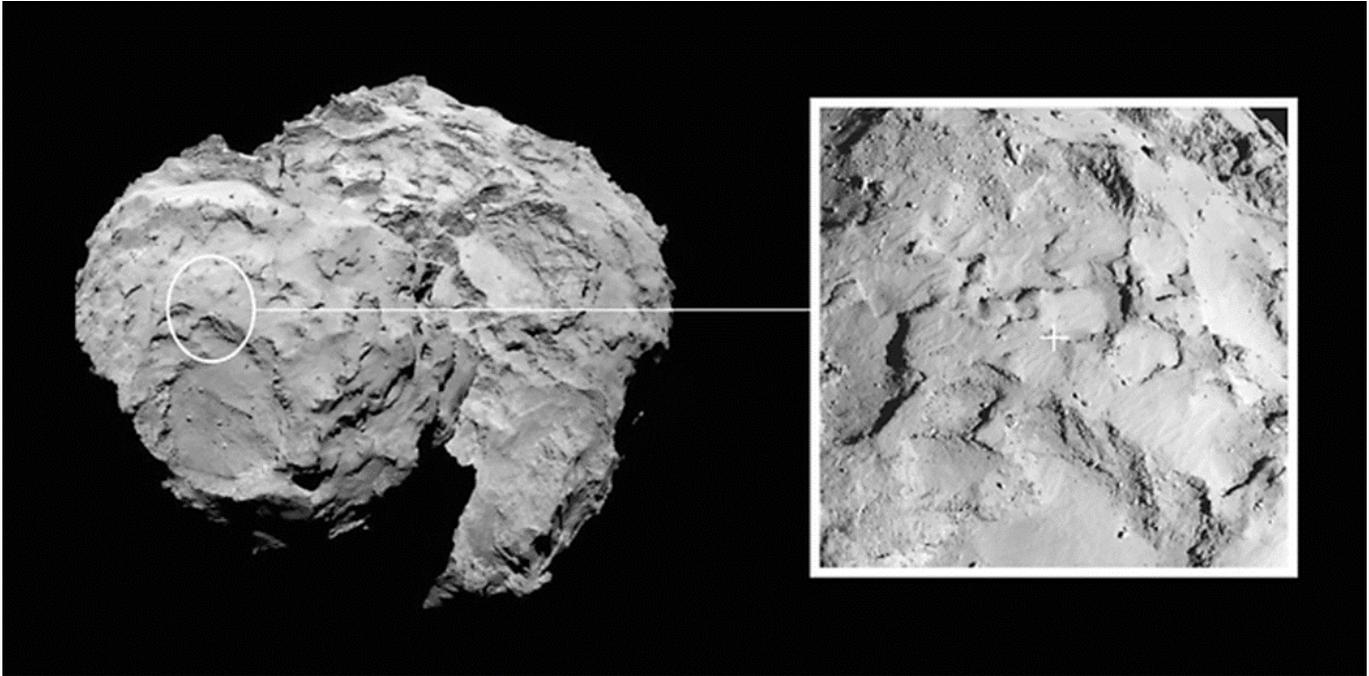
General Mtg: 7:30-10pm

*SJAA events are subject to cancellation due to weather. Please visit website for up-to-date info.*

## INSIDE THIS ISSUE

Rosetta Lander & Comet 67P.....	2
Curiosity rover at Mount sharp....	3
Kid Spot & Constellations.....	4
Club Updates.....	5
Membership form.....	6

## Rosetta's Lander to Land on Comet 67P



*Image depicts the primary landing site on comet 67P/Churyumov-Gerasimenko chosen for the European Space Agency's Rosetta mission.*

*Image Credit: ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM*

The European Space Agency's Rosetta's lander, Philae, will target Site J, an intriguing region on comet 67P/Churyumov-Gerasimenko that offers unique scientific potential, with hints of activity nearby, and minimum risk to the lander compared to the other candidate sites. The 220-pound (100-kilogram) lander is scheduled to reach the surface on November 11, where it will perform in-depth measurements to characterize the nucleus. Rosetta is an international mission spearheaded by the European Space Agency with support and instruments provided by NASA.

Site J is on the "head" of the comet, an irregular shaped world that is just over 2.5 miles (four kilometers) across at its widest point. The decision to select Site J as the primary site was unanimous. The backup, Site C, is located on the "body" of the comet.

"As we have seen from recent close-up images, the comet is a beautiful but dramatic world – it is scientifically exciting, but its shape makes it operationally challenging," says Stephan Ulamec, Philae Lander Manager at the German Aerospace Center (DLR) in Cologne. "None of the candidate landing sites met all of the operational criteria at the 100-percent level, but Site J is clearly the best solution."

Over the weekend, the Landing Site Selection Group of engineers and scientists from Philae's Science, Operations and Navigation Center at the National Center of Space Studies of France (CNES), the Lander Control Center at DLR, and scientists representing the Philae Lander instruments and ESA's Rosetta team, met at CNES, Toulouse, France, to consider the available data and to choose the primary and backup sites.

A detailed operational timeline will now be prepared to determine the precise approach trajectory of Rosetta in order to deliver Philae to Site J. The landing must take place before mid-November, as the comet is predicted to grow more active as it moves closer to the sun.

"There's no time to lose, but now that we're closer to the comet, continued science and mapping operations will help us improve the analysis of the primary and backup landing sites," says ESA Rosetta flight director Andrea Accomazzo from the European Space Operations Centre in Darmstadt, Germany. "Of course, we cannot predict the activity of the comet between now and landing, and on landing day itself. A sudden increase in activity could affect the position of Rosetta in its orbit at the moment of deployment and in turn the exact location where Philae will land, and that's what makes this a risky operation."

All commands for Philae's descent will be uploaded prior to the lander's separation from the Rosetta orbiter. Once deployed from Rosetta, Philae's descent will be autonomous, with the lander taking images and other observations of the comet's environment.

Philae will touch down at the equivalent of walking pace and then use harpoons and ice screws to fix itself onto the comet's surface. It will then make a 360-degree panoramic image of the landing site to help determine where and in what orientation it has landed. The initial science phase will then begin, with other instruments analyzing the plasma and magnetic environment, and the surface and subsurface temperature. The lander will also drill and collect samples from beneath the surface, delivering them to the on-board laboratory for analysis. The interior structure of the comet will also be explored by sending radio waves through the surface toward Rosetta.

"No one has ever attempted to land on a comet before, so it is a real challenge," says Fred Jansen, the ESA Rosetta mission manager from the European Space Research Technology Center, Noordwijk, the Netherlands. "The complicated 'double' structure of the comet has had a considerable impact on the overall risks related to landing, but they are risks worth taking to have the chance of making the first ever soft landing on a comet."

The landing date should be confirmed on September 26 after further trajectory analysis and the final Go/No Go for a landing at the primary site will follow a comprehensive readiness review on October 14.

Launched in March 2004, Rosetta was reactivated in January 2014 after a record 957 days in hibernation. Composed of an orbiter and lander, Rosetta's objectives since arriving at comet 67P/Churyumov-Gerasimenko earlier this month are to study the celestial object up close in unprecedented detail, prepare for landing a probe on the comet's nucleus in November, and track its changes through 2015, as it sweeps past the sun.

Comets are time capsules containing primitive material left over from the epoch when the sun and its planets formed. Rosetta's lander will obtain the first images taken from a comet's surface and will provide comprehensive analysis of the comet's possible primordial composition by drilling into the surface. Rosetta also will be the first spacecraft to witness at close proximity how a comet changes as it is subjected to the increasing intensity of the sun's radiation. Observations will help scientists learn more about the origin and evolution of our solar system and the role comets may have played in seeding Earth with water, and perhaps even life.

Credit: NASA.com

# Curiosity Rover Arrives at Mount Sharp

NASA's Mars Curiosity rover has reached the Red Planet's Mount Sharp, a Mount-Rainier-size mountain at the center of the vast Gale Crater and the rover mission's long-term prime destination. "Curiosity now will begin a new chapter from an already outstanding introduction to the world," said Jim Green, director of NASA's Planetary Science Division at NASA Headquarters in Washington. "After a historic and innovative landing along with its successful science discoveries, the scientific sequel is upon us."

Curiosity's trek up the mountain will begin with an examination of the mountain's lower slopes. The rover is starting this process at an entry point near an outcrop called Pahrump Hills, rather than continuing on to the previously-planned, further entry point known as Murray Buttes. Both entry points lay along a boundary where the southern base layer of the mountain meets crater-floor deposits washed down from the crater's northern rim.

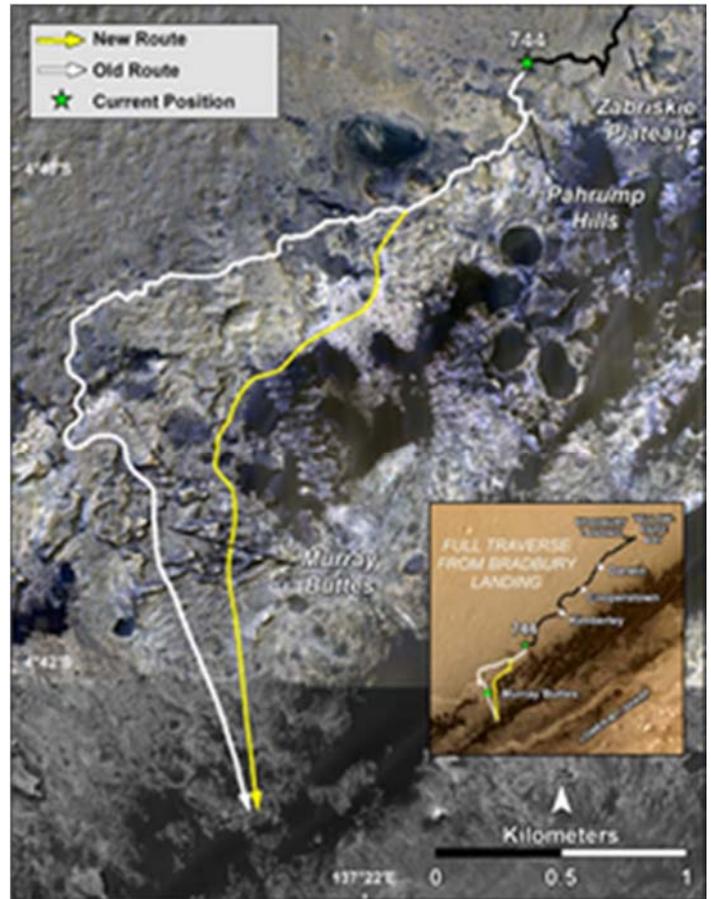
"It has been a long but historic journey to this Martian mountain," said Curiosity Project Scientist John Grotzinger of the California Institute of Technology in Pasadena. "The nature of the terrain at Pahrump Hills and just beyond it is a better place than Murray Buttes to learn about the significance of this contact. The exposures at the contact are better due to greater topographic relief." After 2 years and nearly 9 kilometers of driving, NASA's Mars Curiosity has arrived at the base of Mount Sharp.

Curiosity reached its current location after its route was modified earlier this year in response to excessive wheel wear. In late 2013, the team realized a region of Martian terrain littered with sharp, embedded rocks was poking holes in four of the rover's six wheels. This damage accelerated the rate of wear and tear beyond that for which the rover team had planned. In response, the team altered the rover's route to a milder terrain, bringing the rover farther south, toward the base of Mount Sharp.

"The wheels issue contributed to taking the rover farther south sooner than planned, but it is not a factor in the science-driven decision to start ascending here rather than continuing to Murray Buttes first," said Jennifer Trosper, Curiosity Deputy Project Manager at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California. "We have been driving hard for many months to reach the entry point to Mount Sharp," Trosper said. "Now that we've made it, we'll be adjusting the operations style from a priority on driving to a priority on conducting the investigations needed at each layer of the mountain."

After landing inside Gale Crater in August 2012, Curiosity fulfilled in its first year of operations its major science goal of determining whether Mars ever offered environmental conditions favorable for microbial life. Clay-bearing sedimentary rocks on the crater floor, in an area called Yellowknife Bay, yielded evidence of a lakebed environment billions of years ago that offered fresh water, all of the key elemental ingredients for life, and a chemical source of energy for microbes.

NASA's Mars Science Laboratory Project continues to use Curiosity to assess ancient habitable environments and major changes in Martian environmental conditions. The destinations on Mount Sharp offer a series of geological layers that recorded different chapters in the environmental evolution of Mars.



*This image shows the old and new routes of NASA's Mars Curiosity rover and is composed of color strips taken by the High Resolution Imaging Science Experiment, or HiRISE, on NASA's Mars Reconnaissance Orbiter. This new route provides excellent access to many features in the Murray Formation. And it will eventually pass by the Murray Formation's namesake, Murray Buttes, previously considered to be the entry point to Mt. Sharp.*  
Image Credit: NASA/JPL-Caltech/Univ. of Arizona

Credit: NASA.com

## NASA Ames 1st Open House in 17 years

Saturday, October 18, 2014

More Details here:

<http://www.nasa.gov/ames/openhouse2014/>



# KID SPOT



## Kid Spot Jokes:

- ◆ **Why is an astronaut like a football player?**  
(They both want touchdowns)
- ◆ **What did two black holes say to each other?**  
(Dark matters)

## Kid Spot Quiz:

1. **What is the term for the point in the orbit when any planet, other than Earth, is closest to the Sun?**
2. **What is the approximate circumference of Earth?**



Image: Sun spots 8/2/2014  
Photo Credit: R Duvall

## Kid Spot Night Sky Challenge: October 2014

See if you can spot the following objects in the sky:

- ⇒ Total Lunar eclipse Oct 7/8
- ⇒ Double star in Delphinus
- ⇒ Jupiter at dawn
- ⇒ Mercury at dawn about 80 minutes before sunrise

<http://skyandtelescope.com/observing/ataglance>

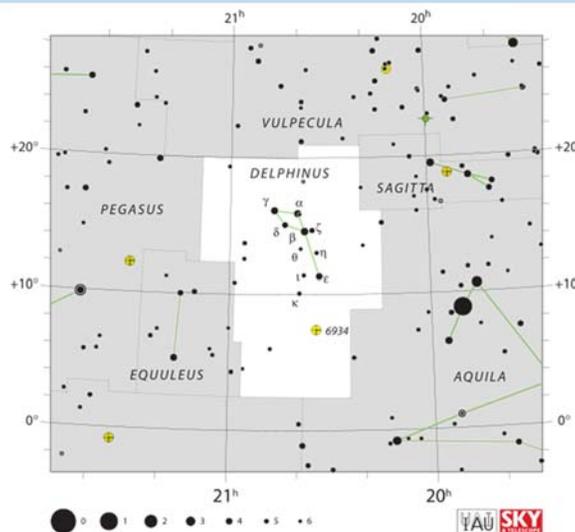
## Constellations

### Delphinus

is a constellation in the northern sky, close to the celestial equator. Its name is Latin for dolphin. Delphinus was one of the 48 constellations listed by the 2nd century astronomer Ptolemy, and it remains among the 88 modern constellations recognized by the International Astronomical Union. It is one of the smaller constellations, ranked 69th in size.

Delphinus' brightest stars form a distinctive asterism that can easily be recognized. It is bordered (clockwise from north) by Vulpecula the fox, Sagitta the arrow, Aquila the eagle, Aquarius the water-carrier, Equuleus the foal and Pegasus the flying horse.

Delphinus does not have any bright stars; its brightest star is of magnitude 3.8. The main asterism in Delphinus is Job's Coffin, formed from the four brightest stars: Alpha, Beta, Gamma, and Delta Delphini.



Beta Delphini, called Rotanev, is a close binary star and the brightest in Delphinus, divisible in only large amateur telescopes. Gamma Delphini is a celebrated binary star among amateur astronomers. The primary is a gold-colored star of magnitude 4.3 and the secondary is a yellow-tinged star of magnitude 5.1.

Because it is in a rich Milky Way star field, Delphinus has several deep-sky objects. NGC 6891 is a planetary nebula of magnitude 10.5. NGC 6934 is a globular cluster of magnitude 9.75. The globular cluster NGC 7006, at a distance of about 185,000 light-years, is extremely remote. It is also fairly dim at magnitude 11.5.

USS Delphinus (AF-24) and USS Delphinus (PHM-1), are two United States Navy ships named after the constellation.

Credit:  
Wikipedia

### Kid Spot Quiz Answers:

- 1) Perihelion
- 2) 40,000 km or 24,901 miles

## New arrivals in SJAA Library!

From Sukhada Palav

Thanks to recent and generous donations by some nice people in our community, SJAA library has some additional books that might be of interest to you:

Star Ware – Philip S. Harrington  
Norton's 2000.0 Star Atlas and Reference Handbook – Arthur P. Norton  
The Cambridge Star Atlas – Wil Tirion  
Uncovering the Secrets of the Red planet – Mars – Paul Raeburn  
365 Starry Nights – Chet Raymo  
Astronomy – Fred Hoyle  
Looking at the Earth – Priscilla Strain & Frederick Engle  
A Dictionary of Astronomy – Dr. Robert Maddison  
Don't Know Much About The Universe – Kenneth C. Davis  
The Accelerating Universe – Mario Livio  
Thursday's Universe – Marcia Bartusiak

And thanks to Eric Randall, we also have some fantastic new DVDs in our collection:

Astronomy Magazine; Infinite Cosmos DVD Series. Episodes available:  
Biggest Things in Space  
Astrobiology  
Can We Make it to Mars?  
Catastrophes That Changed the Planets  
Colonizing Space  
Constellations  
Cosmic Collisions  
Dark Matter/Dark Energy  
How Big, How Far, How Fast  
How the Solar System was Made  
Life Beyond Earth  
The End of Earth: Deep Space Threats .....  
The Journey to Palomar  
The Search for Cosmic Clusters  
To the Moon  
Unexplained Mysteries  
Wildest Weather in the Cosmos

Stop by and check these out! As always, if you have any questions/suggestions/comments/feedback, please email me at [librarian.sjaa@gmail.com](mailto:librarian.sjaa@gmail.com).

## School Star Parties

The San Jose Astronomical Association conducts evening observing sessions (commonly called "star parties") for schools in mid-Santa Clara County, generally from Sunnyvale to Fremont to Morgan Hill. For those who are outside of that area, please see our suggestions on the SJAA webpage under 'Classes-Programs / School Star Party'

The co-coordinator for SJAA is Jim Van Nuland. Please see the SJAA webpage for a step-by-step procedure for setting up a school star party.

## From the Board of Directors

### Announcements

#### SJAA 60 Years Old

SJAA will be 60 years later this year. Keep an eye out for future announcements regarding commemorating the occasion. Also follow the below link to the SJ Mercury News 9/20/14 article on SJAA turning 60:

[http://www.mercurynews.com/san-jose-neighborhoods/ci\\_26509071/business-special-reports](http://www.mercurynews.com/san-jose-neighborhoods/ci_26509071/business-special-reports)

### Board Meeting Excerpts September 06, 2014

#### In attendance

Rob Jaworski, Greg Claytor, Lee Hoglan, Dave Ittner, Rich Neuschaefer, Teruo Utsumi, Ed Wong, Mike Packer

#### West Valley College Solar Exhibit

Mr. Benjamin Mendelsohn, the planetarium director at West Valley College, earlier posted a request for help to the SJAA board list in the design of an exhibit to be added as part of the upcoming renovation at West Valley. His vision is to include a solar image/solar spectrum/sun painting exhibit. He is asking for help in locating people with the technical expertise and time to help design the exhibit. Board members provided some possible contacts and agreed to help locate individuals who may be able to assist.

#### Solar Eclipse Event

A 30% solar eclipse event will occur on Thu. 23 October. The board discussed and approved acquiring a solar projector and solar glasses. Michael Packer will forward a contact to make (or buy) a projector.

#### Celebrate Cambrian Festival Review

Rob Jaworski reported the SJAA booth was well attended and had enough help. Wolf brought UV activated beads to make bracelets and Rob's daughter (and the rest of the Jaworski clan) helped at the booth.

#### Renewing Mendoza Ranch

Ed Wong reported that he is waiting on Mendoza Ranch to proceed with the renewal of the annual permit.

#### Beginners Class

Teruo Utsumi is organizing a meeting for those interested in teaching the class.

#### Accessibility of Board Minutes

Rich Neuschaefer received a comment that the board minutes are not publicly accessible. We've previously discussed putting out a webpage with links to the specific board list postings. It was noted that it is possible to access it through the SJAA website, though it may not be obvious.

#### Ephemeris Frequency

Rob Jaworski reported that there has been no feedback since the announcement of the reduced frequency of the Ephemeris.

#### Preschool Lights

Greg Claytor is moving forward with his idea to design and build shields for the lights around the Houge Park parking lot.

#### SJAA Contacts

President: Rob Jaworski  
Vice President: Lee Hoglan  
Treasurer: Michael Packer  
Secretary: Teruo Utsumi  
Director: Greg Claytor  
Director: Dave Ittner  
Director: Ed Wong  
Director: Rich Neuschaefer  
Director: Bill O'Neil  
Beginner Class: pending  
Fix-it Program: Ed Wong  
Imaging SIG: pending  
Library: Sukhada Palav  
Loaner Program: Dave Ittner  
Ephemeris Newsletter -  
Editor: Sandy Mohan  
Prod. Editor: Tom Piller  
Publicity: Rob Jaworski  
Questions: Lee Hoglan  
Quick START: Dave Ittner  
Solar: Michael Packer  
School Events: Jim Van Nuland  
Speakers: Teruo Utsumi

E-mails:

<http://www.sjaa.net/contact>

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

Articles for publication should be submitted by the 20th of the previous month.

San Jose Astronomical Association  
P.O. Box 28243  
San Jose, CA 95159-8243  
<http://www.sjaa.net/contact>

Place  
postage  
here

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

Fold here

## San Jose Astronomical Association Membership Form

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

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

**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:**

**Membership Type:**

<http://www.sjaa.net/sjaa-newsletter-ephemeris/>

Regular — \$20

Regular with Sky & Telescope — \$53

Junior (under 18) — \$10

Junior with Sky & Telescope — \$43

Questions? Send e-mail to  
[sjaamemberships@gmail.com](mailto:sjaamemberships@gmail.com)

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 2-3 months lead time.)

Bring this form to any SJAA Meeting or send to the address (above). Make checks payable to "SJAA", or join/renew at <http://www.sjaa.net/join-the-sjaa/>

**Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**City/ST/Zip:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**E-mail address:** \_\_\_\_\_