

Sonoma Skies

Newsletter of the Sonoma County Astronomical Society
A nonprofit scientific and educational organization

June 2009

www.sonomaskies.org

Volume XXXII No. 6



Photo by Len Nelson

Young Astronomers making a comet.

What is the Future of the Young Astronomers Club?

We are approaching a critical time for the YA Club. Last November, the Adult Advisor, Gary Jordan, stepped down from his duties and his assistant, Len Nelson, SCAS Vice President, took his place on a temporary basis for the December - March YA meetings. Len advised the SCAS Board in March that he would not take on the Adult Advisor duties and the Board has been pondering what to do since that time. In the past, an interested parent or more mature young astronomer has been “adult in charge,” but right now there are few of these individuals stepping up to take charge of YA.

A new YA Adult Advisor must step forward soon:

YA meetings begin in September and are held monthly through March. Only 6 meetings of the YA are held during the school year, including the March Striking Sparks awards. After March, the sky stays light too late for YA meetings and observing. Sports and other activities take precedence for many students.

The YA Club is important to the Striking Sparks program. It affords a place for Sparks winners to meet, learn to use their telescopes and learn about the night sky. Young astronomers are treated to lectures, slide shows and instructive telescope viewing outside after the meetings. Applicants to the Sparks program are required to attend YA meetings to demonstrate genuine interest in astronomy and science.

Striking Sparks depends on YA:

Without the supporting efforts of the YA, continuation of the Sparks program is in jeopardy. The year 2010 will be the 25th year the SCAS will have awarded telescopes to deserving young astronomers. Do enough of us wish to see Striking Sparks continue?

—continued on Page 2

Charlie Brown and Apollo 10

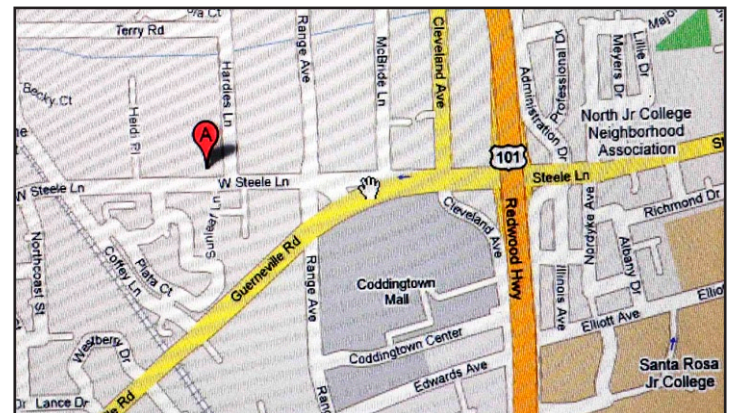
at the Charles Schulz Museum
SCAS June 10 Meeting, 7:30 PM

The June meeting of the SCAS will be held at the Charles Schulz Museum (not at Proctor Terrace School). We will gather for a sit-down meeting and then be taken on a guided tour of the facility.

We will see the exhibit on the Apollo 10 mission, the first mission to the moon that deployed the “LEM” (in low lunar orbit-didn’t land). The exhibit commemorates the Lander and Command Module being named Charlie Brown and Snoopy.

The address is: 2301 HARDIES LANE, SANTA ROSA.

See the map below—the red balloon indicates the location of the museum. Hope to see you there!



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YA Club Ideas *(from Page 1)*

Idea #1--Create A Dual Position:

One idea is to have two adult advisors, preferably one SCAS member and one committed parent of a YA member. These two could more easily share the responsibilities of the position. Many of these young people are quite bright, full of ideas. But they need help to share their interests. Parental help is invaluable, and several SCAS members have worked with YA and can offer program ideas and resources.

Idea #2--Change the YA Meeting Location:

Shall we move the meeting to a more central location, making it easier for advisors and parents to attend? We enjoy having meetings at Apple Blossom School in Sebastopol, and teacher Paul Judge from that school has helped immensely by publicizing the events and preparing the meeting place each month. However, it has been suggested that a more central location would attract more attendance.

Idea #3—Combine YA and SCAS meetings:

Combining the meetings at Proctor Terrace has been suggested, with YA beginning at 6:30. The pros: It would be more central, it would be easier for SCAS members to assist by bringing telescopes, some program segments could be combined, and we'd all have access to viewing after meetings. The cons: The focus of both groups would be compromised, the meetings would be longer, and many people might not have time to eat dinner!

Your suggestions are welcome:

We're still tossing around ideas, so please email your thoughts to Cecelia Yarnell at ceceliay@sbcglobal.net and she will forward your comments to the rest of the SCAS Board. YA members and parents are encouraged to participate in this discussion.

The Future of YA is in Your Hands:

We can only operate those programs that the membership will support. Without personal involvement by more members in YA and Striking Sparks, the SCAS cannot continue to maintain these programs. We need parental involvement. We need volunteers soon. A decision must be made within the next two months.

Think about volunteering. Talk to a Board member to find out more.



NEW MEMBER BONUS!

Scope City at 350 Bay Street, San Francisco, is offering a **\$25 merchandise discount to new members.**

Manager Sam Sweiss has supported SCAS and Striking Sparks and offers a huge selection of telescopes, accessories and more. Obtain a receipt from Dickson Yeager, Membership Director, showing you have paid the \$25 SCAS membership dues. To arrange for your merchandise discount, contact Sam at 415/421-8800 or at <http://www.scopecity.com>



SCAS Star Parties Event Horizons

April 29th had Len Nelson, Loren Cooper, Eric & Mary Swanson, Ted Judah, Walt Bodley and YA President,

Blaine Eldred providing telescope viewing for about 40 students and family members of Kenilworth Junior High School of Petaluma. The seeing was fairly good and the evening was capped off with an Iridium flair at 9:22.

On the 30th, Lynn Anderson Used the Night Sky Network SHADOWS & SILHOUETTES toolkit and a PowerPoint presentation about the moon with one of the third grade classes at Piner Elementary School in Santa Rosa.

While rain and the threat of the H1N1 flu prevented the scheduled Schulz Museum star party, Astronomy Day viewing, and Day Under the Oaks from happening, John Whitehouse and Loren Cooper took telescopes to the Charles Schulz Museum on Friday, May first, to be part of their Family Night. Since the weather prevented any outdoor viewing, John and Loren set up inside the museum and focused their telescopes upon cartoon panels on a far wall, while demonstrating a planisphere and talking about SCAS, the RFO and astronomy in general with the museum's visitors.

We occasionally get requests during the summer months, but with the exception of Yosemite in August 28-29, the public astronomy calendar is clear until the beginning of the next school year.

The summer language camp at Flowery School in Sonoma has again requested an evening of telescope viewing for the students and families that participate in their summer program. Those of you who have participated in the star parties at this event know that the families provide a pot-luck (mostly home cooked Mexican) dinner prior to the viewing. The particular date has not been set as of this writing, but will be during the week of July 13 – 17. Watch this column next month for more details.

Another summer event, of scheduled for telescope viewing will be for the residents of Varenna at Fountaingrove on Sunday evening, August 23rd. Lynn will probably provide a PowerPoint slide show prior to viewing the crescent moon and Jupiter.

Lynn sent an email with attachment outlining the potential star party dates for the 2009-10 school year to all of the educators who contacted him during this school year. He has encouraged these teachers to begin planning for next year and make their requests early. As a result of this solicitation, four teachers have already scheduled star party dates for this fall: Sequoia Elementary on Wednesday, September 23rd, Windsor High School on Thursday, October 15th, Rincon Valley Middle School on Thursday, November 12th, and Old Adobe on Thursday, November 19th

And, as always, if you would like to get on the star party volunteers email list, contact Lynn at astroman@sonic.net

—Lynn Anderson, SCAS Director of Community Activities

SOCIAL AMENITIES

Many thanks to David Simons for providing refreshments at the May SCAS meeting.

Welcome to Membership Renewal Time

Yes Members, it is that time of year again. Your current membership ends May 31, 2009 at midnight. There is an exception. If you were a 2009 Striking Sparks Winner your membership doesn't end until May 31 2010. Please send your renewal checks along with the completed the renewal notice, found on the last page of this newsletter, to:

SCAS
P. O. Box 183
Santa Rosa, CA 95402-183

BIG Reminder: If your email address changes during the year don't forget to notify the Membership Director at membership@sonomaskies.org. This will insure continued delivery of our excellent newsletter Sonoma Skies via email. Of course it is always available online at the SCAS website <http://www.sonomaskies.org>.

Thanking all of you in advance for your prompt response.

—Dickson Yeager, SCAS Membership Director

Chasing Galileo: sketches through a small refractor

By Jane Houston-Jones

When I started thinking about how to integrate the International Year of Astronomy into my *2009 What's Uppodcasts* I naturally focused on Galileo's first observations through a telescope 400 years ago. Over the first months of 2009 I had collected a gallery of Galileo's first sketches, watercolors and engravings. These historic observations suggested a project I've been wanting to do for some time — to recreate all of Galileo's astronomical sketches through a similar sized instrument.

Galileo made his first telescope, a spyglass that magnified 3x in June or July 1609. Next he made an eight-powered instrument and presented it to the Venetian Senate in August. His next telescope, which magnified twenty-one times is the one he used to observe the bumps and shadows on the moon, on Jupiter and its moons, and individual stars within patchy nebulae. These first observations were unveiled to the world in his book, *Sidereus Nuncius* published in March 1610.



Galileo telescope replica and my Televue Ranger

Galileo's telescope, pictured here, has an objective diameter of 37 mm and a focal length of 980 mm. The instrument's magnification is 21. My Televue Ranger ED Doublet Apochromatic refractor has an objective diameter of 70mm, a focal length of 480mm, and using a 25mm Zeiss Abbe Orthoscopic eyepiece, yields a comparable magnification of 19. The field of view, however is

The Semi-Astronomer

by Herb Larsen

His Go-To told him he was "too stupid" to operate the scope because he couldn't even find the moon without help.

dramatically different between the two instruments. Galileo's longer focal length and smaller objective (which he also stopped down to lessen chromatic aberration) give a relatively small field of view—15 degrees. My shorter focal length and larger aperture instrument has triple that FOV.



There were separate housings at either end for the objective and the eyepiece

What this means is that a telescopic view of Venus through both instruments will show the same size Venus, but in my 'scope there will be more "sky" around Venus, and in Galileo's there will be mostly Venus. A view of the moon is a different matter. Just a portion of the moon is visible at any one time through Galileo's scope and the entire moon is visible through mine.

Galileo's drawings and watercolor paintings of the moon inspired me to sketch what I see through the eyepiece. I've been sketching since first light with my own first telescope over 20 years ago. This year, I'll be honoring Galileo and celebrating the 400th anniversary of telescopic observations by creating 21st century sketches through a small refractor.



Galileo's watercolor drawings were made with brown ink wash on watercolor paper. To me these are the most beautiful of Galileo's astronomical renderings. When I look at the lunar terminator through a telescope, and hunt for interesting

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Events

ROBERT FERGUSON OBSERVATORY PUBLIC VIEWING

Saturday, June 20

Solar Viewing: Noon - 4:00 PM

Night Viewing begins 9:00 PM

The Observatory features three telescopes: A 14-inch SCT with CCD camera in the East wing, an 8-inch refractor under the dome and a 24-inch Dobsonian in the West wing. SCAS members may set up telescopes in the observatory parking lot to assist with public viewing. Auto access closes at dusk; late arrivals must carry equipment from the horse stable parking area.

Fees: No admission fee for the solar viewing, but donations are appreciated. The Park charges \$6 per vehicle for entry. A \$3 donation is requested from adults 18 and over for admission to the observatory during night viewing sessions.

NIGHT SKY SUMMER CLASSES

Session #1—June 15

Session #2—June 22

Session #3—June 29

Classes held Mondays at 7:30 PM. Sign up now for the entire series of six classes. Each class includes a lecture on the constellations of the season, their history and mythology, and how to find objects within them.

Fees: \$75 for the series of six presentations. (Single session fee is \$23). 10% discount for VMOA members. Classes are held at the Observatory. For information or to register: (707) 833-6979, nightsky@rfo.org

SANTA ROSA DOWNTOWN MARKET

June 24, 5 - 9 PM

RFO outreach table and moon viewing through a telescope. Purpose is to promote RFO classes, private event rentals and public viewing events. Come join us!

RESERVE THE FERGUSON OBSERVATORY!

Groups of up to 50 can be accommodated. Astronomer docents provide sky interpretation and operate telescopes, and you can stay up as late as you want! Make your reservation at least two weeks prior to your event. Best times for optimal sky gazing are any time more than a week away from a Full Moon.

In addition to \$111 charged by the RFO for use of the observatory facilities, the State Park System charges \$111 for use of the *Group Campground*. Because it is adjacent to the Observatory, the group camp must be reserved for private events. Total Cost: \$222. For information on how to make a reservation, visit <http://www.rfo.org> or email George Loyer at gloyer@rfo.org.

SETI INSTITUTE COLLOQUIUM

June 3: “Field Testing of Utility Robots for Lunar Surface Operations”—Terry Fong, Intelligent Robotics Group, NASA Ames Research Center

Since 2004, NASA has been working to return to the Moon to establish surface infrastructure and an outpost. Achieving these objectives will enable long-duration stays and long-distance exploration of the Moon. Robotic systems will be needed to perform tasks which cannot, or should not, be performed by crew alone. I will discuss our work at NASA Ames to develop “utility robots” for lunar surface operations, field testing and directions for future research.

June 10: “Geological record of recent climate change on Mars”—Mikhail Kreslavsky, UC Santa Cruz

Climate on Mars changes at a wide range of time scales, leaving observable traces in the geological record of the planet. Recent intensive orbital imaging of Mars has revealed a fascinating set of geologically young features indicating different climate conditions: recent gullies, surprisingly dynamic high-latitude landscapes, a wealth of new information about the polar layered deposits, traces of huge extinct tropical mountain glaciers, impressive remnants of wide-spread mid-latitude glaciation, etc. I will present current ideas, points of emergent understanding and key questions in reading the geological record.

June 17: “Apocalypse: Earthquakes, Archeology and the Wrath of God”—Amos Nur, Emeritus Wayne Loel Professor of Earth Sciences & Professor of Geophysics, Stanford University

‘Earthquakes and Archaeology’ is an emerging field with impact on both earthquake science and archaeological and historical studies. Archaeologists and historians have traditionally rejected earthquakes as an important agent. But with the advent of plate tectonics and modern instrumentation, this controversy is subsiding as we begin to offer answers to some key questions in both disciplines, including maximum earthquake magnitude and rupture length, layers of destruction, and who buried the Dead Sea Scrolls. A specific example is the catastrophic end of the bronze age in 1200BC.

June 24: “Death of the Martian Dynamo”—Robert Lillis, Planetary and Space Physics, UC Berkeley

Unlike Earth, Mars has no global dynamo-driven magnetic field. The strongly magnetized crust tells us that such a field existed in the past. The reasons for, and timing and manner of, its demise is an important question in Mars science, with ramifications for the evolution of the atmosphere and the stability of liquid water on the Martian surface. Dr. Lillis will explain how mantle convection simulations of the effects of giant impacts, combined with observed magnetic field signatures and crater retention ages of the resulting impact basins, tell us that the dynamo likely died quickly and may have been killed off by the cataclysmic impact resulting in the Utopia basin.

Colloquiums run from noon to 1PM on Wednesdays at the SETI Institute, 515 N. Whisman Road, Mountain View. Free. Get podcasts at: <http://www.seti.org/Page.aspx?pid=592>

Events

UC BERKELEY IYA LECTURE SERIES

June 20, 11 AM-12 PM: “Dark Energy and the Runaway Universe”—Alex Filippenko, UC Berkeley

Observations of very distant exploding stars (supernovae) show that the expansion of the Universe is now speeding up, rather than slowing down due to gravity as expected. Other, completely independent data strongly support this amazing conclusion. Over the largest distances, our Universe seems to be dominated by a repulsive “dark energy” --- an idea Einstein had suggested in 1917, but renounced in 1929, anecdotally as his “biggest blunder.” Dark energy stretches the very fabric of space itself faster and faster with time. But the physical origin of dark energy is unknown, and is often considered to be the most important unsolved problem in physics; it probably provides clues to a unified quantum theory of gravity.

Location: UC Berkeley Genetics and Plant Biology Building, Room 100. Limited hourly pay parking is available. Free.

MORRISON PLANETARIUM SHOWS

Lift off from planet Earth and take a jaw-dropping ride to the far reaches of the Universe. The Academy’s initial program, Fragile Planet, is projected onto a 75-foot diameter screen.

Summer Schedule (May 23 - September 7):

Weekday show times: Monday through Friday, every hour on the half-hour, 11:30 am - 4:30 pm.

Weekend, holiday and “free day” show times: Saturdays every 45 minutes, 10:30 am - 4:30 pm. On Sundays, every 45 minutes, 10:30 am - 4:30 pm, with the 10:30 am show exclusively for members. Free days: June 17, July 15, August 19

Tickets are handed out on a first-come first-served basis. Visit the kiosk at the planetarium entrance to select your show time. Location: California Academy of Sciences, Golden Gate Park

GOLDEN STATE STAR PARTY

June 20-24

Location: Frosty Acres Ranch near Adin in northeast California at an elevation of 4400 feet. You’ll feel Home On The Range, with real wide open spaces, views of Mount Shasta 66 miles west, on-site amenities, nearby towns, all at true dark sky distance from city lights.

The surface is heritage grass, safe for driving, and provides a comfortable camping surface. The area is enormous. In 2008 GSSP had over 300 attendees and did not fill 1/8th the available space. The driving road has been moved east of the camping field, so traffic dust blows away from us.

Sign up now! Registration for all 5 days is \$60. One-day adult pass at the gate is \$35. For more information about camping, accommodations, etc., and to register:

<http://goldenstatestarparty.blogspot.com/>

SCAS YOSEMITE STAR PARTY

This year’s dates are August 28 and 29. We will provide public astronomy at Glacier Point on both nights, and camp at the Bridal Veil group campground. All participants bring their own telescopes. Park entry and campground fees are a gift from the park for our service.

As of this writing we have a full contingent of volunteers. Plans change, however, so you can add your name to the waiting list by contacting Len Nelson at lennelsn@comcast.net.

MT. TAMALPAIS ASTRONOMY

June 27, 8:30 PM: “Exploring the Extreme Universe with Fermi”—Professor Lynn R. Cominsky, Sonoma State University

NASA’s Fermi Gamma-ray Space Telescope (formerly known as GLAST) mission is exploring the most energetic and exotic objects in the cosmos: blazing galaxies, intense stellar explosion and super-massive black holes. Fermi probes the Universe on scales from the infinite to the infinitesimal, and future observations may shed light on the nature of dark matter.

Sponsored by the Mt Tamalpais State Park and coordinated by volunteers of the Mt Tam Interpretive Association. FREE and open to the public. Families and students encouraged to come. Presentations held in the Mountain Theatre. Viewing afterwards in Rock Springs Parking Area, provided by San Francisco Amateur Astronomers. Dress warmly and car pool if possible. Bring a flashlight! Info: 415/455-5370; <http://www.mttam.net/>

IYA PODCAST BY TED JUDAH

Our own SCAS Board Secretary, Ted Judah, has produced two podcasts that will be featured on the International Year of Astronomy website in celebration of 365 Days of Astronomy.

June 23—“Star Parties - Fun in the Dark.”

Details about the podcasts can be found at: <http://365daysofastronomy.org/>

MESSIER FUN FACTS

The most *northerly* Messier object is M82 in Ursa Major, with a declination of 69°41'

The most *southerly* Messier object, M7 in Scorpius, has a declination of -34°47'

The *nearest* (and brightest) Messier object is M45 in Taurus at approximately 440 LY away

The *farthest* Messier object, M77 in Cetus, lies more than 60 million LY distant.

The *faintest* Messier objects are M76, M91 and M98---each glows at mag 10.1

—Thanks to Linda Mahan for providing these factoids

Young Astronomers



Striking Sparks Star Parties at the RFO

—by Len Nelson, SCAS Vice President

Hello Young Astronomers...have you been to a Star Party recently?

Last month I sent this message to all Young Astronomers who have won Striking Sparks from 2006-2009.



Geoffrey Knoll

Three Young Astronomers responded that they would love to come to a Star Party at the RFO (Robert Ferguson Observatory) on Saturday, May 23 and they were: YA VP Geoffrey Knoll, Ray Pan and Andrew Wong.

I then prepared a list of items that they should find in the night sky to give their adventure some goals. The list included 12 constellations, 7 stars and a few Messier objects. In the course of the evening, we sought these items and discussed them. I

also had a drawing of where the satellites of Saturn should be situated so that we could find and identify them. Unfortunately, my *The Sky* astronomy software must need updating because what I had predicted using the correct time, location turned out to be in error. However, one of the RFO docents took up this issue with the RFO computer with current *The Sky* software and derived the correct locations for the main satellites of Saturn.

It was a very pleasant evening, with clear skies (despite less than stellar predicted seeing conditions) and great views of Saturn. Many constellations were located and principal stars located by name. As we were leaving, the Summer Triangle was rising in the east and I told the Yung Astronomers to take a mental note of where it was and to expect to see it right overhead later this summer.



Andrew Wong

By the way, did I mention that Noah Dove unexpectedly came too? As you can expect from Noah, he took great pride in demonstrating his keen insights and in-depth knowledge of almost every detail of the objects he located. With Noah in one's midst, having a star atlas is almost an unnecessary item to bring with you. It is so much easier to just ask Noah for the facts than to look them up under challenging seeing conditions!

This was the second Young Astronomer Star Party at the RFO in the last two months. The first was on April 15th when I invited 3 local Petaluma Striking Sparks winners (Ray Pan Brock Albee & Ryan Cardiff) to join me at the RFO during spring break.



Ray Pan

I also prepared a check list of things to find in that night sky. We opened the roof to the 24" reflector and discussed and demonstrated how other eyepieces could benefit their viewing experiences with their Striking Sparks telescopes. Based on that experience, I widened the invitation to the Striking Sparks winner of 2005-2009.

Young Astronomer...are you reading this now? If you wish to go on our next trip to the Robert Ferguson Observatory, please let me know and I'll be sure that you are specifically invited. The current plan is to have a Star Party there each month during a public star party.

—All Photos by Len Lenson

REMINDER

There are no Young Astronomer meetings during the summer, but you are welcome to attend the SCAS general meetings held on the 2nd Wednesday of each month.

Join us this month at the Schulz Museum to see the Charlie Brown and Apollo 10 exhibit. See front page for details. Hope to see you there!

YOUNG ASTRONOMERS CLUB

Meetings: 7:30 PM the third Friday of each month of the school year, at Apple Blossom School, 700 Water Trough Road, Sebastopol, in the Multipurpose Hall. Open to all Sonoma County students. Telescope viewing is held in the upper parking lot after the meeting. Directions: From Hwy. 116 in Sebastopol, go west onto Bodega Ave. Continue almost two miles to Water Trough Rd. Turn left and go about 1/3 mile to the school, on your right.

YA ELECTED OFFICERS

PRESIDENT: Blaine Eldred

VP/PROGRAM DIRECTOR: Geoffrey Knoll

NEWSLETTER EDITOR: Max Eliaser, Maxxedout@comcast.net

NEWSLETTER CO-EDITOR: Alex Katz

ADULT ADVISOR: Open



Helen Johnson, a spacecraft technician at NASA's Goddard Space Flight Center, works on one of the three tiny Space Technology 5 spacecraft in preparation for its technology validation mission.

NASA SpacePlace

Scoring More Energy from Less Sunlight

For spacecraft, power is everything. Without electrical power, satellites and robotic probes might as well be chunks of cold rock tumbling through space. Hundreds to millions of miles from the nearest power outlet, these spacecraft must somehow eke enough power from ambient sunlight to stay alive.



That's no problem for large satellites that can carry immense solar panels and heavy batteries.

But in recent years, NASA has been developing technologies for much smaller microsatellites, which are lighter and far less expensive to launch. Often less than 10 feet across, these small spacecraft have little room to spare for solar panels or batteries, yet must still somehow power their onboard computers, scientific instruments, and navigation and communication systems.

Space Technology 5 was a mission that proved, among other technologies, new concepts of power generation and storage for spacecraft. "We tested high efficiency solar cells on ST-5 that produce almost 60 percent more power than typical solar cells. We also tested batteries that hold three times the energy of standard spacecraft batteries of the same size," says Christopher Stevens, manager of NASA's New Millennium Program. This program flight tests cutting-edge spacecraft technologies so that they can be used safely on mission-critical satellites and probes.

"This more efficient power supply allows you to build a science-grade spacecraft on a miniature scale," Stevens says. Solar cells typically used on satellites can convert only about 18 percent of the available energy in sunlight into electrical current. ST-5 tested experimental cells that capture up to 29 percent of this solar energy. These new solar cells, developed in collaboration with the Air Force Research Laboratory in Ohio, performed flawlessly on ST-5, and they've already been swooped up and used on NASA's svelte MESSENGER probe, which will make a flyby of Mercury later this year.

Like modern laptop batteries, the high-capacity batteries on ST-5 use lithium-ion technology. As a string of exploding laptop

batteries in recent years shows, fire safety can be an issue with this battery type.

"The challenge was to take these batteries and put in a power management circuit that protects against internal overcharge," Stevens explains. So NASA contracted with ABSL Power Solutions to develop spacecraft batteries with design control circuits to prevent power spikes that can lead to fires. "It worked like a charm."

Now that ST-5 has demonstrated the safety of this battery design, it is flying on NASA's THEMIS mission (for Time History of Events and Macroscale Interactions during Substorms) and is slated to fly aboard the Lunar Reconnaissance Orbiter and the Solar Dynamics Observatory, both of which are scheduled to launch later this year.

Thanks to ST-5, a little sunlight can go a really long way. Find out about other advanced technologies validated in space and now being used on new missions of exploration at:

<http://nmp.nasa.gov/TECHNOLOGY/scorecard>

Kids can calculate out how old they would be before having to replace lithium-ion batteries in a handheld game at:

http://spaceplace.nasa.gov/en/kids/st5_bats.shtml

—Article provided by JPL/NASA

SPINOFFS FROM SPACE

Did you know that smoke detectors, ski boots and invisible braces, along with hundreds of items we use every day, were originally invented for use in the space program?

Applications on Earth of technology needed for space flight have produced thousands of "spinoffs" that contribute to improving national security, the economy, productivity and lifestyle. It is almost impossible to find an area of everyday life that has not been improved by these spinoffs. See some of them here:

<http://www.thespaceplace.com/nasa/spinoffs.html>

Mars Robots May Have Destroyed Evidence of Life

by David Shiga, *The New Scientist Magazine*

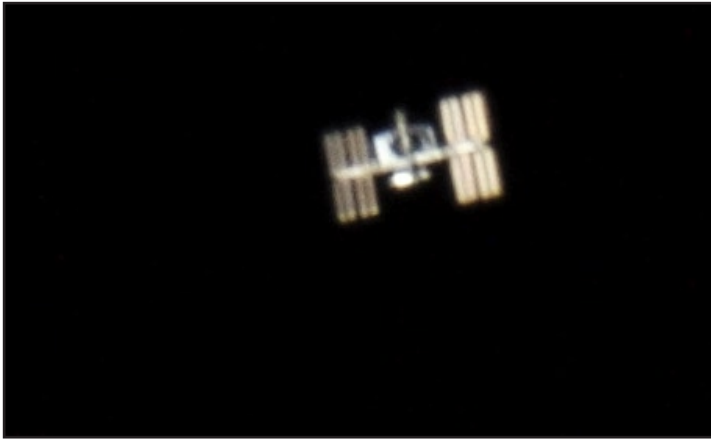
Have Mars landers been destroying signs of life? Instead of identifying chemicals that could point to life, NASA's robot explorers may have been toasting them by mistake.

In 1976, many people's hopes of finding life on Mars collapsed when the twin Viking landers failed to detect even minute quantities of organic compounds - the complex, carbon-containing molecules that are central to life as we know it. "It contributed, in my opinion, to the fact that there were no additional [US lander] missions to Mars for 20 years," says Jeff Moore of NASA's Ames Research Center in Moffett Field.

The result also created a puzzle. Even if Mars has never had life, comets and asteroids that have struck the planet should have scattered at least some organic molecules—though not produced by life—over its surface.

Some have suggested that organics were cleansed from the surface by naturally occurring, highly reactive chemicals such

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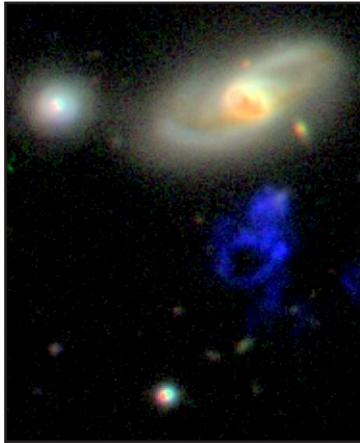
Capturing the International Space Station, by Ted Judah:

I used my Canon DSLR attached via a T-adaptor (I believe it's called prime focus) to my 2800mm focal length C-11 (Celestron 11" telescope). I had an electronic shutter release cable. I made sure the finder scope crosshairs were perfectly lined up with the scope's field of view. After establishing focus using Saturn and the crescent moon I waited for the ISS. My german equatorial mount was balanced and both axes were loose and free. I followed the ISS the best I could manually and when it was anywhere near the crosshairs I fired off shots. ISO: 800 and 1/500th second shutter speed. Photographed May 27.

Hanny's Voorwerp and the Galaxy Zoo

May 21 IYA Podcast interview by Ted Judah, excerpted

In 2007 Dutch school teacher Hanny van Arkel discovered a unique deep space object never before described... from the comfort of her computer chair! While using the website Galaxy Zoo, Hanny discovered what was to become known as Hanny's Voorwerp.



Hanny: "Galaxy Zoo is an online astronomy project where real astronomers ask the public to help them classify galaxies. You don't need to know anything about galaxies or astronomy cause there is this short explanation online and you get to see these beautiful pictures and you classify them by clicking on a button to tell them what shape you think it has. Computer programs aren't as good at this as the human brain so that's why they asked the public. And, I heard about it through Queen's guitarist Brian May actually. (Galileo, Galileo, Galileo Figaro!) I admire him for his music, but also he writes for his website and he mentioned this and I thought, "Oh, sounds good let's check it out.)"

A week into classifying objects Hanny came across a strange and unusual object that caught her eye... "At that moment I didn't know it was something unusual. It looked like an irregular

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June Observing Notes

- 6/4 Io occults half of Europa: Begins 2:54, ends 3:00 AM
- 6/5 Venus at greatest elongation West, 2 PM
- 6/7 Largest full moon of 2008. ~5hr before closest perigee in 15 YEARS! Very large tides!
- 6/9 Double Shadow Transit on Jupiter, 1 AM. Jupiter rises with Ganymede shadow transit in progress. Jupiter's altitude becomes decent for second half of event.





Time	Sat	Event	Alt/Az
0105	Io	ShIn	05/138
0220	Io	TrIn	18/125
0315	Gan	ShEx	26/136
0321	Io	ShEx	27/137
0350	Astronomical Twilight begins		
0436	Io	TrEx	35/156

- 6/9 Mercury in East thru 6/20. A moderately good morning apparition from about 6/9 to 6/20 with altitudes of about 5° or greater 30 minutes before sunrise (about 0515).
- 6/11 Io occults half of Europa: Begins 5:07, ends 5:12 AM
- 6/13 Moon near Jupiter, 4 AM.
Mercury at greatest elongation West, 5 AM. A moderately good morning apparition from about 6/9 to 6/20 with altitudes of about 5° or greater 30 minutes before sunrise (about 0515).
- 6/15 Jupiter stationary, 1 PM. Jupiter, in Capricornus, begins retrograde motion.
- 6/16 Double Shadow Transit on Jupiter, 2:30 AM. Ends in twilight.

Time	Sat	Event	Alt/Az
0258	Io	ShIn	27/138
0338	Gan	ShIn	32/148
0348	Astronomical Twilight begins		
0410	Io	TrIn	35/156
0514	Civil Twilight begins		
0515	Io	ShEx	38/166
0546	Sunrise		

- 6/19 Venus near Mars, 4 AM. Venus has been "chasing" Mars in the predawn sky since early May and, today, catches up and passes Mars. Both planets are directly below a crescent moon!
- 6/20 Crescent Moon near M45, 4:30 AM. The 8% crescent moon will be above M45 in the east during nautical twilight. At 0515, look for Mercury below M45, altitude 7°. **Summer Solstice** at 10:46 PM.
- 6/22 New Moon, 12:30 PM.
- 6/23 Pluto Opposition, 1 AM, mag 13.9 in Sgr. Extremely difficult to observe due to Milky Way star cloud background.
2.7% Crescent Moon, Alt/Az 6/293 at 9:15 PM. The thin crescent will be half as high as, and slightly south of, Pollux. Large Tides. Moon at perigee less than 24 hours after new moon.
- 6/27 Moon near Saturn, 10 PM. The large crescent moon near Saturn, both in Leo, should make a nice sight in the west.

June 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	
7	8 	9	10 7:30 PM SCAS Meeting at Schulz Museum	11	12	13
14	15  7:30 PM RFO Night Sky	16	17	18	19	20 RFO Observing Solar: Noon-4 Night: 9PM >
21	22  7:30 PM RFO Night Sky	23 IYA Podcast by Ted Judah	24 5-9 PM RFO at Santa Rosa Downtown Market	25	26	27
28	29  7:30 PM RFO Night Sky	30				

See [Pages 4 and 5](#) for more detailed information on events. SCAS Star Parties are listed on [Page 2](#).

JUPITER'S MOON SHOW

Get your cameras ready! Every six years, Earth spends a number of months passing through the orbital plane of Jupiter's moons. During the passage, amateur astronomers get to see a rare display of "mutual occultations." Jupiter's moons eclipse one another in plain view of backyard telescopes.

On both June 4 and 11 we will be able to see it from here. See the observing times at left.

On May 25th, Mike Salway of Central Coast, Australia, watched Ganymede eclipse Io. Check <http://spaceweather.com>, then click on the May 28 archive to see his movie of Europa passing directly in front of Ganymede.

Images like these are unprecedented. Although Jupiter's moons put on the same kind of show in 2002-2003, no one recorded such clear pictures. "Imaging techniques and equipment have improved immensely over the past 6 years," notes Salway. "So this is the first year where amateurs are recording these events and producing detailed, high-res images of the phenomena."

CAN YOU LAND A SHUTTLE?

Here's a cockpit view of the 200,000-pound shuttle (flying brick) descending from about 83,000 feet, going from Mach II to 25 miles an hour in 6+ minutes. Hold your breath until the end!

<http://de.truveo.com/cockpit-view-of-shuttle-landing/id/2312402248>

Chasing Galileo (from Page 3)

features to sketch, I sometime daydream, and try to imagine what Galileo thought as he surveyed these surprising lunar features.

I've been sketching the moon for about 20 years, but I've always focused on a small segment of the lunar terminator as my sketching target. I'd never tried to sketch the entire moon in one sitting before. So I decided to make my sketches very small - three sketches to a page for the lunar sketches. I used a 5" x 8" bound sketch book instead of the usual 3.5 x 5-inch 400 Series Strathmore spiral bound sketch pad I use for most of my sketches. But I did use my slender set of 12 mix-and-match Pitt pure Graphite, Castell fine, and Wasserlack bold Faber-Castell graphite art set pencils. That's all I use for sketching. I like to keep the process simple and uncluttered and the supplies compact. No table, no lights shining off my forehead, no messy products that would get on my Zeiss eyepieces or my fingers. Armed with these supplies, all I had to do is wait for the moon to become visible on a night of above-average seeing.

Here is a partial collection of "cropped" lunar sketch pages made at the eyepiece of my 70mm Televue f/7.8 Ranger refractor. I haven't completed my "Galileo-like" lunar sketches yet because I prefer to wait for those nights of exceptional seeing to sketch at the eyepiece, and I am in no hurry to finish this project.

I used one of the finest planetary eyepieces to complement this fine apochromat—a 25mm Zeiss Abbe Orthoscopic. This gave me a 19x view of the lunar surface, similar to what you would see through a pair of binoculars, but also similar to the magnification (but not the same field of view) of Galileo's telescope, which was 20x. Twentieth century Extra-Low Dispersion ("ED") glass in the Televue Ranger and the exceptional quality of the Zeiss Abbe ortho eyepieces plus a wider field of view give me quite an advantage, but that's the telescope and eyepieces I have at my disposal. Lucky me!

Hanny's Voorwerp (from Page 8)

galaxy because it had the same characteristics, it has remarkable form, and it's deep blue but it didn't quite look the same as one of those. I was curious and I just thought well let's send them an email and ask.

"I said, "What's the blue stuff below? Anyone? - Does anyone

know? But nobody did really. And not even the astronomers, who were really busy because Galaxy Zoo turned out to be such a success and they had lots of e-mails and mine just was one of them. So the first response was, 'Yeah it looks interesting,' but they didn't really know what it was until they started looking at it with different telescopes and it turns out that the human eye would actually see it as green."

Ted: "How did it get the name Voorwerp?"

Hanny: "Well, Voorwerp is just the Dutch for "object" so basically all the stuff around me on my desk are "voorwerpen" and in the beginning, Chris Lintoff from Galaxy Zoo - he thought it was an exotic description of the object I found in the sky... so Hanny's Voorwerp is the name of this object I found and is a new class of object from what I've been told. It's a gas cloud and it's about 6 or 7 hundred million light years away from the earth - really far away. It's very light and hot but it hasn't got any stars in it. And they call it a light echo because, they think, it reflects the energy from this galaxy next to it."

Ted: "Why do you think major news media such as the BBC, CNN (and now the 365 Days of Astronomy) are interested in this object?"

Hanny: "I think because it's one-of-a-kind. I don't think there is another one at the moment that we know of and I've been told that if it is what they think it is (and they're still investigating it) it can teach us a lot about galaxies in itself. And it's a great story because how can a Dutch schoolteacher like me, who hasn't done an astronomical course, just discover something which also gets your name. That's a cool story—citizen science."

Ted: "I read that Hanny's Voorwerp was approved to be imaged by the Hubble. Is this true?"

Hanny: "Yes, that's correct. We wrote a proposal that was accepted so if all goes well we should be hearing about that soon. And there was also this Japanese telescope which does x-ray and they actually just observed it - Well, IC 2497 which is the galaxy next to Hanny's Voorwerp but they are still working on the data and these things just take time. We also have time with the XMN Newton telescope which also does x-ray but at different wavelengths."

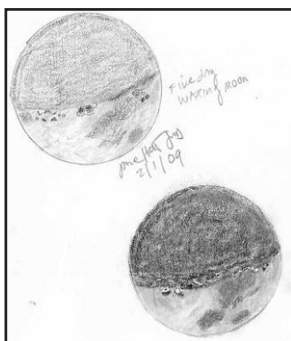
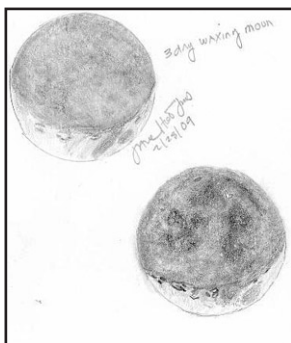
If you would like to learn more about Hanny's Voorwerp please visit her website: <http://www.hannysvoorwerp.com/>. Find out about Galaxy Zoo at: <http://www.galaxyzoo.org/>

Mars Robot X'd Life? (from Page 7)

as hydrogen peroxide. Then last year, NASA's Phoenix lander, which also failed to detect organics on Mars, stumbled on something in the Martian soil that may have, in effect, been hiding the organics: a class of chemicals called perchlorates.

At low temperatures, perchlorates are relatively harmless. But when heated to hundreds of degrees Celsius they release a lot of oxygen, which tends to cause any nearby combustible material to burn. For that very reason, perchlorates are used in rocket propulsion.

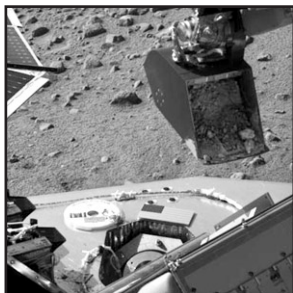
The Phoenix and Viking landers looked for organic molecules by heating soil samples to similarly high temperatures to evaporate them and analyse them in gas form. When Douglas Ming of NASA's Johnson Space Center in Houston, Texas, and colleagues



tried heating organics and perchlorates like this on Earth, the resulting combustion left no trace of organics behind. Ming's team presented their results at the recent Lunar and Planetary Science Conference in Houston.

Iron oxides have also been suspected of interfering with the detection of organics, but perchlorates are probably far more effective, says Chris McKay of Ames. Even if organics make up a few parts per thousand of the soil, Viking or Phoenix could have missed them, he adds, so it is too soon to conclude that these materials are not there. "We haven't looked the right way," he says.

Jeffrey Bada of the University of California, San Diego, agrees that a new approach is needed. He is leading work on a new instrument called Urey for the European Space Agency's ExoMars rover, due to launch in 2016, which will be able to detect organic material at concentrations as low as a few parts per trillion. The good news is that, although Urey heats its samples, it does so in water, so the organics cannot burn up.



Loaded scoop approaching oven

Mystery of the missing salt

Organic chemicals are not the only substance that we may have missed on the Red Planet (see above). We should have seen carbonate salts littering the surface.

Weathering breaks down basalt, the dominant rock in the planet's crust, into a clay plus positive ions. These ions should react with carbon dioxide in the Martian atmosphere to form carbonate salts, explains Ralph Milliken at NASA's Jet Propulsion Laboratory in Pasadena, California.

Orbiters have spotted clay on Mars but few carbonates or other salts. We shouldn't assume that they aren't there, however, Milliken says.

Milliken and his colleagues have calculated that weathered Mars basalt should produce equal amounts of clay and salt. Thus in the planet's southern highlands, where thousands of clay deposits have been identified, there should be at least as much salt (Geophysical Research Letters, DOI: 10.1029/2009gl038558). "Chemistry has shown that you can't draw conclusions from observations alone, because you are still missing pieces of the puzzle," says Milliken.

Some argue that the lack of known carbonate salt deposits points to a different atmospheric composition in the past, but Milliken says we should study the rocks directly before making any conclusions.

—Reprinted from the *New Scientist* April 25 article:
<http://www.newscientist.com/article/mg20227094.500-mars-robots-may-have-destroyed-evidence-of-life.html>

FROM THE EDITOR

Links: You've probably noticed that some of the text in this newsletter is an italic aqua-blue color, like *this*. That means you can click on it while you're reading and it will automatically open the web page pertaining to that link, or take you to the continuing page in this publication. Please let me know when

it doesn't work so I can refine the process. If it doesn't work for you, just copy the link and paste it into your browser's address bar, but do let me know.

I hope you enjoy the universe of information that's out there. Yours to edit and quantify at will.

Articles: There are many interesting articles in this issue. I feel like a newspaper reporter with the hottest sources! I scan the internet all month and am subscribed to a lot of online magazines and websites, so when it's time to write up *Sonoma Skies*, I want to share it all with you. Much of it is "hot off the presses" and you *could* hear it first right here in your hometown newsletter.

Talk Me Down: *Sonoma Skies* could eventually run 20 pages or more if you don't stop me. Here's your chance. Vote to rein me in or egg me on. Let me know what you think at cecelya@sbcglobal.net. "Rein in" or "Egg on" in the title bar will suffice, and comments are welcome.

Comments: Some of the articles may be contrivertial, scientifically or otherwise. Feel free to respond so I can publish your thoughts. You can respond anonymously if you like. More dialog is useful, and far more interesting. You never know—we could become a "go-to" spot on the web. So here's my challenge: I'm egging you on!

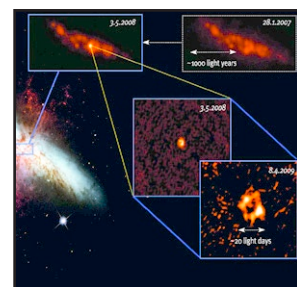
Massive Supernova Nearest in Five Years

European radio astronomers have discovered the hidden explosion of a massive star, in the nearby galaxy M82.

Despite being the closest supernova discovered in the last five years, the explosion was only detected at radio wavelengths, as dense gas and dust surrounding it have rendered it invisible at other wavelengths. Without the dust and gas, the explosion would have been visible even with amateur telescopes, say the authors of a study in this week's *Astronomy & Astrophysics Letters*.

The new explosion was discovered in April when Andreas Brunthaler of the Max Planck Institute For Radio Astronomy in Bonn, Germany, examined data from the Very Large Array (VLA) observatory in New Mexico, USA. "I then looked back into older data we had from March and May last year, and there it was as well, outshining the entire galaxy!" Observations taken before 2008 showed neither pronounced radio nor X-ray emissions at the position of this supernova.

"This cosmic catastrophe shows that using our radio telescopes we have a front-row seat to observe the otherwise hidden universe," added co-author Heino Falcke of Radboud University, Nijmegen in the Netherlands.



The galaxy M82 is to the left. The VLA image (top left) shows the supernova taken in May 2008. The high-resolution image (lower right) shows an expanding shell at the scale of a few light days.

Citizen Sky Project on epsilon Aurigae

Who are citizen scientists? Volunteers, many of whom have no prior scientific training, who work with trained scientific researchers to answer real-world questions. This means YOU!

About the Citizen Sky Project on epsilon Aurigae: Epsilon Aurigae (eps Aur) is a bright star located in the constellation Aurigae, the charioteer. At 3rd magnitude the star is bright enough to be seen with the unaided eye even in the most light polluted cities. It is well placed for observing in the fall, winter, and spring skies (in the early summer it is hidden by the Sun's glare).

Every 27.1 years the star goes into an eclipse that lasts approximately one and a half years. Then, near the very end of the eclipse, it suddenly gains most of its brightness back in a matter of weeks. Even after over 175 years of scrutiny, no one knows why this happens. The next eclipse of eps Aur is predicted to begin in August 2009. We need you to help us collect data so that we can better understand this star. Because the star is very bright, it can be observed by anyone regardless of background, training, or equipment: with just good eyesight and a finder chart, you can monitor this eclipse.

The AAVSO's Citizen Sky project welcomes anyone who has an interest in participating! We will guide you through the process of how to observe eps Aur, how to send us your observations of the star, how to see your results, analyze them, and even publish them in a scientific journal!! No previous experience is required. We hope that this will be the largest citizen science project in modern history that involves real, active research!

Our new web page will be launching in June 2009. This site will serve as the home base for anyone interested in participating in this project. The new Citizen Sky website will include blogs, discussion forums, a place to submit and analyze data, training materials, plus much more, so come visit us in June! In the meanwhile, visit <http://www.citizensky.org> for project announcements and information.

Observations/Analysis: Epsilon Aurigae is an ideal target for those interested in learning how to observe variable stars. By following the Ten Star Tutorial available on our website, a new observer will be trained in the technique needed to make and report a visual variable star estimate. Information on taking digital observations of epsilon Aurigae will be available on the Citizen Sky website. The AAVSO is developing data analysis software, which will come with tutorials to help train participants in the basics of astronomical data analysis. A special edition of the peer-reviewed Journal of the AAVSO will be dedicated to papers written by project participants.

Everyone can play a role in the Citizen Sky Project! Get involved and discover yours.

Sonoma County Astronomical Society (SCAS)

Membership Information

Meetings: 7:30 PM on the second Wednesday of each month, in the Multipurpose Room of Proctor Terrace Elementary School, 1711 Bryden Lane at Fourth Street, Santa Rosa, unless otherwise announced in this publication. The public is invited.

Dues: \$25, renewable June 1 of each year. New members joining between December 1 and May 31 pay partial-year dues of \$12.50.

Star Parties: See the Events section for dates and times.

Rental Telescope: Members are eligible to borrow the club's 80mm refractor with tripod. Contact any Board member listed below.

Egroup URL: Connect with other members about going observing, observing reports and chat about astronomy and news items from AANC and *Sky & Telescope*. Hosted by Robert Leyland at r.leyland@verizon.net. Any SCAS member is welcome to join. Visit <http://groups.yahoo.com/group/scas> and click the "Join" button, or send an email to scas-subscribe@yahoogroups.com

Discount Subscriptions: For *Sky & Telescope*, new subscribers may send a check for \$32.95 payable to "SCAS", with your complete mailing address, directly to: Larry McCune, 544 Thyme Place, San Rafael, CA 94903. Once you have received the discount rate, you may renew your subscription by sending your personal check with the renewal notice directly to Sky Publishing. Discount subscriptions to *Astronomy* Magazine occur annually in October. Check *Sonoma Skies* for details.

Library: SCAS Librarian David Simons hosts a library of astronomy books that may be checked out by members at SCAS meetings, to be returned at the next meeting. Videotaped lectures on astronomy may be rented for \$3 per month.

Sonoma Skies is the monthly newsletter of the Sonoma County Astronomical Society (SCAS). Subscription is included as part of membership. Articles and member announcements are welcome and are published on a first come, first served basis, space permitting, and may be edited. **The deadline for submissions is 7 days prior to the end of each month.** Mail to: Editor, SCAS, P.O. Box 183, Santa Rosa, CA 95402, or email publications@sonomaskies.org

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Young Astronomers Advisor: Open

Visit us on the web at:
www.sonomaskies.org

Sonoma County Astronomical Society Membership Application/Renewal

The \$25.00 Annual Membership fee for 2009-2010 is due June 1.

Please complete this form and give it to Dickson Yeager with your check, payable to "SCAS," at the next meeting, or mail them to: SCAS, P.O. Box 183, Santa Rosa, CA 95402

New **Renewal** (If renewing, provide name only, plus any information that has changed).

Name: _____

Email Address *(Required if you wish to receive Sonoma Skies via email)*: _____

Address: _____

City/State/Zip: _____

Telephone: _____

Your renewal dues include membership in the Astronomical League, our monthly newsletter Sonoma Skies, discounted subscriptions for Sky and Telescope and Astronomy magazines, great guest speakers at our monthly meetings, and opportunities to meet new and interesting people who share your interest in many aspects of astronomy and science.

IYA 2009 PROJECT: OBSERVING MUTUAL PHENOMENA OF THE GALILEAN SATELLITES OF JUPITER

In 2009, the equinox will occur on the planet Jupiter (a once every six year event), allowing observation from Earth of mutual occultations and eclipses between the Galilean satellites. We will take the opportunity of the International Year of Astronomy 2009 to encourage everyone to look at these satellites and to make astronomical observations.

The satellites are very easy to observe and the mutual phenomena are accessible to amateur astronomers, students, and anyone using even a small telescope. These phenomena are not only spectacular and easy to see, they are also rich in scientific information, improving our knowledge of the Galilean satellites of Jupiter. These include objects as large as the planets Mercury or Mars, Io and its volcanoes, Europa and its ice crust, Ganymede, and Callisto.

As well as observing for fun, we request scientific observations to be made according to some simple but rigorous rules, to be followed by observers who possess materials and the ability to record such events. The data will be gathered and used for scientific purposes.

Since the phenomena occur only from April to December 2009, we need a large worldwide network of observers to catch as many events as possible. We intend to include all the participating observers sending valuable data into a final publication in an international journal, as has been done in the past after previous campaigns of observations with amateur astronomers.

See: http://www.imcce.fr/hosted_sites/ama09/phemu09_en.html

NASA'S KEPLER MISSION BEGINS SEARCH FOR PLANETS LIKE EARTH

NASA's Kepler spacecraft has begun its search for other Earth-like worlds. The mission, which launched from Cape Canaveral on March 6, will spend the next three-and-a-half years staring at more than 100,000 stars for telltale signs of planets. Kepler has the unique ability to find planets as small as Earth that orbit sun-like stars at distances where temperatures are right for possible lakes and oceans.

"Now the fun begins," said William Borucki, Kepler science principal investigator at NASA's Ames Research Center, Moffett Field, Calif. "We are all really excited to start sorting through the data and discovering the planets."

Scientists and engineers have spent the last two months checking out and calibrating the Kepler spacecraft. Data have been collected to characterize the imaging performance as well as the noise level in the measurement electronics. The scientists have constructed the list of targets for the start of the planet search, and this information has been loaded onto the spacecraft.

"If Kepler got into a staring contest, it would win," said James Fanson, Kepler project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "The spacecraft is ready to stare intently at the same stars for several years so that it can precisely measure the slightest changes in their brightness caused by planets." Kepler will hunt for planets by looking for periodic dips in the brightness of stars—events that occur when orbiting planets cross in front of their stars and partially block the light.

For images, animations and more information about the Kepler mission, visit: <http://www.nasa.gov/kepler>