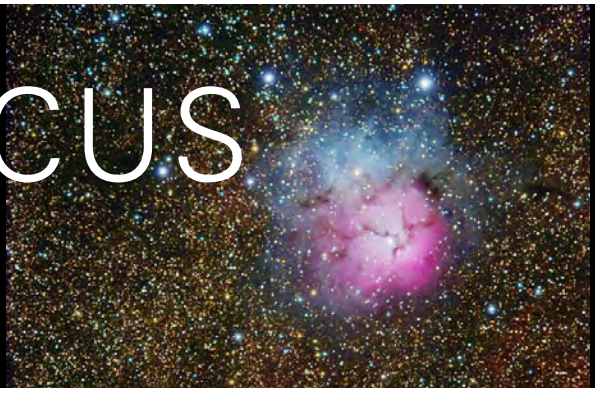
# PRIMEFOCUS
Tri-Valley Stargazers

June 2009

**Meeting Info:**

**What**
*Summer BBQ*

**Who**
TVS Members

**When**
June 19, 2009
Set Up at 7:00 p.m.
Dinner at 7:30 p.m.

**Where**
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

## Inside



## June Meeting

Summer BBQ
*TVS Members*

Our June meeting will be our annual Summer BBQ. We'll start setting things up and get the coals going around 7:00 p.m., and start eating around 7:30.

TVS will provide the burgers, drinks, and plastic ware. Members are asked to bring a dish to share. In the past we've had a list of what to bring based on the first initial of the last name. This time around, as we did at our Holiday Potluck, we're throwing caution to the wind and are making this a free for all. Bring whatever you li'l ol' heart desires, just make sure you bring enough to feed about 5-8 people. You may also bring family and friends; we're all for indoctrinating unsuspecting people in the ways of all things astronomy.

M63 / NGC 5055. The Sunflower Galaxy is about 60,000 light years across and 37 million light years away in the constellation Canes Venatici. It gravitationally interacts with M51, the Whirlpool Galaxy, and several smaller galaxies.

Image taken in May 2009 with a 12" f/10 ACF & 0.67x reducer, and an ST10XME 1x1 -15C & -20C. L: 180min; RGB: 40,40,60min.
*Photo: Gert Gottschalk*

# News & Notes

## New Member

TVS welcomes our newest member, **Jill Evanko**.

## 2009 TVS Meeting Dates

The following lists the TVS meeting dates for the next few months. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the July 5th deadline is for the July issue).

| Lecture Meeting | Board Meeting | *Prime Focus* Deadline |
|---|---|---|
| June 19 | June 22 | June 7 |
| July 17 | July 20 | July 5 |
| Aug 21 | Aug 24 | Aug 9 |
| Sept 18 | Sept 21 | Sept 6 |

## Money Matters

The May Board Meeting was canceled due to a lack of a quorum. However, Treasurer David Feindel did send report of the TVS account balances as of May 18, 2009.

| | | |
|---|---|---|
| Checking | $4,379.20 | |
| CD #1 | $3,757.66 | matures 5/17/09 |
| CD #2 | $2,651.71 | matures 5/27/09 |

We've paid the State of California our bi-annual "we exist" fee. Our PO Box rental is due at the end of the month (May).

## Yosemite Star Party

The view from Glacier Point

Every year Bay Area astronomy clubs, in conjunction with Yosemite National Park, host public star parties at Glacier Point in exchange for free camping at the Bridalveil Campgrounds. This year TVS will be the host on the weekend of July 31-August 1. Unfortunately, we'll have a Waxing Gibbous Moon to contend with. It sets at 2:00 a.m. in the early hours of August 1st, and at 2:53 a.m. on the 2nd, so most of the evenings will be bathed in moonlight.

As in the past, Saturday evening will be a potluck BBQ dinner. Dave Rodrigues is the trip coordinator, so let him know if you will be attending (or if you have questions regarding the trip). Dave can be reached at 510-410-6047. Mark your calendar so you won't forget the date!

The dates for the White Mountain trip have yet to be determined, but will most likely be in September. Dave is the coordinator for that trip as well.

# Calendar of Events

**June 10 - 21**

What: *From Earth to the Universe: Astronomical Image Display*
Who: Everyone
Where: Chabot Space & Science Center
Cost: General Admission ($14.95 adults; $10.95 kids)

From June 10th through June 21st, Chabot will be displaying a gallery of space images captured by NASA's "Great Observatories," as part of the International Year of Astronomy 2009. From the Earth to the Universe is a collection of some of the most beautiful and captivating images of astronomical objects ever taken. The 14-image display at Chabot has been selected from the collection, and is provided by NASA/Ames Research Center. For more information, visit fromearthtotheuniverse.org.

**June 17, 12:00 - 1:00 p.m.**

What: *Apocalypse: Earthquakes, Archeology and the Wrath of God*
Who: Robert Landis (NASA Ames Intelligent Systems Division)
Where: SETI in Mountain View
Cost: Free

'Earthquakes and Archaeology' is an emerging field with impact on both earthquake science and archaeological and historical studies. It has been controversial as archaeologists and historians have traditionally rejected earthquakes as an important agent. But now 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:

**Some Significant Geophysics Questions:**

1. Time/space pre-instrumental patterns of large earthquakes.

2. Maximum earthquake magnitude, maximum rupture length, etc.

3. One big event or several smaller ones?

**Some Significant Archaeological Questions:**

1. Why so many ruins?

2. Why so many layers/levels of destruction? [Knossos-10, Jericho-22, Armageddon-30, Troy-45].

3. Who buried the Dead Sea Scrolls?

**Newsletter header image**: M20 - Trifid Nebula

M20 is a relatively close (5,000-9,000 light years) and fairly young (about 300,000 years old) star forming nebula in Sagittarius. It is both an emission and reflection nebula and contains a cluster of stars.

This image of the Trifid was taken at this year's Texas Star Party. Alas, no details are available as the photographer is in the middle of a cross country move. *Photo: Bill Drelling*

4. The nature of regional destructions and system collapse. A specific example Professor Nur will focus on is the catastrophic end of the bronze age at 1200BC.

Amos Nur, Emeritus Wayne Loel Professor of Earth Sciences & Professor of Geophysics, Stanford University

This lunchtime talk is part of the SETI Institute Colloquium Series. Location is 515 N. Whisman Road, Mountain View, CA 94043. For more info, visit their web site http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

**June 17, 9:30 a.m. - 4:00 p.m.**

What: *California Academy of Sciences Free Day!*
Who: Everyone
Where: California Academy of Sciences
Cost: Free

Free admission is available to visitors on the third Wednesday of every month, presented by Wachovia. Admission is on a first come, first served basis, and early arrival is recommended due to the likelihood of high demand. Also, please note that final entry to the museum on free days is 4 p.m. and, finally, that there will be no members-only entrance on free days. INSIDER TIP: Crowds tend to be a little lighter in the afternoon.

**June 20, 11:00 a.m. - 12:00 p.m.**

What: *Dark Energy and the Runaway Universe*
Who: Alex Filippenko
Where: UC Berkeley, Genetics and Plant Biology Building, Room 100
Cost: Free

This talk was originally scheduled in the September slot but will now take place in June.

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.

Alex Filippenko joined the UC Berkeley faculty in 1986, where he is a leading authority on exploding stars, active galaxies, black holes, gamma-ray bursts, and the expansion of the Universe. He was a member of both teams that discovered the accelerating expansion of the Universe. He has appeared in numerous television documentaries, produced several introductory astronomy video courses, and coauthored an award-winning textbook.

Limited hourly pay parking is available; please check the signs. You are encouraged to take public transport—BART and bus lines are within walking distance. For more information about the talks, please visit http://astro.berkeley.edu/~scroft/iya/ .

**June 23, 7:30 p.m. - 8:30 p.m.**

What: *Cosmic Accelerators: Engines of the Extreme Universe*
Who: Stefan Funk (SLAC National Accelerator Laboratory)
Where: Panofsky Auditorium (overflow seating available in Kavli Auditorium), SLAC National

*continued page 5*

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**Web & E-mail**

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**Eyes on the Skies**

Eyes on the Skies is a robotic solar telescope run by Mike Rushford (rushford@eyes-on-the-skies.org). You may access it by visiting www.eyes-on-the-skies.org.

**TVS E-Group**

So how do you join the TVS e-group, you ask? Just send an e-mail message to the TVS e-mail address (trivalleystargazers@gmail.com asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

## What's Up *by Debbie Dyke*

All times Pacific Daylight unless otherwise noted.

### June

7 Sun **Full Moon**. 11:12 a.m.

10 Wed Moon at apogee (250,967 miles). 9:00 a.m.

13 Sat Venus at aphelion.
The Moon is 3° from Jupiter and 2°17' from Neptune. 5:00 a.m.
Mercury at greatest elongation W (23°). 5:00 a.m.
1944 JPL was formed, originally called Air Corps Jet Propulsion Research Project.
1983 Pioneer 10 becomes the first spacecraft to exit the solar system.

14 Sun Mercury at greatest heliocentric latitude south.

15 Mon Jupiter stationary. 1:00 p.m.
**Last Quarter Moon**. 3:15 p.m.

16 Tue 1963 Valentina Tereshkova becomes the first woman in orbit.

18 Thur 1983 Sally Ride becomes the first U.S. woman in space, 20 years after USSR sent Valentina up for a spin.

19 Fri Venus, the Moon, and Mars make a little grouping in the early morning. Venus is 2° south of Mars and 7° from the Moon; Mars is 5° south of the Moon. Mercury is just above the eastern horizon. 5:00 a.m.
**Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.

20 Sat Summer Solstice. 10:46 p.m.

21 Sun 2004 SpaceShipOne is the first private manned mission to space.

22 Mon **Tri-Valley Stargazers Board meeting**. 7:30 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore.
**New Moon. 12:35 p.m.**

25 Thur Pluto at opposition. 1:00 a.m.
Moon at perigee (221,968 miles). 4:00 a.m.
1178 Five British monks observe an impact on the crescent Moon. Theory has it that the resulting crater is the one we know as Giordano Bruno.

26 Fri 1730 Charles Messier born.

27 Sat Saturn 8° north of the Moon. 10:00 p.m.

29 Mon **First Quarter Moon**. 4:48 a.m.
1868 George Ellery Hale born.

30 Tue 1905 Einstein submits his new theory of special relativity.
1908 An asteroid breaks up and explodes over Siberia near Tunguska with the force of a hydrogen bomb. Ka-boom.

### July

1 Wed Uranus stationary. 9:00 a.m.

3 Fri Venus 7° south of the Pleiades (M45). 4:00 a.m.
Earth at aphelion (94,296,557 miles). 7:00 p.m.

4 Sat Independence Day.
Antares 51' south of the Moon low in the southwest. 2:00 a.m.
1054 Chinese astronomers, and possibly Native Americans, observe the Crab Nebula supernova.
1868 Henrietta Swan Leavitt born. Henrietta discovered over 2,400 variable stars and the relationship between period and luminosity in Cepheid variables.
1997 Mars Pathfinder lands on Mars.

7 Tue **Full Moon** (smallest in 2009). 2:21 a.m.
Moon at apogee (251,863 miles). 3:00 p.m.

## 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.

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.

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

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

## Calendar of Events *continued*

Accelerator Center, Menlo Park

**Cost:** Free

The Universe is home to numerous exotic and beautiful phenomena, some of which can generate almost inconceivable amounts of energy. While the night sky appears calm, it is populated by colossal explosions, jets from supermassive black holes, rapidly rotating neutron stars, and shock waves of gas moving at supersonic speeds. These accelerators in the sky boost particles to energies far beyond those we can produce on earth. New types of telescopes, including the Fermi Gamma-ray Telescope orbiting in space, are now discovering a host of new and more powerful accelerators. Please come and see how these observations are revising our picture of the most energetic phenomena in the Universe.

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551

**PRIME**FOCUS

# Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category: _____ $5 Student.
_____ $30 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $40 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ $20 H2O key holder fee. (A refundable key *deposit*—key property of TVS).
_____ $40 Patron Membership. Must be a member for at least a year and a key holder.
_____ $34 One year subscription to *Astronomy* magazine.
_____ $60 Two year subscription to *Astronomy* magazine.
_____ $32.95 One year subscription to *Sky & Telescope* magazine. **Note**: Subscription to *S&T* is for new subscribers only. Existing subscribers please renew directly through *S&T*.
$_____ Tax deductible contribution to Tri-Valley Stargazers.

$_____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.