

PRIMEFOCUS

Tri-Valley Stargazers

May 2009



Meeting Info:

What

Supernovae: You Wouldn't Be Here Without Them

Who

Jeffrey M. Silverman

When

May 15, 2009
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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May Meeting

Supernovae: You Wouldn't Be Here Without Them

Jeffrey M. Silverman

In my talk I will discuss some of the biggest and most fascinating explosions in the Universe, known as supernovae. These colossal outbursts result from the deaths of stars and for a time can outshine the entire rest of the galaxy in which they are found.

I will give a brief history of supernovae observations and some of the physics behind these stellar explosions. In addition, I will discuss a few of the ways in which astronomers (including myself) search for and study supernovae today.

Detailed observations of these explosions have raised nearly as many questions as they have helped us answer. Astronomers know that elements which are essential for life (such as iron and calcium just to name a couple) can only be released into interstellar space by supernova explosions and only after being expelled from a star's core can they be incorporated into new generations of stars, planets, and life forms. It has also been shown that SN explosions often trigger new stars to form in their vicinity, thus completing the stellar "Circle of Life". Furthermore, in 1998, observations of very distant supernovae provided evidence that the expansion of the Universe is actually speeding up with time, rather than slowing down as expected due to gravity. Other lines of investigation have since supported this surprising conclusion. This implies that our Universe is dominated by a repulsive and mysterious "dark energy" that acts as a kind of anti-gravity.

Jeffrey M. Silverman is a fourth-year graduate student at the University of California – Berkeley studying and observing supernovae with Professor Alexei V. Filippenko. He is particularly interested in relatively nearby supernovae and how subtle differences between them relate to their farther-away brethren. Jeffrey was born and raised in Anaheim, CA just down the street from Disneyland. He received a B.S. Astrophysics and a B.A. Mathematics cum laude from Rice University in Houston, TX in 2005, and a M.A. Astrophysics from UC Berkeley in 2007. In addition to staying up all night to look through telescopes, Jeffrey likes to stay up all night to watch movies and go to all kinds of concerts.



Supernovae 1994D in NGC 4526. Photo: NASA, ESA, The Hubble Key Project Team, and The High-Z Supernova Search Team

News & Notes

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
May 15	May 18	May 3
June 19	June 22	June 7
July 17	July 20	July 5
Aug 21	Aug 24	Aug 9

Money Matters

The April Board Meeting was canceled due to a lack of a quorum. However, Treasurer David Feindel did report the TVS account balances as of April 20, 2009.

Checking	\$3,979.63	
CD #1	\$3,756.74	matures 5/17/09
CD #2	\$2,651.71	matures 5/27/09

Alviso Adobe Star Parties

Eric Nicholas, the naturalist for the new park in Pleasanton, Alviso-Adobe Community Park, requests our presence and scopes at a few star parties he's scheduled. The park is on Old Foothill Road, just north of the Bernal intersection.

A star party scheduled for April 25th was canceled due to rain and will be rescheduled. There will be another star party on May 23 (Saturday), and Eric is asking for volunteers with scopes to help him out. He's done one or two already, with his own small scope. He said turnout at the first parties he's had were around 15-20 people, with almost no promotional effort at all. The star parties start at 8:30 p.m., with a short talk by him.

Eric would also like to do a solar "star" party on May 23 at 11 a.m. He has a Coronado, but would certainly appreciate more solar scopes out there. We'll send e-mail updates to the TVS Yahoo Group list as the date nears.

Calendar of Events

May 16 11:00 a.m. - 3:00 p.m.

What: *Imaging Planets Beyond the Solar System*
Who: James Graham
Where: UC Berkeley, Genetics and Plant Biology Building, Room 100
Cost: Free

For most of human history, planets were mysterious points of light that wandered among the fixed stars. With

the discovery of the astronomical telescope by Galileo it became possible to see that planets are other worlds. The last few years has seen a revolution in the study of planets because we now have detections of nearly 250 planetary systems. These detections are indirect, based on observation of the parent star (eclipses or changes in velocity that betray orbital motion). The next step in this adventure is to see these planets directly. Direct detection is exceedingly hard; for example, Jupiter is about a billion times fainter than our Sun. Prof. Graham will describe the first glimpses of extrasolar planets themselves allowed by new technologies.

James Graham is a professor at UC Berkeley and the Chair of the Astronomy Department, where he works on observational astronomy and with cutting-edge astronomical instruments, including adaptive optics (using lasers to counteract the blurring effect of the Earth's atmosphere) and SOFIA (an observatory which flies aboard a Boeing 747). His main scientific interest is in the dusty disks around nearby stars, which are candidates for forming planetary systems. He was a member of a team of scientists who obtained the first visible-light images of an extrasolar planet with orbital motion around the star Fomalhaut, at a distance of 25 light years from Earth, research which was featured in the New York Times, and was picked as one of Time Magazine's 10 biggest scientific breakthroughs of 2008. Prof. Graham has also been honored with the Noyce Prize for excellence in undergraduate teaching.

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/>.

May 17, 9:30 a.m. - 5:00 p.m.

What: *NCHALADA LXXXVII*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: Free

The next NCHALADA (Northern California Historical Astronomy Luncheon and Discussion Association) meeting will be held on Saturday, May 17, 2009. Refreshments and chat at 9:30.

The morning session (10:00 a.m.-12:30 p.m.) will be *Con-*

Newsletter header image: Martian Dunes

A view of an impact depression 1,674 miles in diameter, just to the west of Hellas Basin. On the left is a mesa, to the right are crescent shaped of sand dunes called barchans. The linear dunes are called seifs.

This image was taken with the HiRISE camera on the Mars Reconnaissance Orbiter. *Photo: NASA, JPL, University of Arizona*

stellations of Middle and South America, chaired by John Westfall, Association of Lunar and Planetary Observers.

Lunch will probably be at Harry's Hofbrau or Home Town Buffet, then a brief business meeting.

The afternoon discussion (2:00 p.m. - 5:00 p.m.) will be *The Other Moons of the Solar System*, chaired by Nancy K. Cox, San Francisco Amateur Astronomers.

NCHALADA meets several times a year at the Chabot Space and Science Center in the hills of Oakland, California. They spend a Saturday morning and afternoon discussing two topics related to (did you guess this) the history of astronomy. Between the two sessions, they justify the rest of the title by having lunch at a local restaurant. After lunch and before the afternoon session, they have a short business meeting to select the topics and date for the following meeting. No proxy votes are allowed, the people actually present are considered to be the whole nchalada.

May 27, 12:00 - 1:00 p.m.

What: *NEOs Ho!! The Asteroid Option*

Who: Robert Landis (NASA Ames Intelligent Systems Division)

Where: SETI in Mountain View

Cost: Free

In late 2006, NASA's Constellation Program (CxP) sponsored a study to examine the feasibility of sending a piloted Orion spacecraft to a near-Earth Object (NEO). One of the significant advantages of this type of mission is that it strengthens and validates the foundational infrastructure of the United States Space Exploration Policy and his highly complementary to NASA's planned lunar sortie and outpost missions circa 2020. Rob Landis will discuss how human expedition to a NEO would not only under-

line the broad utility of the Orion Crew Exploration Vehicle (CEV) and Ares launch systems, but would also be the first human expedition to an interplanetary body beyond the Earth-Moon system.

This lunchtime talk is part of the SETI Institute Colloquium Series. Location is 515 N. Whisman Road, Mountain View, CA USA 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 1, 7:30 - 9:00 p.m.

What: *The New Mars: Habitability of a Neighbor World*

Who: David Des Marais (NASA Ames)

Where: Morrison Planetarium, San Francisco

Cost: Adults \$10, Seniors \$8, Members \$8
Reservations recommended.

Of all the other planets in the solar system, Mars is the one whose past climate most closely resembled the Earth's. Recent missions have revealed richly fascinating landscapes and deeply important discoveries on Mars. The red planet might have supported life sometime in the past, and perhaps supports life even today.

Reservations: Advance ticketing is recommended. Please call 800-794-7576 for reservations. Tickets may be purchased at the door, but there is no guarantee of availability.

June 3, 12:00 - 1:00 p.m.

What: *Field Testing of Utility Robots for Lunar Surface Operations*

Who: Terry Fong (Intelligent Robotics Group, NASA Ames Research Center)

Where: SETI in Mountain View

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Chuck Grant
cg@fx4m.com
925-422-7278

Vice-President:
unfilled

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feindel1@comcast.net

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Librarian:

Jim Alves
Ajaengr@yahoo.com
209-833-9623

Newsletter Editor:

Debbie Dyke
astrodeb@comcast.net
925-461-3003

Program Director: unfilled

Loaner Scope Manager:

John Swenson
johnswenson1@comcast.net

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unfilled

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Debbie Dyke

Mentor:

Mike Rushford
rushford@eyes-on-the-skies.org

Addresses

Mailing:

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

Lecture Meeting:

Unitarian Universalist Church
1893 N. Vasco Road, Livermore

Board & Discussion Meetings:

Round Table Pizza
1024 E. Stanley Blvd., Livermore

Web & E-mail

www.trivalleystargazers.org
trivalleystargazers@gmail.com

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.

May

- | | | |
|----|------|--|
| 1 | Fri | First Quarter Moon. 1:44 p.m. |
| 2 | Sat | Venus greatest illuminated extent. 8:00 a.m.
The Moon is 3°15' from Regulus. 10:00 p.m. |
| 6 | Wed | The Moon is 3°22' from Spica. 9:00 p.m. |
| 8 | Fri | Full Moon. 9:01 p.m. |
| 10 | Sun | Mother's Day.
Moon 25' from Pi Scorpii 12:00 a.m.
Venus at descending node. |
| 13 | Wed | Moon at apogee (251,047 miles). 8:00 p.m. |
| 14 | Thur | 1973 Space station Skylab is launched. |
| 15 | Fri | Tri-Valley Stargazers general meeting. 7:30 p.m. at the Unitarian Universalist Church,
1893 N. Vasco Road, Livermore. |
| 17 | Sun | Last Quarter Moon. 12:26 a.m.
The Moon 4° from Jupiter, and 3°12' from Neptune. 5:00 a.m. |
| 18 | Mon | Tri-Valley Stargazers Board meeting. 7:30 p.m. at the Round Table Pizza on 1024
E. Stanley Blvd., Livermore.
Mercury in inferior conjunction. 3:00 a.m.
1910 Earth passes safely through the tail of Comet Halley.
1969 Apollo 10 launched. |
| 21 | Thur | The thin crescent Moon, Mars, and Venus are grouped together low in the morning sky. 5:00 a.m. |
| 22 | Fri | Start of RTMC-Riverside Telescope Makers Conference. |
| 23 | Sat | 1980 The Tri-Valley Stargazers become incorporated as a non-profit organization. |
| 24 | Sun | New Moon (lunation 1069). 5:11 a.m. |
| 25 | Mon | Memorial Day.
Moon at perigee (223,914 miles). 9:00 p.m. |
| 26 | Tue | Jupiter and Neptune 20' apart. 4:00 a.m. |
| 28 | Thur | The Moon is 5°40' from the Beehive Cluster (M45). 10:00 p.m.
1959 First primates in Space—Able and Baker. |
| 29 | Fri | The Moon is 4°32' from Regulus. 11:00 p.m.
1919 Einstein's theory of general relativity is tested for the first time during a total solar eclipse. |
| 30 | Sat | First Quarter Moon. 8:00 p.m. |
| 31 | Sun | Comet Kopff (22P) 2°35' north of Jupiter. Kopff is predicted to be magnitude 8.2. 4:00 a.m. |

June

- | | | |
|----|------|---|
| 1 | Mon | 1858 Lick Observatory dedicated. |
| 4 | Thur | 1965 Ed White becomes first American to walk in space. His walk lasted 22 minutes. |
| 6 | Sat | The Moon is just over 1° from Antares. 10:00 p.m. |
| 8 | Mon | 1625 Giovanni Cassini born. |
| 9 | Tue | 1812 Johann Galle (Neptune discoverer) born. |
| 13 | Sat | 1944 JPL was formed, originally called Air Corps Jet Propulsion Research Project.
1983 Pioneer 10 becomes the first spacecraft to exit the solar system. |

The Swiss Army Knife of Weather Satellites

Spotting volcanic eruptions, monitoring the health of crops, pinpointing distress signals for search and rescue teams.

It's not what you might expect from a weather satellite. But these are just a few of the abilities of NOAA's newest polar-orbiting weather satellite, launched by NASA on February 6 and turned over to NOAA for full-time operations on February 26.

Formerly called NOAA-N Prime and now renamed NOAA-19, it is the last in its line of weather satellites that stretches back almost 50 years to the dawn of the Space Age. Over the decades, the abilities of these Television Infrared Observation Satellites (TIROS) have gradually improved and expanded, starting from the grainy, black-and-white images of Earth's cloud cover taken by TIROS-1 and culminating in NOAA-19's amazing array of capabilities.

"This TIROS series has become quite the Swiss army knife of weather satellites, and NOAA-19 is the most capable one yet," says Tom Wrublewski, NOAA-19 Satellite Acquisition Manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

The evolution of TIROS began in 1998 with NOAA-K. The satellites have carried microwave sensors that can measure temperature variations as small as 1 degree Celsius between Earth's surface and an altitude of 40 kilometers—even through clouds. Other missions have added the ability to track large icebergs for cargo ships, monitor sea surface temperatures to aid climate change research, measure the amount of ozone in Earth's protective ozone layer, and even detect hazardous particles from



The new NOAA-19 is the last and most capable in the long line of Television Infrared Observation Satellites (TIROS).

solar flares that can affect communications and endanger satellites, astronauts in orbit, and city power grids.

NOAA-19 marks the end of the TIROS line, and for the next four years it will bridge the gap to a new series of satellites called the National Polar-orbiting Operational Environmental Satellite System. NPOESS will merge civilian and military weather satellites into a single system. Like NOAA-19, NPOESS satellites will orbit Earth from pole to pole, circling the planet roughly every 100 minutes and observing every location at least twice each day.

NPOESS will have yet more capabilities drawn from its military heritage. Dim-light sensors will improve observations of the Earth at night, and the satellites will better monitor winds over the ocean — important information for ships at sea and for weather and climate models.

"A lot more capability is going to come out of NPOESS, improving upon the 161 various environmental data products we already produce today," Wrublewski says.

Not even a Swiss army knife can do that many things, he points out.

For more on the NPOESS, check out <http://www.npoess.noaa.gov>. Kids can find out about another NOAA satellite capability—tracking endangered migrating species—and play a fun memory game at http://spaceplace.nasa.gov/en/kids/poes_tracking.

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*

Cost: Free

Since 2004, NASA has been working to return to the Moon. In contrast to the Apollo missions, two key objectives of the current exploration program are to establish surface infrastructure and an outpost. Achieving these objectives will enable long-duration stays and long-distance exploration of the Moon. To do this, robotic systems will be needed to perform tasks which cannot, or should not, be performed by crew alone. In this talk, I summarize our work at NASA Ames to develop "utility robots" for lunar surface operations, present results and lessons learned from field testing, and discuss directions for future research.

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

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Livermore, CA 94551



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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 _____

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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.