PRIMEFOCUS
Tri-Valley Stargazers

March 2009

Meeting Info:

What
Spying on Star Clusters with Space Observatories

Who
Dr. Adrienne Cool

When
March 20, 2009
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

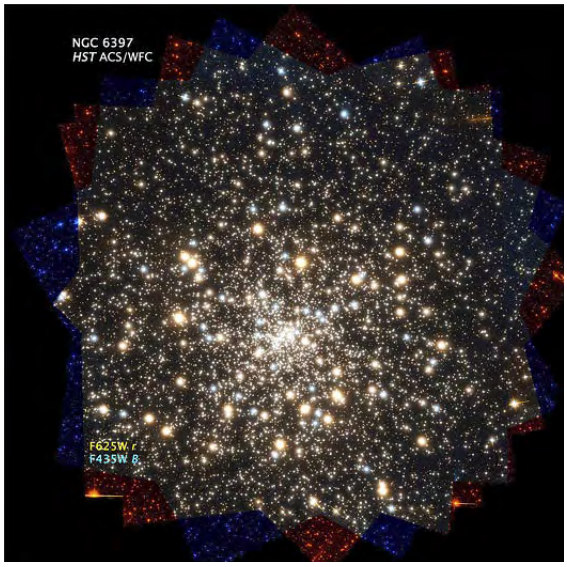
Inside

March Meeting

Spying on Star Clusters with Space Observatories
Dr. Adrienne Cool

Adrienne will begin her talk with an overview of globular clusters: what they are, and some of what can be learned from studying them. Then she will focus on globular cluster dynamics in particular, and the role that binary stars play in cluster dynamical evolution. Finally, she will present recent results of searches for binary stars and related objects in globular clusters using the Advanced Camera for Surveys on Hubble Space Telescope. She will end with a new discovery that caught them by surprise: a population of unusually low-mass white dwarfs that provide a new window into the binary-star populations in globular clusters.

Above: Image of NGC 6397 from Hubble's Wide Field and Planetary Camera 2 ("WFPC2") combines images at ultraviolet, blue, and infrared wavelengths.



Right: Another view of NGC 6397, also taken with the Hubble telescope, this time with the Advanced Camera for Surveys. The photo is a combination of red and blue images.

NGC 6397 is 8,500 light years away in the constellation Ara (visible in the southern hemisphere). It contains a variety of stars, such as helium white dwarfs, cataclysmic variables, blue stragglers, and normal white dwarfs.

Adrienne will be talking about the results related to both of these images.

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 March 8th deadline is for the March issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Mar. 20	Mar. 23	Mar. 8
Apr. 17	Apr. 20	Apr. 5
May 15	May 18	May 3
June 19	June 22	June 7

Money Matters

Treasurer David Feindel reported the TVS account balances as of February 23rd, 2009.

Checking	$4,164.00	
CD #1	$3,756.74	matures 5/17/09
CD #2	$2,647.37	matures 2/27/09

We will attempt to pay the Church rental, again; the H2O rental is due in March.

TVS Membership Renewal

If you received the e-mail notification that this issue of PrimeFocus was available for download, or received a hard copy in the mail, then you've paid your 2009 membership dues. Thank you for supporting the club with your dues!

If you've downloaded this issue, but didn't received an e-mail notification, then either you need to contact our Treasurer, David Feindel, to get your e-mail status corrected or you haven't renewed yet. If it's the latter, please send in your renewal to David. You can find the renewal form on the back page of the newsletter. Please fill it out and send it in with your check (made out to Tri-Valley Stargazers) to PO Box 2476, Livermore, CA 94551. You can also give your check and form to David at the club meeting.

Just a reminder that if you are a subscriber to *Sky & Telescope* magazine and need to renew, follow whatever instructions *S&T* sends you. If you are a new subscriber to *S&T*, fill out the membership renewal form and submit your payment to TVS. *Astronomy* magazine will continue to follow the procedure for subscribing or renewing through the club.

Rates continue to be $32.95 for a 1-year subscription to *S&T*, and $34/$60 for a 1- or 2-year subscription to *Astronomy*. If you have questions regarding the subscriptions, contact David (his contact info is in the box on the next page).

Science Fun Fair - March 17

The annual Pleasanton School District's Science Fun Fair will be on Tuesday, March 17th, from 6:00-9:00 p.m. at the Alameda County Fairgrounds in Pleasanton.

As we have done in the past, TVS will have a booth in the Young California building. We'll need two volunteers at our booth and more volunteers outside with telescopes to show attendees whatever objects are easily visible from the parking lot. The Moon won't be up, but the Beehive Cluster and crowd favorite Saturn will be visible. It's a lot of fun, and the kids (and their parents) are always excited to be able to look through a telescope.

The Fair usually attracts about 10,000 kids and their families, but don't fear, we usually get around 100 coming out to view through the scopes. We only have one parking pass that will allow parking by the building, but we do have several passes for the main parking lot.

If you wish to help, please contact Debbie Dyke at 925~461~3003 or astrodeb (at) comcast.net.

Calendar of Events

March 21, 11:00 a.m. - 12:00 p.m.

What: *Is Anybody Out There? Searching for ET with Help from 8 Million Volunteers*
Who: Dr. Dan Werthimer
Where: UC Berkeley, Genetics and Plant Biology Building, Room 100
Cost: Free

Dr. Werthimer will discuss the possibility of life in the universe, the search for radio and optical signals from other civilizations, and how you can help in the search for ET. The SETI@home project analyzes data from the world's largest radio telescope using desktop computers from millions of volunteers. SETI@home participants have contributed three million years of computer time and have formed one of Earth's most powerful supercomputers. Users have the small but captivating possibility their computer will detect the first signal from a civilization beyond Earth.

Dr. Werthimer will also discuss the Allen Telescope Array, next generation telescopes, and public participation scientific supercomputing.

Newsletter header image: Comet Lulin

This image of Comet Lulin was taken on February 27th. Details of the shot: 300 mm telephoto lens attached to a Canon 20Da. There were 17 exposures combined, each 2 minutes long, making a total exposure of 34 minutes. Photo was taken from the observatory deck at the Chabot Space & Science Center. *Photo: Conrad Jung*

Dan Werthimer has been involved in the search for extra-terrestrial intelligence since 1979. A researcher at UC Berkeley's Space Sciences Laboratory, he is the project chief scientist of Seti@Home, as well as heading up several other SETI searches. He is also principal investigator of the Center for Astronomy Signal Processing and Engineering at Berkeley.

Doors open at 10:30 and seating is on a first come, first served basis. 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.

March 26, 4:00 p.m.

What: *The Fermi Gamma-Ray Space Telescope: The First 6 Months*
Who: Dr. Peter Michelson (Stanford University)
Where: Lockheed Martin Colloquia, 3251 Hanover St, ATC Auditorium-Bldg 202, Palo Alto
Cost: Free

Fermi is providing an important window on a wide variety of high-energy phenomena including pulsars, black holes, and active galactic nuclei; gamma-ray bursts; the origin of cosmic rays and supernova remnants; and searches for new phenomena such as supersymmetric dark-matter annihilations and exotic relics from the Big Bang.

The main instrument on the Fermi observatory is a large area telescope (LAT) that measures cosmic gamma-ray radiation in the range of 20 MeV to >300 GeV. The Gamma-ray Burst Monitor (GBM) measures gamma-ray bursts from 8 keV to 30 MeV. LAT offers a big improvement in sensitivity, a larger field-of-view, and much finer angular resolution. It observes 20 percent of the sky at any instant and covers the entire sky every three hours.

Dr. Michelson is a professor of physics and a member of the Kavli Institute of Particle Astrophysics and Cosmology and the W. W. Hansen Experimental Physics Laboratory at Stanford University. He also is the principal investigator of the Fermi LAT. For more info, visit http://fermi.gsfc.nasa.gov.

April 1, 12:00 p.m.

What: *Weathering on Icy Satellites: Probing the Near Surface Using Infrared Spectroscopy*
Who: Rachel Mastrapa (NASA Ames, SETI Institute)
Where: 515 N. Whisman Road, Mountain View
Cost: Free

Infrared spectra of icy satellites contain information about the surface composition and the phase state of those materials. For example, the phase of H2O-ice can be used to interpret the temperature and radiation history of an icy surface. Optical constants derived from laboratory data are needed to create model spectra for comparison to observations and may lead to a new understanding of surface processes. The talk is part of the SETI Institute Colloquium Series.

April 5, 12:00 p.m. - 4:00 p.m.

What: *SJAA Auction XXIX*
Who: San Jose Astronomical Association
Where: Houge Park, San Jose
Cost: Free

It's time for the annual transfer of astronomical stuff from one garage to another. The SJAA's auction is an opportunity to sell or buy all kinds of astronomical gear.

Doors open at noon, selling will start at 1:00 p.m. and go to about 4:00 p.m. Visit SJAA's web site for more information: www.sjaa.net.

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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.

March

12 Thur 1923 Wally Schirra born.

13 Fri In the next two weeks, look for the Zodiacal Light in the west after evening twilight.
1781 Wilhelm Herschel discovers Uranus using a 6-inch scope he built himself.

14 Sat 1879 Albert Einstein born.
1986 Giotto spacecraft encounters Comet Halley.

15 Sun Venus at greatest heliocentric latitude north.

16 Mon 1750 Caroline Herschel born.
1926 Robert Goddard launches the first liquid-fuel rocket.

17 Tue Antares 4° from the Moon. 6:00 a.m.
St. Patrick's Day.

18 Wed Mercury at greatest heliocentric latitude south.
Last Quarter Moon. 10:47 a.m.
1965 First walk in space by Cosmonaut Alexei Leonov from the Voskhod 2.

19 Thur Moon at apogee (250,665 miles). 6:00 a.m.

20 Fri Vernal Equinox. Spring has sprung! 4:44 a.m.
Tri-Valley Stargazers general meeting. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.

22 Sun The Moon just under 3.5° from Jupiter in the early morning. It's even closer to Castor—about 17".

23 Mon **Tri-Valley Stargazers Board meeting**. 7:30 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore.
1840 First photo of the Moon taken.

24 Tue 1993 Eugene and Carolyn Shoemaker and David Levy take a picture of what turns out to be comet Shoemaker-Levy 9.

25 Wed 1655 Christiaan Huygens discovers Saturn's largest moon, Titan.

26 Thur Mars at greatest heliocentric latitude south.
New Moon (lunation 1067). 9:06 a.m.

27 Fri Venus in inferior conjunction. 12:00 p.m.

29 Sun The Moon 7° from the Pleiades in the evening.
1974 Mariner 10 makes first flyby of Mercury and sends pictures home.

30 Mon Mercury in superior conjunction. 8:00 p.m.

31 Tue 1966 Russia launches the first craft to orbit the Moon, Luna 10.

April

1 Wed Moon at perigee (229,408 miles). 7:00 p.m.
1949 Gerald Kuiper discovers Neptune's moon Neried.

2 Thur **First Quarter Moon**. 7:34 a.m.
1845 First photo taken of the sun by Louis Fizeau and Leon Foucault.

3 Fri The Moon is 3° from M44, the Beehive Cluster. 9:00 p.m. The Moon closes to within 2° at 3:00 a.m.

4 Sat 1983 Space shuttle Challenger makes its first flight.

6 Mon The waxing gibbous Moon is 6° from Saturn. 9:00 p.m.
1852 Sir Edward Sabine announces that the 11 year sunspot cycle coincides with the geomagnetic cycle.

9 Thur 1959 NASA selects first seven astronauts.

Where did all these gadgets come from?!

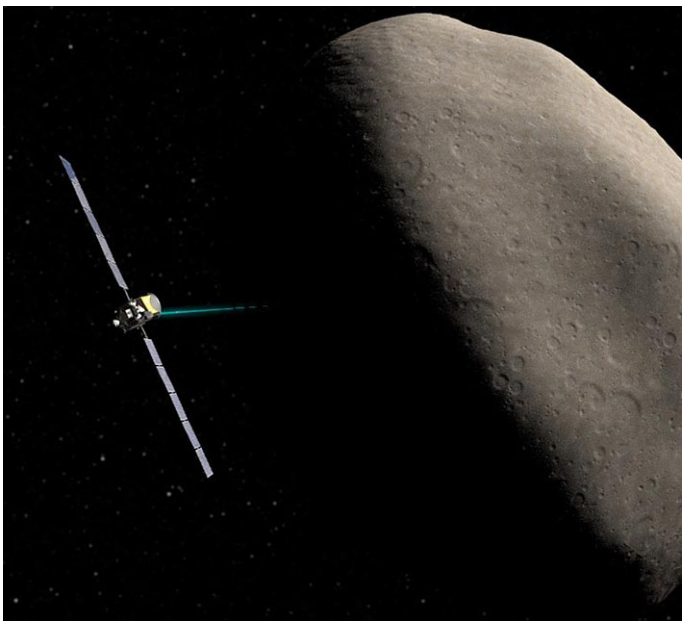
Ion propulsion. Artificial intelligence. Hyper-spectral imagers. It sounds like science fiction, but all these technologies are now flying around the solar system on real-life NASA missions.

How did they get there? Answer: the New Millennium Program (NMP). NMP is a special NASA program that flight tests wild and far-out technologies. And if they pass the test, they can be used on real space missions.

The list of probes that have benefited from technologies incubated by NMP reads like the Who's Who of cutting-edge space exploration: Spirit and Opportunity (the phenomenally successful rovers exploring Mars), the Spitzer Space Telescope, the New Horizons mission to Pluto, the Dawn asteroid-exploration mission, the comet-smashing probe Deep Impact, and others. Some missions were merely enhanced by NMP technologies; others would have been impossible without them.

"In order to assess the impact of NMP technologies, NASA has developed a scorecard to keep track of all the places our technologies are being used," says New Millennium Program manager Christopher Stevens of the Jet Propulsion Laboratory.

For example, ion propulsion technology flight-tested on the NMP mission Deep Space 1, launched in October 1998, is now flying aboard the Dawn mission. Dawn will be the first probe to orbit an asteroid (Vesta) and then travel to and orbit a dwarf planet (Ceres). The highly efficient ion engine is vital to the success of the 3 billion mile, 8 year journey. The mission could not have been flown using conventional chemical propulsion; launching the enormous amount of fuel required would have broken the project's budget. "Ion propulsion was the only practical way," says Stevens.



Dawn will be the first spacecraft to establish orbits around two separate target bodies during its mission—thanks to ion propulsion validated by Deep Space 1.

In total, 10 technologies tested by Deep Space 1 have been adopted by more than 20 robotic probes. One, the Small Deep Space Transponder, has become the standard system for Earth communications for all deep-space missions.

And Deep Space 1 is just one of NMP's missions. About a half-dozen others have flown or will fly, and their advanced technologies are only beginning to be adopted. That's because it takes years to design probes that use these technologies, but Stevens says experience shows that "if you validate experimental technologies in space, and reduce the risk of using them, missions will pick them up."

Stevens knew many of these technologies when they were just a glimmer in an engineer's eye. Now they're "all grown up" and flying around the solar system. It's enough to make a program manager proud!

The results of all NMP's technology validations are online and the list is impressive: nmp.nasa.gov/TECHNOLOGY/scorecard/scorecard_results.cfm. For kids, the rhyming storybook, "Professor Starr's Dream Trip: Or, How a Little Technology Goes a Long Way" at spaceplace.nasa.gov/en/kids/nmp/starr gives a scientist's perspective on the technology that makes possible the Dawn mission.

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*

April 6, 7:30 - 9:00 p.m.

What: *Habitable Worlds in the Universe: The Search Begins*
Who: Dr. Geoff Marcy (UC Berkeley)
Where: Morrison Planetarium, San Francisco
Cost: Adults $10, Seniors $8, Members $5
Reservations recommended-800-794-7576.

Science fiction assumes that our Milky Way Galaxy abounds with habitable planets populated by advanced civilizations engaged in interstellar commerce and conflict. Back in our real universe, Earth-like planets and alien life have proved elusive. Has science fiction led us astray? In 2009, astronomers will launch the first searches for Earth-like worlds around other stars, using bizarre, extreme telescopes for the task. These telescopes fundamentally supersede Galileo's historic little scope for the first time. A wild race for signs of inhabited worlds and extraterrestrial life is about to begin.

Tri-Valley Stargazers
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PRIMEFOCUS

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.