PRIMEFOCUS
Tri-Valley Stargazers

April 2007

Meeting Info:

What
NASA's Spaceward Bound

Who
Brian Day

When
April 20, 2007
Doors open 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

Inside

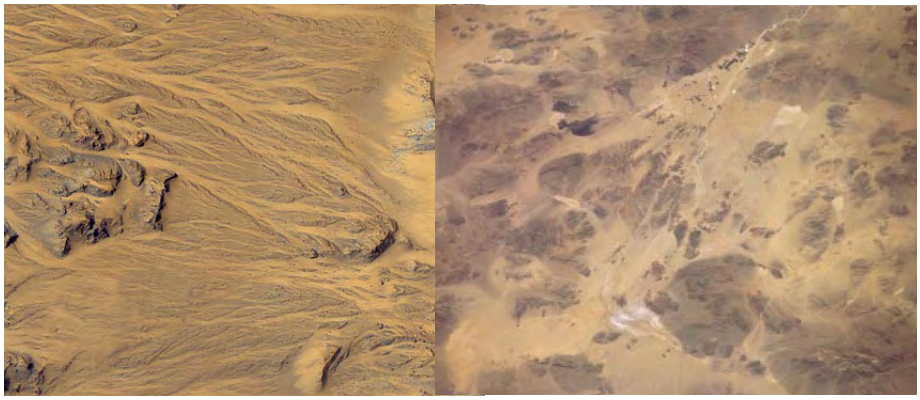
April Meeting

NASA's Spaceward Bound
Brian Day (NASA Ames)

NASA scientists are conducting field expeditions to some of the harshest environments on Earth. These locations have at least some factors in common with Martian environments such as extreme aridity, low temperatures, and/or high UV exposure. These expeditions allow researchers to study how life adapts to extreme conditions and to devise the tools and techniques that we will use in continuing our search for life on Mars.

Spaceward Bound has added an educational component to these expeditions. The focus of Spaceward Bound is to train the next generation of space explorers by allowing students and teachers to join researchers from around the world in NASA terrestrial-Mars analog studies. In June, 2006, seven middle school teachers from around the U.S. teamed with seven teachers from Antofagasta, Chile to work alongside scientists in exploration of the Mars-like soils in the Atacama Desert in Northern Chile. In March, 2007, 46 teachers joined over 35 researches in an expedition in the Mojave Desert. On both expeditions, participating teachers worked as part of the research teams being led by the scientists. Teachers collaborated with each other and NASA Education staff to develop strategies for integrating their experiences back into their classrooms. Spaceward Bound has also enabled students at the upper undergraduate and graduate level (including teachers) to participate as crew members in two-week long immersive full-scale simulations of living and working on the Moon and Mars at the Mars Desert Research Station (MDRS), established and operated by The Mars Society in Utah.

Brian will present an overview of Spaceward Bound's expeditions to Chile, the Mojave, and Utah, looking at what we are learning and how the next generation of space explorers is being trained.



Can you identify which picture is Mars, and which is Mojave?

Mojave is on the right.

News & Notes

Welcome

TVS welcomes our newest member—**Sridhar Ramanathan**.

2007 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 June 3rd deadline is for the June issue).

Lecture Meeting	Board Meeting	*Prime Focus* Deadline
Apr. 20	Apr. 23	Apr. 8
May 18	May 21	May 6
June 15	June 18	June 3

Money Matters

Treasurer **David Feindel** reports the TVS account balances (as of March 19, 2007):

Checking	$3,875.22	
CD #1	$3,605.29	matures 05/17/07
CD #2	$2,548.14	matures 05/27/07

Science Fun Fair Success

Once again, TVS members delighted many children and their families by showing fabulous views through our scopes at the Pleasanton School District's Science Fun Fair at the fairgrounds.

A big thank you for those who came out to help at the Science Fun Fair. **David Feindel** showed the crowds the Moon through his Stellarvue refractor. **David Woolsey** showed Saturn and Titan through his large Schmidt-Cassegrain. **Eric Dueltgen** helped me, Debbie, at the TVS table inside, answering all manner of questions and stamping countless cards. **Chuck Grant** had the view of the night—the Moon, Saturn, and Saturn's moon Titan all in the same field of view.

Carter is a Bruce

Congratulations to EAS President, and long-time TVS member, Carter Roberts on being this year's recipient of the G. Bruce Blair Award! The Bruce Blair is awarded by the Western Amateur Astronomers to an individual that has made outstanding contributions to amateur astronomy.

Carter was educated at UC Berkeley and San Jose State University. He has been employed by the U.S. Geological Survey since 1974 and is a geophysicist working with gravity and magnetic data.

He has been to 19 total solar eclipses and also specializes in astrophotography.

Carter and his dear friend Rachel.

He joined the Eastbay Astronomical Society in 1973 and became one of the volunteer instructors in the Telescope Makers Workshop. He has been Archivist for the society since the mid-1980s and was appointed the Historian for the Chabot Space & Science Center (CSSC). He was Astronomy Day Coordinator for the Astronomical Association of Northern California from 1985-1998, has been President of the EAS since 1988 and on the Board of the Riverside Telescope Makers Conference since 1998. He has been honored by Minor Planet (10683) Carter.

Appointed to the CSSC Board in 1994, he was very active in the Architecture Committee where he was the expert

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Newsletter header image: Black Holes

No, it's not a picture of CCD pixels gone bad. Each of those bright dots is a black hole. This image, made with data from NASA's Chandra X-ray Observatory, the Spitzer Space Telescope and ground-based optical telescopes, covers 9.3 square degrees of sky. It was taken in a region of the Boötes and involved 126 separate pointings of 5,000-second Chandra exposures each.

The black holes in the image are hundreds of millions to several billion times more massive than the sun and lie in the centers of galaxies between six to 11 billion light years from Earth. *Photo: NASA, CXC, CfA, R.Hickox et al.*

Calendar of Events

April 16, 7:30 p.m.

What: *From Dust to Dust: the Shrouds of Stellar Birth and Death*
Who: Dr. Peter Tuthill (Univ. of Sydney)
Where: Jewish Community Center, San Francisco
Cost: $4.00 at the door or by mail

The life cycle of most stars is bracketed at both ends by dust. From the spectacular flattened whirlpools feeding stellar births, to the dramatic plumes and shells cast by dying stars, new imaging technologies are delivering our first clear views into the crucibles of creation and destruction among the stars.

All programs begin at 7:30 pm in Kanbar Hall at the Jewish Community Center of San Francisco, 3200 California Street. Parking is available across the street in the UCSF Laurel Heights campus parking lot for $1.25 per night. Parking in the JCC garage is $1.25 per half-hour. For more information, call 415-321-8000.

April 21

What: *Astronomy Day*
Who: Everyone
Where: Everywhere
Cost: Varies

Saturday, April 21st, is the 34th annual Astronomy Day. There will be various events going on throughout the Bay Area including:

• Chabot Space & Science Center (www.chabotspace.org): From 11 a.m. to 5:00 p.m., learn how telescopes work, determine the relative temperature of the stars, and make a Solar System bracelet.

Enter a drawing to win a Meade ETX-80AT telescope and a grand prize state-of-the-art Meade 10" LX200R Smart-Mount Telescope.

• Cal State East Bay Hayward campus will have a free Science Festival from 11 a.m. to 4 p.m.

Eastbay Astro Society and Chabot Space & Science Center will add to the solar observing there (probably with Hydrogen Alpha), weather permitting. SOHO's outreach team is expected again, too. Lots of other shows with computing science, chemistry, biology, etc., for students of all ages.

• Foothill College in Los Altos: Public reopening of the Foothill College Observatory with its newly installed 16" robotic telescope.

• Astronomy Day is also "Cal Day" at UC Berkeley up at the Lawrence Hall of Science. There will be free admission as part of the Cal Day celebration. Events include:

What's Up in the Universe? at 1:15 or 3:15 p.m. Meet the director of this movie that blends science, art, and storytelling with interviews of explorers and scientists.

Geoff Marcy lecture following both showings.

Circus! Science Under the Big Top.

Five 30-minute planetarium shows starting at 12:45 p.m. (limited seating)

Meet friendly animals (Earth creatures) in Biology Lab, starting 1:30 p.m.

The Bay View Cafe will be open from 10 a.m. to 3 p.m.

Cal Day visitors get 10% off at the Discovery Corner Store on all items beginning with a B (for Berkeley!).

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on the new Chabot site. He had made the first map of the site in 1982, did extensive mapping of trees and endangered Alameda Manzanita in 1995-6, helped with site testing and positioning the telescopes on the site. He has been very active in outreach programs for CSSC starting with the Festival at the Lake from 1989-1997 and the Chinatown StreetFest from 1993 to present.

He extensively photographed the construction of CSSC and has taken many photographs since for marketing purposes. He was also one of the most active members of the "Rachel Restoration Team" helping paint the telescopes and clean Rachel's lenses in 1988-9 and restoring the three original Chabot Observatory telescopes and two clocks in 1999-2001.

White Mountain & Yosemite Trips

The dates for this year's White Mountain/Barcroft and Yosemite trips have been announced.

TVS's stint at Yosemite is on Labor Day weekend (August 31st through September 2nd). In exchange for putting on a public star party for park visitors at Glacier Point, members get free park entrance and camping at the Bridalveil Campground. Plus, after the public viewing has ended, members can continue to observe until the sun comes up.

The White Mountain/Barcroft trip follows right after, from September 4th through the 15th, with a final departure date of the 16th. Barcroft is a high altitude research station located at 12,400' elevation.

Attendees can choose how many days they would like to stay at Barcroft. The cost is $63 per person per day, which includes a bunk bed in a dormitory setting, very good food, and very dark skies.

If you are interested in either excursion, contact trip coordinator **Dave Rodrigues** at 510-483-9191.

NGC2174 and IC443. Photo taken with a 200mm f4 Pentax and ST10XME camera. 1x1 -20C, 16x5 min (HRGB) *Photo: Gert Gottschalk*

H2O Open House

After much debate regarding best Sun setting and Moon rising times, the Board has picked the dates for this year's club observatory open houses—Saturday, June 8th and Saturday, July 7th. Our back up date, should bad weather cancel one of the dates, is Saturday, October 6th.

The meeting place and time for the caravan of cars to the site is at the corner of Mines & Tesla, usually about an hour and a half before sunset. This is to give us time to drive to the site and set up scopes before the sun sets. There is a $3 per car entrance fee (exact change).

For those of you who are unfamiliar with the site, there is no electricity and no running water. The only amenities are dark skies, a large scope, and pit toilets. You'll need to bring whatever food and drink you'll need to sustain you through the evening.

Before and After: Above, Nellie's primary mirror is showing signs of oxidization and dust. Right, the mirror just after getting its new coatings. What a difference a vacuum chamber and some aluminum can make!

Nellie Gets a Face Lift

Nellie, Chabot Space & Science Center's 36-inch Classic Cassegrain telescope, is getting a makeover of sorts. The mirrors (primary and secondary) were removed and have just come back from being realuminized and recoated at UC Santa Cruz. The tube assembly is also getting a little work done—ventilation holes have been drilled and fans will be installed. The whole assembly will be reinstalled in the next couple of weeks, so if all goes well she'll be back on line by the end of April.

Nellie is the largest of the three Chabot scopes. Rachel is a 1915 20-inch refractor (with lens by John Brashear and mount by Warner & Swasey). Leah, an 8-inch refractor, is the original Chabot scope, purchased new in 1883 from Alvan Clark & Sons. All three telescopes are open to the public for viewing on Friday & Saturday nights (weather permitting) for FREE. Occasionally the facility is closed for a private event, so check the Chabot web site for the latest information: www.chabotspace.org.

Calendar of Events *continued*

Finally, on the plaza outside LHS from 9 to 11 p.m., stargazing.

There are other events going on in the Bay Area. Check out the AANC's web site for more locations—http://www.aanc-astronomy.org/AstroDay.html.

April 21, 8:00 p.m.
What: *Climate Change: Observational Evidence, the Role of Humans and Societal Impacts*
Who: Dr. Philip Duffy (Lawrence Livermore Lab)
Where: Mt. Tam Mt. Theater
Cost: Free

An overview of scientific evidence for global warning and for a human role in this process, followed by a discussion of possible consequences for society.

All talks are free and open to the general public. The program is in the Mt. Theater and is followed by observing in the Rock Spring Parking Area.

Please car pool if possible, dress warmly and bring a flashlight. If the weather is questionable on the program date, call the hotline at 415-455-5715. It will be updated after 3:00 p.m. For more info visit www.mttam.net.

April 27, 8:00 - 11:00 p.m.
What: *Lunar Lounge Express Yuri's Night*
Who: The Variable Stars & You
Where: Chabot Space & Science Center, Oakland
Cost: Lunar Lounge: $15 Adult, $10 Student, $8 Member
Lunar Lounge + Mission: $23 Adult, $18 Student, $16 Member.
Space is limited! Call the Box Office at 510-336-7373 for reservations.

Celebrate the first human space flight and come party under the stars at Chabot's monthly nocturnal celebration.

The Lunar Lounge Express
Featuring live music, refreshments, activities and fun! The Lunar Lounge Express gives you full access to the Chabot Space & Science Center's interactive exhibits and includes the Planetarium program SonicVision (a new alternative music show), as well as telescope viewing at the Observatory Complex.

You can purchase food from the Celestial Café, and enjoy $3 micro-brews from Buffalo Bill's Brewery and $3 wine from the cash bar.

Musical entertainment is by *The Variable Stars*. Belle & Sebastian meet the Smiths. Poppy and catchy indie rock.

For an additional $8 you can add a Space Mission!

Comet Collision
Don't miss your chance to embark on a daring exploration of comets aboard the C.L.C. Spacecraft! The mission's objective is to plot a course to rendezvous with a comet and launch a probe to collect scientific data. Drinks will be served during the mission briefing. To complete your mission, your team of astronauts must overcome any unforeseen challenges and unexpected emergencies.

The Leo Triplet: M65, M66, and NGC3628 imaged with a Takahashi FS-102 and an ST-2000XM CCD. The total exposure time was 10 hours on the nights of 16-17 March 2007 (LRGB, 2.5 hours each, 1x1 bin). *Photo: Ken Sperber*

The Mission lasts for one hour.

April 28, 11:00 a.m. - 4:00 p.m.
What: *Celebrate Yuri's Day*
Who: The Variable Stars & You
Where: Chabot Space & Science Center, Oakland
Cost: General Admission

Celebrate the anniversary of the first human space flight at Chabot! You'll get full access to Chabot Space & Science Center interactive exhibits and telescopes. Hear a recording of the transmission of the first human space flight. View an actual Russian spacesuit. There will be hands-on activities throughout the day.

May 5, 9:30 a.m.
What: *NCHALADA LXXX*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: Free

After coffee and puns at the 9:30, the morning session, *Perceived Threats from Space*, will start at 10:00, chaired by John Westfall. The afternoon topic, *Dutch Astronomers*, will be chaired by Bruce R. Mehlman.

NCHALADA (Northern California Historical Astronomy Luncheon and Discussion Association) meets several times a year at the Chabot. The meeting is divided up with morning and an afternoon discussions of two topics related to the history of astronomy. Between the two sessions,

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What's Up *by Debbie Dyke*

All times Pacific Daylight Time.

April

10 Tue **Last Quarter Moon**. 11:04 p.m.

11 Wed Tonight and tomorrow night the Pleiades star cluster will be 3° north of Venus in the early evening western sky.

13 Fri Mars will be 6.5° east of the Moon low in the southeastern sky. 6:00 a.m.

16 Mon Moon at perigee (closest point to the Earth) - 221,424 miles. Expect large tides. 11:00 p.m.

17 Tue **New Moon**. 4:36 a.m.

19 Thur Venus at perihelion.
The thin crescent Moon is just 4° north of Venus in the early evening.

20 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
1972 Apollo 16 lands on the Moon at Descartes.

21 Sat **National Astronomy Day.**

22 Sun **Tri-Valley Stargazers discussion meeting**. 2:00 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
Earth Day.
Lyrid meteors peak. 3:00 p.m.

23 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
First Quarter Moon. 11:36 p.m. The Moon is 5° from M44 (The Beehive Cluster) in the evening.

24 Tue Saturn 3.5° south of the Moon in the evening.

25 Wed Regulus 2.5° from the Moon. 9:00 p.m.
1990 Hubble Space Telescope deployed from shuttle Discovery.

26 Thur 1514 Copernicus makes his first observations of Saturn.

27 Fri 4977 B.C. According to Kepler, the Creation occurs on this date.

28 Sat Mars is less than 1° south from Uranus low in the early morning eastern sky. Phi Aquarii stands between the two of them.

30 Mon Moon at apogee (251,849 miles). 4:00 a.m.

May

1 Tue 1006 A supernova in Lupus is discovered by Ali ibn Ridwan, with the Japanese, Chinese, and a Swiss monk also recording the event.

2 Wed **Full Moon**. 3:09 a.m.
Mercury in superior conjunction. 9:00 p.m.

3 Thur 1661 Johannes Hevelius observes the 3rd transit of Mercury ever to be seen.
1715 Edmund Halley observes "Baily's Beads" total solar eclipse phenomenon.

4 Fri Eta Aquarid meteors peak. 4:00 a.m.

5 Sat Jupiter 6° north of the Moon. 4:00 a.m.
1961 Alan Shepard becomes the first American in space with a 15 minute ride on Freedom 7. He was paid $14.38.

9 Wed **Last Quarter Moon**. 9:27 p.m.

10 Thur 1969 Apollo 10 crew transmit the first color pictures of the Earth from space.

13 Sun Mother's Day.

Early Bird Gets the Worm or Black Hole Breakfast

by Dr. Tony Phillips

We all know that birds eat worms. Every day, millions of birds eat millions of worms. It's going on all around you! But how often have you awakened in the morning, stalked out in the dewy grass, and actually seen a bird having breakfast? Even though we know it happens all the time, a bird gulping a worm is a rare sight.

Just like a black hole gulping a star…

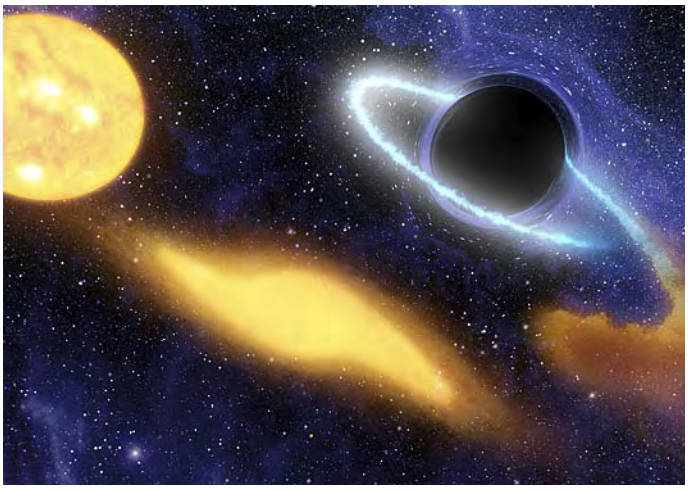
Every day in the Universe, millions of stars fall into millions of black holes. And that's bad news for the stars. Black holes exert terrible tides, and stars that come too close are literally ripped apart as they fall into the gullet of the monster. A long burp of X-rays and ultraviolet radiation signals the meal for all to see.

Yet astronomers rarely catch a black hole in the act. "It's like the problem of the bird and the worm," says astronomer Christopher Martin of Caltech. "You have to be in the right place at the right time, looking in the right direction and paying attention."

A great place to look is deep in the cores of galaxies. Most galaxies have massive black holes sitting in their pinwheel centers, with dense swarms of stars all around. An occasional meal is inevitable.

A group of astronomers led by Suvi Gezari of Caltech recently surveyed more than 10,000 galactic cores—and they caught one! In a distant, unnamed elliptical galaxy, a star fell into a central black hole and "burped" a blast of ultraviolet radiation.

"We detected the blast using the Galaxy Evolution Explorer (GALEX), an ultraviolet space telescope," explains Gezari. Her team reported the observation in the December 2006 issue of The Astrophysical Journal Letters. "Other telescopes have seen black holes devouring stars before," she adds, "but this is the first time we have been able to watch the process from beginning to end."



In this artist's concept, a giant black hole is caught devouring a star that ventured too close.

The meal began about two years ago. After the initial blast, radiation diminished as the black hole slowly consumed the star. GALEX has monitored the process throughout. Additional data from the Chandra X-ray Observatory, the Canada-France-Hawaii Telescope and the Keck Telescope in Hawaii helped Gezari's team chronicle the event in multiple wavelengths

Studying the process in its entirety "helps us understand how black holes feed and grow in their host galaxies," notes Martin.

One down, millions to go.

"Now that we know we can observe these events with ultraviolet light," says Gezari, "we've got a new tool for finding more."

For more on this and other findings of GALEX, see www.galex.caltech.edu. For help explaining black holes to kids, visit The Space Place at spaceplace.nasa.gov.

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*

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. Anyone who is interested is invited to attend the meetings.

May 7, 7:30 p.m.

What: *The Day the Sun Blew Up*
Who: Dr. Sten Odenwald (NASA Goddard Space Flight Center)
Where: Jewish Community Center, San Francisco
Cost: $4.00 at the door or by mail

In 1859, the biggest solar storm in recorded history rocked the Sun, causing major worldwide disruptions of telegraph service and reports of fires in every major city on Earth. What will happen when such a 'superstorm' comes again? This talk will explore the possible human and technology impacts of the next solar superstorm.

All programs begin at 7:30 pm in Kanbar Hall at the Jewish Community Center of San Francisco, 3200 California Street. Parking is available across the street in the UCSF Laurel Heights campus parking lot for $1.25 per night. Parking in the JCC garage is $1.25 per half-hour. For more information, call 415-321-8000.

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

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.
_____ $32.95 One year subscription to *Sky & Telescope* magazine.
_____ $34 One year subscription to *Astronomy* magazine.
_____ $60 Two year subscription to *Astronomy* magazine.
_____ $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.
$_____ 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.