

PRIMEFOCUS

Tri-Valley Stargazers



January 2011



Meeting Info:

What: Conversation, ...

Who: TVS Members

When:

January 21, 2011

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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January Meeting

Conversation, ...

As of this writing (Tuesday, January 18), we do not have a speaker for this month's meeting. If we find a speaker the announcement will go out via the TVS Yahoo User's Group, and it will be posted on the website (time permitting). Some of the calendar announcements are out of date, since I held off submitting the newsletter for web-posting in the hope that a speaker would be found.

Numerous suggestions have been made for the meeting, including taking the opportunity to better get to know your fellow club members, chatting about all things astronomical, presenting new astronomy toys that you may have received as a holiday gift, or perhaps we will show an astronomy related DVD from the club library.

If anyone has suggestions for future speakers, please contact Jim Alves.

Dues Are Due

TVS' membership year runs from January to December, so now is the time to renew your membership. Our membership rates remain unchanged from last year, as do the subscription rates for *Astronomy* and *Sky & Telescope*. We no longer offer the "Regular" membership level since we do not send out printed copies of the newsletter. Rather, at the "Basic" membership level we contact you via email to let you know that a .pdf of the newsletter is available. The renewal form can be found on the back of this newsletter or on our website under the Membership link. Please send in your renewal today.



The Mercury and Gemini capsules that Gordon Cooper flew into space are on exhibit at the Johnson Space Center, Houston, TX. What fascinated me was the erosion pattern of the ablative heat shield that protected the astronauts from the fiery reentry into Earth's atmosphere. See page 2 for more info on the Johnson Space Center. Photo Credits: Ken Sperber

News & Notes

2011 TVS Meeting Dates

The following lists the TVS meeting dates for 2011. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting.

Lecture Meeting	Board Meeting	Prime Focus Deadline
Jan. 21	Jan. 24	
Feb. 18	Feb. 21	Jan. 29
Mar. 18	Mar. 21	Feb. 25
Apr. 15	Apr. 18	Mar. 25
May 20	May 23	Apr. 29
Jun. 17	Jun. 20	May 27
Jul. 15	Jul. 18	Jun. 24
Aug. 19	Aug. 22	Jul. 29
Sep. 16	Sep. 19	Aug. 26
Oct. 21	Oct. 24	Sep. 30
Nov. 18	Nov. 21	Oct. 28
Dec. 16	Dec. 19	Nov. 25

Money Matters

Treasurer David Feindel indicates that as of the October 18, 2010 the TVS account balances are:

Checking	\$4,638.17	
CD #1	\$3,762.36	rolled over 8/17/2010
CD #2	\$2,655.68	rolled over 8/27/2010

TVS Positions Available

We still need people to fill the positions of Vice-President and Secretary, and to serve on the Board of Directors. Please consider offering some of your time to influence the future direction of TVS. If you wish to help with any of these positions, please contact any officer or board member.

RASC Handbooks and Calendars Available

David Feindel has Royal Astronomical Society of Canada (RASC) Handbooks and Calendars for purchase. The pricing is the same as last year--\$22 for the Handbook, \$15 for the Calendar. Pictures of them are available on the www.rasc.ca website.

Mission (Control) Update by Ken Sperber

In late December, Karen and I took a trip to the Johnson Space Center for the "Level 9 Tour," which gives access to facilities that are normally not accessible to the general public. The tour is limited to 12 people per day, and lasts about 5 hours. Among the highlights were (1) the historic Apollo Mission Control (where you can sit at the consoles) and the shuttle and ISS mission control rooms, (2) the vehicle mock-up training facility, where we saw numerous shuttle mock-ups (see

image below) used for astronaut training, as well as futuristic manned and unmanned vehicles for surface operations on the Moon and/or Mars (see Robonaut image below), (3) Ellington Airport, where, from the tarmac, we saw the arrival of a T38 jet piloted by an astronaut, and (4) a guided tour of Rocket Park (otherwise open to the public; see image below which shows a Mercury Redstone and an F-1 engine from a Saturn V). Unfortunately, the neutral buoyancy lab was closed.



The Level-9 tour also included free entry to Space Center Houston the next day, which is a treasure-trove of space history and artifacts, including capsules that flew in space from the Mercury, Gemini, and Apollo programs, spacesuits from all eras of space travel, flight simulators (I successfully landed the shuttle two out of four tries), a tourable shuttle cockpit and mid-deck, and numerous movies. What a great birthday present it was!!!

For more information see: <http://spacecenter.org/Level9Tour.html>

Header Image: Five F-1 engines of the first stage of the fully-restored Saturn V rocket on display at Rocket Park, Houston, TX. See p. 6 for a photo of the Saturn V. Photo credit: Ken Sperber.

Calendar of Events

January 17, 7:30 pm

What: The Origin of Elements in Massive Stars that go Supernova
Who: Dr. Wick Haxton, UC Berkeley
Where: California Academy of Science, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA
Cost: Adults \$12, Seniors \$10, Academy members \$6. Reserve a Space Online or call 800-794-7576

See <http://www.calacademy.org/events/lectures/> for more information.

January 18, 12:00 - 1:00 pm

What: Near Earth Asteroids as Targets for Human and Robotic Exploration
Who: David Morrison, Director of the Carl Sagan Center for Life in the Universe, SETI Institute
Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

Near-Earth Asteroids (NEAs) are both enemies (that can collide with our planet) and friends (future targets for human exploration missions). As the Spaceguard Survey nears its goal of finding 90% of NEAs larger than 1 km, public and government interest turns to the much more numerous sub-kilometer NEAs. These small asteroids are the most likely to hit Earth and are also the designated NASA target for astronaut visits in the late 2020s. This talk addresses our knowledge (and ignorance) of the physical properties of the sub-km NEAs and discusses proposed space missions to reconnoiter these targets.

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

January 18, 7:30 pm

What: New Horizons: NASA's Historic Mission to the Pluto System and Beyond
Who: Alan Stern, Southwest Research Institute
Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

In 2006 NASA launched a sophisticated robotic explorer to make the first reconnaissance of planet Pluto and its moons, three billion miles from the Sun. That spacecraft is called New Horizons. The principal investigator of New Horizons, Dr. Alan Stern, will describe the mission, it's full objectives, and will describe the new class of planets that Pluto represents.

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

January 19, 7:00 pm

What: How I Killed Pluto and Why It Had it Coming!
Who: Dr. Michael Brown, California Institute of Technology
Where: Foothill College, Smithwick Theater, El Monte Road and Freeway 280, in Los Altos Hills, CA
Cost: Free, \$2 parking (bring change for meters)

The controversial "demotion" of Pluto was mainly the result of discoveries by a team of astronomers led by Michael Brown. In this talk, Dr. Brown will share the inside story of how he discovered "other Pluto's" out there beyond Neptune, including Eris, larger than Pluto, which he later named for the goddess of discord. Because, as he'll describe with his characteristic humor, its discovery resulted in a private and public controversy which led to the redefinition of what a planet is. Dr. Brown has written a popular-level memoir, "How I Killed

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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.



Konrad Thürmer took these images of the 20-21 December 2010 Lunar Eclipse from the parking lot of the Livermore Library. He used a Canon full-frame DSLR attached to a Celestron CPC800 with focal reducer (1280mm f/6.3). This was the first time he used this camera for night sky imaging!

Pluto and Why It Had It Coming,” and he will be signing books after the lecture.

See <http://www.foothill.edu/ast/SVL.htm> for more information, or call (650) 949-7888.

January 22, 1pm and 3pm

What: Challenger Commemoration
 Who: You (ages 8 and up)
 Where: Chabot Space & Science Center, 10000 Skyline Boulevard, Oakland
 Cost: Guests: \$10 + General Admission, Members: \$10; Register: (510) 336-7373.

January 28th marks the 25th anniversary of the 1986 Challenger shuttle tragedy. Join us as we remember the event with public missions, tours of the Challenger Learning Center,[®] and a short presentation in the briefing room. Visit the CLC to let your voices be heard.

*Center-wide moment of silence in memoriam at 1pm.

January 26, 12:00 - 1:00 pm

What: Geophysical evidence for an ocean on Titan
 Who: Francis Nimmo, UC Santa Cruz
 Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
 Cost: Free

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Calendar of Events (continued)

Whether or not Titan currently possesses a subsurface ocean is crucial for understanding its long-term evolution. In this talk Prof. Nimmo will present two lines of evidence suggesting the existence of a subsurface ocean, probably ammonia-rich.

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

January 31, 8:00 pm

What: The Hidden Reality – The Fabric of The Cosmos
Who: Brian Greene (Columbia University): In Conversation With Michael Krasny
Where: Herbst Theatre, 401 Van Ness Avenue, San Francisco, CA 94102
Cost: Adults \$20, Academy members \$18.
Reserve a seat online (www.cityboxoffice.com/) or call 415-392-4400

The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos is the latest book from the best-selling author of The Elegant Universe and The Fabric of the Cosmos. In recent years, a growing body of work—based on the principles of quantum mechanics, cosmology, and string theory—has been steadily converging around a proposal that our universe is actually only one of many universes. In fact, research supports a number of different models of parallel universes in which our world appears: for instance, as one of many “bubbles” in a rapidly growing bath of universes, or as one of numerous cosmic slabs separated from one another through additional spatial dimensions. Brian Greene, with his trademark impartiality, crystal-clear prose, and inspired use of analogy, opens up the strange worlds of the “multiverse,” taking us on a journey grounded firmly in science, and limited only by our imaginations.

February 2, 12:00 - 1:00 pm

What: Cracking under the stress: Europa’s orbit, tides, and fracture systems
Who: Alyssa Rhoden, UC Berkeley
Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

February 2, 7:30 pm

What: Cracking under the stress: Europa’s orbit, tides, and fracture systems
Who: Timothy Ferris
Where: Bankhead Theater, 2400 First st., Livermore, CA
Cost: \$30

Award-winning author Timothy Ferris makes a passionate

case for science as the inspiration behind the rise of liberalism and democracy. Ferris argues that the scientific revolution rescued billions from poverty, fear, hunger, and disease and the values that inspired has dramatically increased the number of persons living in free and democratic societies.

For more information see <http://www.livermoreperformingarts.org/bankheadtheater/speakers.html#MoreTimothyFerris>

February 9, 12:00 - 1:00 pm

What: TEGA and the search for habitable conditions at the Phoenix landing site
Who: Aaron Zent, Ames Research Center
Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

February 16, 12:00 - 1:00 pm

What: Science Fiction as a bridge between Future Societies and the Contemporary Russian and American Cultures
Who: Larisa Mikhaylova, Lomonosov Moscow State University
Where: New SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

Dr. Mikhaylova will discuss images from science fiction literature and films which have addressed human interaction in space (created by Frederick Pohl, Ivan Yefremov, Arthur C. Clarke, in Star Trek, Avatar, etc.). Is international cooperation essential for humans to move into the Universe – or not? Has the time arrived to build burgers on Mars? Dr. Mikhaylova will discuss the results of recent internet contests of SF about space in Russia and the ‘Back to the Future’ contest conducted by NASA. Ethical aspects of space exploration are manifold, and there is hope that looking at human conflicts from an extraterrestrial angle still may help to solve pressing problems today and create a livable future.

For more information see <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

What's Up by Ken Sperber (adapted from The Year in Space)

All times Pacific Standard, unless otherwise noted.

January

- 19 Wed Full Moon (1:21pm)
- 25 Tue The Moon, Saturn, and Algol form a triangle (predawn)
- 26 Wed Last-Quarter Moon (4:57am)

February

- 1 Tue Mercury 4 degrees south of the Moon (predawn)
- 2 Wed New Moon (6:31pm)
- 4 Fri Mars in conjunction with the Sun (not visible)
- 6 Sun Uranus 6 degrees south of the Moon (evening)
- 7 Mon Jupiter 7 degrees south of the Moon (evening)
- 10 Thu First-Quarter Moon (11:18pm)
- 17 Thu Neptune in conjunction with the Sun (not visible)
- 18 Fri Full Moon (12:36am)
- 21 Mon Saturn 7 degrees north of the Moon
- 24 Thu Last-Quarter Moon (3:26pm)



Caption: The massive Saturn V is nestled inside of its new climate controlled home at Rocket Park, Houston. The Saturn V is 363 feet in length, and the five F-1 engines of the first stage generated about 7.5 million pounds of thrust at launch. At launch, the vehicle weighed about 6.7 million pounds, of which over 90% was fuel. The first stage, powered by RP-1 Kerosene and liquid oxygen, operated for about 2 minutes 40 seconds, carrying the vehicle to an altitude of ~42 miles and a speed of ~5300 mph. The second and third stages consisted of five and one J-2 engine(s), respectively, and they were powered by liquid hydrogen and liquid oxygen. The J-2 was the first restartable rocket engine. The third stage J-2 provided the remaining power necessary to put the vehicle in Earth orbit. It was later fired for about 6 minutes to send the Command/Service Module and the LM to the Moon. For more information see Wikipedia. Photo Credit: Karen Harris

Astronomers Stumble onto Huge Space Molecules

By Trudy E. Bell and Tony Phillips

Deep in interstellar space, in a the swirling gaseous envelope of a planetary nebula, hosts of carbon atoms have joined together to form large three-dimensional molecules of a special type previously seen only on Earth. Astronomers discovered them almost accidentally using NASA's Spitzer Space Telescope.

"They are the largest molecules known in space," declared Jan Cami of the University of Western Ontario, lead author of a paper with three colleagues published in Science online on July 22, 2010, and in print on September 3.

Not only are the molecules big: they are of a special class of carbon molecules known as "fullerenes" because their structure resembles the geodesic domes popularized by architect Buckminster Fuller. Spitzer found evidence of two types of fullerenes. The smaller type, nicknamed the "buckyball," is chemical formula C₆₀, made of 60 carbon atoms joined in a series of hexagons and pentagons to form a spherical closed cage exactly like a black-and-white soccer ball. Spitzer also found a larger fullerene, chemical formula C₇₀, consisting of 70 carbon atoms in an elongated closed cage more resembling an oval rugby ball.

Neither type of fullerene is rigid; instead, their carbon atoms vibrate in and out, rather like the surface of a large soap bubble changes shape as it floats through the air. "Those vibrations correspond to wavelengths of infrared light emitted or absorbed—and that infrared emission is what Spitzer recorded," Cami explained.

Although fullerenes have been sought in space for the last 25 years, ever since they were first identified in the laboratory, the astronomers practically stumbled into the discovery. Co-author Jeronimo Bernard-Salas of Cornell University, an expert in gas and dust in planetary nebulae, was doing routine research with Spitzer's infrared observations of planetary nebulae with its spectroscopy instrument. When he studied the spectrum (infrared signature) of a dim planetary nebula called Tc 1 in the southern-hemisphere constellation of Ara, he noticed several clear peaks he had not seen before in the spectra of other planetary nebulae.

"When he came to me," recounted Cami, an astrophysicist who specializes in molecular chemistry, "I immediately and intuitively knew it I was looking at buckyballs in space. I've never been that excited!" The authors confirmed his hunch by carefully comparing the Tc 1 spectrum to laboratory experiments described in the literature.

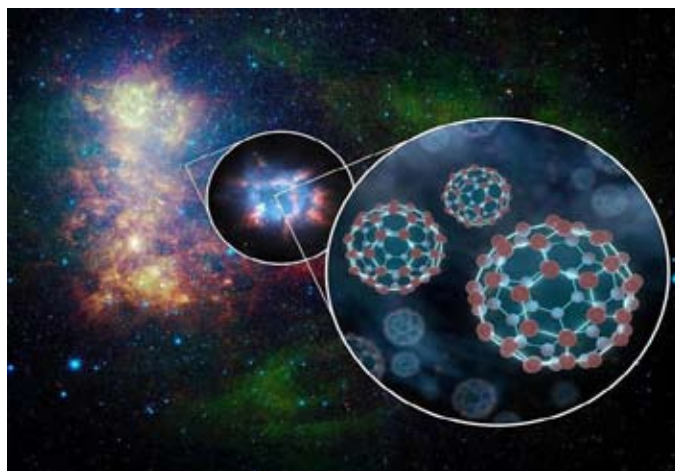
"This discovery shows that it is possible—even easy—for complex carbonaceous molecules to form spontaneously

in space," Cami said. "Now that we know fullerenes are out there, we can figure out their roles in the physics and chemistry of deep space. Who knows what other complex chemical compounds exist—maybe even some relevant to the formation of life in the universe!"

Stay tuned!

Learn more about this discovery at <http://www.spitzer.caltech.edu>. For kids, there are lots of beautiful Spitzer images to match up in the Spitzer Concentration game at <http://spaceplace.nasa.gov/en/kids/spitzer/concentration>.

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



Caption: Superimposed on a Spitzer infrared photo of the Small Magellanic Cloud is an artist's illustration depicting a magnified view of a planetary nebula and an even further magnified view of buckyballs, which consist of 60 carbon atoms arranged like soccer balls.

Tri-Valley Stargazers
P.O. Box 2476
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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.
 - _____ \$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.