

universe

J e t P r o p u l s i o n L a b o r a t o r y

I n s i d e

May 7, 2004
Volume 34 Number 9

News Briefs	2	Open House	3
Special Events Calendar	2	Passings, Letters	4
Hall of Fame Honorees	2	Retirees, Classifieds	4

Rovers roll in extended mission

By Guy Webster

Image mosaic from Opportunity's panoramic camera from approximately 70 meters (about 230 feet) from the rim of "Endurance Crater" on the rover's 93rd sol on Mars, in late April. The foreground highlights the now-familiar ripples and dimples, common on the plains of Meridiani Planum.

Both of JPL's Mars Exploration Rovers have completed their originally planned mission and are tackling extra-credit assignments.

"Spirit and Opportunity have completed all the primary objectives of the mission," said Orlando Figueroa, director of the Mars Exploration Program at NASA Headquarters. "The terrific success achieved is a tribute to a superb team whose commitment to excellence, and keeping the public engaged, is hard to match."

Opportunity finished its 90th martian day of surface operations on April 26. That was the last of several criteria set in advance for full mission success. Spirit passed its 90-day mark on April 5. Both rovers have met all goals for numbers of locations examined in detail, distances traveled, and scientific measurements with all instruments. Both rovers are healthy. In early April, NASA approved funding for extending operation of Spirit and Opportunity through September.

"This brings Opportunity's primary mission at Meridiani Planum to a resounding and successful close. It's stunning to think through the short history of this vehicle," said Matt Wallace, Opportunity mission manager at JPL, where rover assembly began barely two years ago. In its three-month primary mission, Opportunity drove 811 meters (more than half a mile) and sent home 15.2 gigabits of data about Mars, including 12,429 images.

Opportunity found other rock exposures in late April similar to the ones near its landing site that yielded evidence for a body of salty water covering the area long ago. Instead of spending many days to examine those rocks, controllers told the rover to go to the rim of a 130-meter-wide (approximately 430-foot-wide) crater informally named "Endurance."

When Opportunity sends home a view into Endurance Crater, scientists and engineers will begin deciding whether the rover should try to enter that crater. "We're coming up on a major branch point in the mission," said Dr. Scott McLennan of the State University of New York, Stony Brook, a member of the rovers' science team. "Can we get down into Endurance? Can we get back out?"

In mid-April, Opportunity paused beside a crater dubbed "Fram," less than one-tenth the size of Endurance Crater. It examined a rock

studded with small, iron-rich spherules that are one part of the evidence for past water in the region. The rover used its rock abrasion tool to grind a hole. This allowed examination of the interior of the rock, called "Pilbara."

McLennan said, "Pilbara is a dead ringer for McKittrick," a rock target in the outcrop Opportunity examined in February and March. Another rock at Fram showed hints that it might provide the best-yet evidence about how minerals precipitated out of solution as the ancient body of water evaporated. "It's something that would be of interest to come back and study more if we don't see something of even greater interest along our way," he said. Images of Endurance Crater from a distance seem to show much thicker layers of outcrop than Opportunity has been able to reach so far.

Improvement to the rovers' mobility from new software has expanded options for planning their explorations. Spirit and Opportunity drove farther in April than in the previous three months combined. As of the end of April, Spirit has traveled more than 1.2 kilometers (three-fourths of a mile), and has another 1.8 kilometers (more than a mile) to go before reaching highlands informally named "Columbia Hills." Scientists hope to examine rock layers older than the volcanic plain Spirit has been crossing. In late April, Spirit crossed from an area dominated by material dispersed by crater-forming impacts into an area with fewer rocks.

"We are transitioning into a geologically different region. Nothing could be more striking evidence of this than the view ahead of a landscape that has fewer and smaller rocks than the region explored so far," said Dr. Dave Des Marais, a rover science team member from NASA Ames Research Center, Moffett Field, Calif. Scientists are using Spirit's observations at ground level to check ideas about the region's geology based on observations from orbiting spacecraft. That could improve interpretation of orbital data for the whole planet. Spirit will systematically survey the soils, rocks and other features on the plain as it continues toward Columbia Hills, with arrival planned for mid to late June.



Kids have their day

About 650 children of JPL staff came out to the Laboratory for "Take Our Daughters and Sons to Work Day" on April 22. JPL photographer Tom Wynne's daughter, Alice, took her turn with the camera and caught youngsters enjoying a rover prototype rolling over them (below). She also captured a group (above right) enjoying the von Kármán visitor center museum. Meanwhile, dad Tom took an image of Kevin Criddle of Section 312B and his daughter Sandra. Criddle stood in for the Cassini solar blanket in Richard Shope's pantomime demonstration.



Photo by Alice Wynne

Photo by Alice Wynne

Tom Wynne / JPL Photolab

News Briefs

Beck video takes NASA award

Producer JOHN BECK of JPL's Media Relations Office recently earned honors in NASA's Videographer of the Year awards.

Beck's production "Six Minutes of Terror," which depicted the Mars Exploration Rovers' entry, descent and landing phase using a fast-paced mix of project personnel describing the action along with animation, won first place in the "Public Affairs Office" category.

Award judges included Academy Award-winning editor Dan Hanley. The winners were announced at an April meeting of the National Association of Broadcasters Media Show in Las Vegas. Other categories that were recognized were Production and Documentation.

The video is available online at <http://marsrovers.jpl.nasa.gov/gallery/video/challenges.html>. Check under the heading "Entry, Descent and Landing."



John Beck captured first-place honors for his video.

Published paper probes pulsar pair

The only known gravitationally bound pair of pulsars—extremely dense, spinning stars that beam radio waves—may be pirouetting around each other in an intricate dance.

"Pulsars are intriguing and puzzling objects. They pack as much mass as the Sun crammed into an object with a cross-sectional area about as large as Boston," said FREDRICK JENET of JPL. Jenet and SCOTT RANSOM of McGill University in Montreal have developed a theoretical model to explain the behavior of this one-of-a-kind set of pulsars.

"The physics of radio pulsar emission has eluded researchers for more than three decades," Jenet said. "This system may be the 'Rosetta Stone' of radio pulsars, and this model is one step toward its translation."

The research appears in the April 29 issue of the journal *Nature*. Jenet and Ransom studied the recently-discovered double pulsar system, in which two spinning pulsars orbit each other.

The discovery of the two-star system, officially named PSR J0737-3039B, was announced in 2003 by a multinational team of researchers from Italy, Australia, the United Kingdom and the United States. Those researchers proposed that the duo contained one spinning pulsar and a neutron star.

Later in 2003, scientists working at the Parkes Observatory in New South Wales, Australia, determined that both stars are actually pulsars. This discovery marked the first known example of a "binary," or double, pulsar system. The stars are referred to as A and B.

Pulsars emit high-intensity radio radiation into a narrow beam. As the pulsar rotates, this beam moves in and out of our line of sight. Hence, we see periodic bursts of radio radiation. In this sense, a pulsar works like a lighthouse, in which the light may be on all the time, but it appears to blink on and off. Scientists were surprised to find that the B pulsar is on only at certain locations in its orbit. "It's as though something is turning B on and off," Jenet said.

According to Jenet and Ransom, this "something" is closely related to the radio emission beam emanating from the A pulsar. They believe that B becomes bright when it is illuminated by emission from A. Jenet and Ransom used Einstein's Theory of General Relativity to predict the future evolution of this pulsar system. The theory implies that gravitational effects will change the emission pattern of A, which will then alter the exact orbital locations where B becomes bright.

The double pulsar system is located about 2,000 light-years, or 10 million billion miles, from Earth. Jenet and Ransom based their research on observations made at the Green Bank Telescope in West Virginia.

Space Place site is revamped

The award-winning, educational Web site Space Place has been revamped to make it even more out of this world. The site targets elementary school children, their parents and teachers. The new design makes it even easier for kids to stay in touch with fun facts about space.

All the projects on Space Place integrate the inspirational work of NASA and JPL into interactive games, puzzles and animations for kids.

Webmaster DIANE FISHER said the site covers 32 current and past JPL missions and studies. Each contains its own educational lesson.

For example, kids can "Blast Off for a Mars Adventure," solve gravitational waves crosswords, or make their own Star Finder to help them locate constellations. The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) game shows them the difference between infrared and visible light.

If Web visitors get hungry, there are simple recipes for asteroid potatoes or Moon cookies.

The new Space Place site helps students learn all about the solar system, stars, Earth sciences and technology. A version of the site is also available in Spanish.

Fisher said site visitation has grown to average about 10,000 unique visits a day.

To see the new and improved Space Place, visit <http://spaceplace.nasa.gov>.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parents Group for Children With Special Needs—Meets the second Thursday of the month at noon in Building 167-111 (the Wellness Place).

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, May 7

"Asian Americans Front and Center: Making Sure Our Voices Are Heard"—Ted Chen, an anchor and reporter for the Channel 4 News, will open Asian Pacific American Heritage Month with a talk at noon in Building 180-101.

Saturday, May 8

Bandorama—The Caltech Concert and Jazz Bands' 26th annual concert will be presented at 8 p.m. in Beckman Auditorium. Featured will be Chris Renk, winner of the Caltech competition for new music for concert band. The concert band will also play a medley of songs from *La Bohème* and the jazz bands will perform Big Band music. Free admission. A reception will follow the concert. For more information, call (626) 395-4652.

Monday, May 10

"How We Might Have Gone to Mars in 1965: The Story of Project Orion"—Dr. Freeman Dyson, Professor Emeritus at Princeton Institute for Advanced Study and Distinguished Visiting Scientist at JPL, will speak at 10:30 a.m. in von Kármán Auditorium. The talk is part of the Director's Topical Seminar Series.

Tuesday, May 11

JPL Stamp Club—Meeting at noon in Building 183-328.

SQI Seminar Series—Alan Ferdman, team leader in the Software Assurance Group of the Quality Assurance Office, will present "Is Your Software Project On Track? How Can You Tell?" at noon in conference room 167. Ferdman will discuss how software tasks can be monitored and controlled in a way that prevents surprises and leads to consistent success.

Wednesday, May 12

"Computational Design Synthesis: Opportunities, Models and Applications"—Dr. Jonathan Cagan, professor of mechanical engineering at Carnegie Mellon University in Pittsburgh, will speak at 9 a.m. in conference room 167. The talk is presented by JPL's Center for Space Mission Architecture and Design.

Investment Advice—TIAA/CREF will offer a workshop in Building 180-101 from 9 to 10:30 a.m. that focuses on how a Supplemental Retirement Annuity offers an easy, affordable and tax-deferred way to build the additional assets needed to supplement your retirement plan and Social Security benefits. While your retirement plan and Social Security provide a good foundation, they are not likely to be

enough for the type of retirement lifestyle most employees really want.

JPL Amateur Radio Club—Meeting at noon in Building 238-543.

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Debbi Llata at ext. 4-8374 for information.

TIAA/CREF Enrollment Meeting—This workshop, held at noon in Building 249-114, is designed to assist employees newly eligible for the Caltech/JPL retirement plan with selection of investment options and the completion of enrollment forms.

Friday, May 14

Investment Advice—Fidelity will offer one-on-one counseling in Building 249-114. For an appointment, call (800) 642-7131.

Sunday, May 16

"The Nigerian Spam Scam Scam"—Actor/comedian Dean Cameron will perform at 2 p.m. in Caltech's Baxter Lecture Hall in this Skeptics Society-sponsored event. Donations: \$5 for members, \$8 for nonmembers, free for the JPL/Caltech community. For more information, call (626) 794-3119.

Monday-Tuesday, May 17-18

Investment Advice—TIAA/CREF will offer one-on-one counseling in Building 249-114. For an appointment, visit www.tiaa-cref.org or call (877) 209-3140, ext. 2614.

Tuesday, May 18

Annual Investment Review Workshop—Fidelity will present "Investing Your Retirement Account in a Changing Market" from 2:30 to 4 p.m. in Building 180-101. Roland Jacobs, vice president of Fidelity Investment Consulting, will review economics and markets, historical mutual fund performance, and advanced asset allocation principles. Seating is limited. Call Fidelity at (800) 642-7131 to reserve your space.

Tues.-Wed., May 18-19

Blood Drive—Held in von Kármán Auditorium from 10 a.m. to 4 p.m. Tuesday and from 7 a.m. to 1 p.m. Wednesday. Advance signup sheets are available at JPL Occupational Health Services, Building 310-202, prior to the blood drive, or sign up online at <http://www.givelife.org/index.cfm?hcl=JPL>. Enter your e-mail and birthdate; "JPL" is the sponsor code. For last-minute signups, or to change your appointment, call the Red Cross at (626) 960-6956, ext. 225.

Wednesday, May 19

"The Evolution of Human Skin Coloration"—Anthropologist Nina Jablonski will lecture at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$12. For more information, call (626) 395-4652.

Thursday, May 20

Clogging Class—Meeting at noon in Building 300-217. For more information, call Shary DeVore at ext. 4-1024.

Thu.-Fri., May 20-21

Von Kármán Lecture Series—Nagin Cox, deputy team chief on the Mars Exploration Rover Project's Spacecraft Rover Engineering Team, will present "Step by Step, Robotically at the Red Planet," at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Thursday's lecture will be webcast at www.jpl.nasa.gov/events/lectures/may04.cfm. For more information, call Public Services at ext. 4-0112.



Dutch Slager / JPL Photolab

Hall of Fame honorees

JPL Deputy Director Eugene Tattini salutes JPL team members whose Precision Global Positioning System Software System was recently inducted into the Space Technology Hall of Fame. From left: Dr. Michael Heflin, Dr. Willy Bertiger, Dr. Sien-Chong Wu, Dr. Stephen Lichten, Tattini, Dr. James Zumberge, Dr. Thomas Yunck, Dr. Frank Webb, Dr. Yoaz Bar-Sever. Team members not pictured: Ronald Muellerschoen and Dr. Kenneth Hurst.

Lab welcomes thousands to its annual showcase May 15-16

It's not too late to help make this Open House an even greater event. If you can volunteer a half-day, full day or both days, call Public Services at ext. 4-0112.

"Spirit of Exploration" is the theme for Open House 2004, to be held Saturday and Sunday, May 15-16, from 9 a.m. to 5 p.m. each day.

Structured around the themes of technology, Earth, Mars, our solar system and the universe, the event offers space enthusiasts and non-space buffs alike the chance to see and learn more about how missions come together.

Watch student-built robots compete and see your friends fly in space. Learn about the devices scientists use to explore our planet, from the ground below to the outer reaches of Earth's atmosphere. Or follow the water to Mars through a tour of the

laboratory designed for test-driving robotic vehicles destined for Mars.

Learn how we communicate with the spacecraft currently exploring the solar system. Watch "Ring World," a multimedia presentation on the Cassini mission to Saturn, shown in planetariums around the globe.

Visitors will have the opportunity to meet with scientists and engineers, who will staff booths to answer questions about current and future missions.

Here are some highlights coming up next weekend:

Earth

Earth Science

Come see your home planet through the eyes of JPL's armada of satellites and instruments, which continuously study Earth's land, seas and sky. The images, beautiful by themselves as pieces of art, provide us with keen insights into how our Earth system ticks.

Image Processing

Learn about the unique capabilities of the nine cameras on the Multi-angle Imaging Spectro-Radiometer. See stereo and 3-D images of Earth, as well as videos and animation. Find out what this successful instrument is telling us about Earth's surface, clouds and particles in the air.

Solar System

- Check out JPL's sample-return missions, Stardust and Genesis.
- Collect planetary trading cards and ask an astronomer about the Venus Transit, happening in June.
- Learn about how Project Prometheus is making strategic investments in space nuclear fission power and electric propulsion technologies. The Jupiter Icy Moons Orbiter is the first proposed mission within Project Prometheus.
- Hear about Voyager, now the most distant human-made object in the solar system.
- Discover how the New Millennium Program "road-tests" tomorrow's technologies.
- See a model of the Deep Impact spacecraft, the first mission to look inside a comet.

Technology

Robots, Cutting-Edge Technology, New Methods

- Watch URBIE the rover and Spiderbot the robot.
- Discover the latest in optical communications, from lasers to radio frequencies.
- Check out the advanced rockets that launch JPL missions.
- Talk with engineers and scientists about the importance of mission safety and success — how JPL and NASA are lowering costs and risks of technology development for future explorers.

Microdevices Laboratory

The cutting edge of small space technology. Check out the latest in microchips, sensors and quantum infrared detectors. These help provide power and digital capabilities for instruments on many spacecraft.

Multimission Image Processing Laboratory

Experience space science data processing; view animations, 3-D images, high-definition television, and a 3-D movie with the latest images from Mars.

Special Activities

- The Mars Show: von Kármán Auditorium. Shows approximately every 30 minutes.
- Ring World: Building 167 conference room. Shows approximately every 45 minutes.
- Journey to the Planets and Beyond: Building 180-101. Shows approximately every 45 minutes.
- Solar System Walk: Take a walk through a scale model of the solar system, starting at the entrance to Open House and stretching the length of JPL.

Mars

Mars Reconnaissance Orbiter

Slated for launch in August 2005, MRO will study the martian surface and atmosphere in never-before-seen detail, returning 15 times more data than previous missions and images of objects measuring only a few feet across.

Mars Exploration Rover Mission

The twin rovers have been exploring Mars since January, and are now in an extended mission.

Odyssey and Global Surveyor

See models of the orbiters and an impressive display from their martian photo albums.

Just for Kids

Especially for school-age children. Learn about space exploration through demonstrations, audience participation and exhibits.

- Child Educational Center. Hands-on activities for pre-school-age children.
- Solar System Exploration Kids' Area. Planet tactile, coloring, stickers of Saturn, trading cards of the planets.
- Meet Southern California high school robotic teams, then see their robots in action.
- Fly in Outer Space. Come to the JPL television studio and see yourself fly in space.
- Mars Kids' Area. Kids will have fun being "run over" by a lightweight rover and coloring their own rover.
- Planetarium. Draw your constellation and write a story for it, then it will be added to the portable planetarium.

Universe

The Search for Other Life

Is there another Earth out there? Are we alone? Come and see how future NASA missions like Kepler, the Space Interferometry

Mission and the Terrestrial Planet Finder will take us closer to finding that special planet that might have life. And explore other mysteries of deep space that give us clues about how planets, stars and galaxies formed a long time ago. See how missions like the Spitzer Space Telescope, Galaxy Evolution Explorer and Laser Interferometer Space Antenna will help answer another age-old question — where did we come from?

Cool Demonstrations

See your own face and hands transform through a heat-sensitive camera, learn how scientists experiment with weightlessness without going into space, discover why we have to put telescopes in space and why the stars "wobble."

General Information

Parking, Lab Access

Several buildings will be used as display venues. Buildings open at least partially to the public include 167, 168, 169, 170, 180, 186, 190, 202, 230, 249, 303 and 317. Prior to the event, **staff are reminded to lock office doors and properly secure sensitive items, equipment and material to prevent theft, damage or disclosure.** In addition, personnel should challenge anyone without proper identification in closed buildings and report the incident immediately to JPL Security (4-3530).

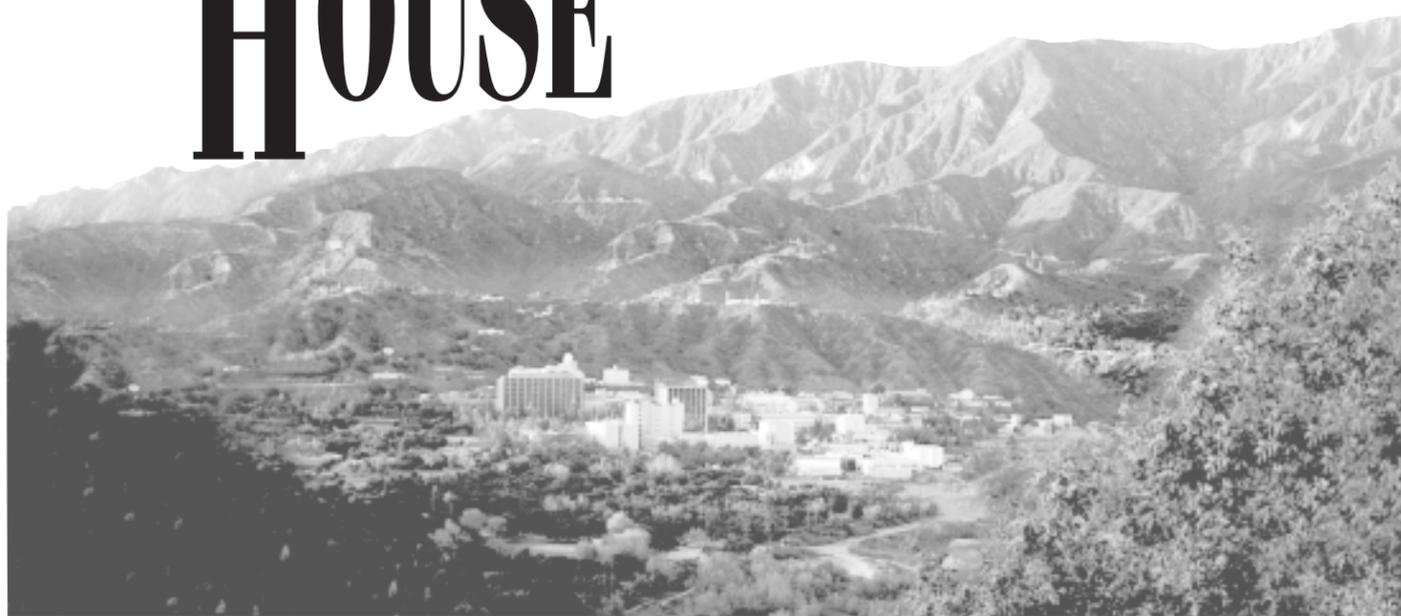
Additional security measures will be in place. Specifically, all vehicles, persons and possessions will be subject to inspection. Prohibited items include backpacks, ice chests, alcohol, controlled substances, weapons, dangerous devices, explosives, skateboards, skates, roller blades and pets (except guide animals).

The Main Gate will be reconfigured so that traffic will be restricted to outbound tour buses and emergency vehicles only. Badged employees working on the day of the event may park on-Lab but must drive through the South Gate. To maximize parking for non-JPL visitors, employees are strongly encouraged to park in lots located north of Explorer Road. Staff attending the Open House with visitors must park in areas designated for guests and enter the Laboratory through the pedestrian checkpoint at the Main Gate.

Visitors may park in the West Lot, Blue Lot (accessible from the West Lot), East Lot and Arroyo Lot. Visitors must ride parking lot buses from the East Lot and Arroyo Lot to the Main Gate. Walking in from the East Gate or South Gate will not be permitted either day of the event.

Emergencies may be reported to JPL Security by calling 911 from a Lab extension or 818-393-3333 from a cell phone.

OPEN HOUSE 2004 ON THE WAY



Team G receives honors



JPL's Team G, responsible for estimating ground data system and mission operation costs for proposals and studies, won a NASA Continual Improvement team award at the agency's recent Continual Improvement and Reinvention conference in Alexandria, Va. On April 14, Randall Reed, the team's spokesperson, accepted the award from NASA Deputy Administrator Fred Gregory after presenting to senior NASA executives and 200 of NASA's top contractors. Reed illustrated how Team G significantly reduced the workforce required to develop accurate designs and

costs, while improving cost estimate fidelity. During the past two years, Team G has adopted many new techniques and standards that promote continual improvement. The award recognized NASA center teams that have made significant, positive impacts on their centers and the agency. A board of NASA quality management associates had selected five teams last year from nominations submitted by all the NASA centers. To nominate a team for consideration in the next competition, contact Martin Johnson at ext. 3-6060.

Passings

NORMAN SNIDER, 78, a procurement negotiator from the former Section 621, died of a massive heart attack Feb. 28.

Snider worked at JPL from 1979 to 1990. He is survived by his wife, Del, along with two daughters, four grandsons, two granddaughters and three great-grandchildren.

He is interred at Fort Rosecrans, Pt. Loma, San Diego.

DR. JOHN BLUTH, 60, a longtime JPL archivist, died April 19 in Camarillo.

Bluth joined JPL in 1992 after being a contractor for several months working on the oral history program. He remained a JPL employee until September 1998, when he moved to the contract with Sherikon Space Systems. Most recently, he consulted on a JPL Internet museum project.

Bluth is survived by his wife, Pat, and daughter Sarah. Services were held April 24 in Camarillo.

Letters

A very sincere thank you to all of my co-workers and friends who extended their congratulations and best wishes on the occasion of my retirement after 30 years. I will always appreciate the challenges and successes I shared with many of you in Division 35 during my early years and in 5X these last 19 years.

Jim Arnett

Sometimes in the turmoil and confusion following an unexpected death in the family, things are left unsaid. I fear that I may have forgotten to thank everyone at JPL for their thoughts, prayers, cards, flowers and comforting words upon the passing of my father. I can only apologize and let everyone know how much it was sincerely appreciated by myself, my brother and sister and our mother. The JPL community truly is like family. Thank you all so very much.

Kirk Gerbracht

In memory of A. Robb Frederickson, thank you, JPL, for the nice fern plant.

Christine Frederickson

Thank you to my JPL family for the outpouring of love and support in the passing of my beloved Dad. It is of great comfort to my heart to know how much others care and I seek solace in your kindness.

Sally Hughes

Classifieds

For Sale

APT. CLEARANCE, SW Pasadena, May 7-23; electric dinner bun warmer, \$7; turkey roaster, \$8; covered vegetable dish, porcelain, \$9; sleeping bag, \$10; dishes, cutlery, bedrm. items, camping items; make offers. 626/793-1895.

BED, frame, Cometa queen, cherry wood, Italian design, see at <http://www.modfurniture.com/italian.html>, paid \$1,300 new, sell \$800. 244-8822.

BOOKS: "Applied Electronics," 1943 WWII, MIT classic textbook, John Wiley publisher, \$12; Big Band Almanac, 1978, lavishly illustrated, all dance bands and singers, 1930s-'60s, 450 pgs., \$10; 626/793-1895.

BREAST PUMP, new Medela Pump-In-Style, sealed in original box from manufacturer, \$199. 909/576-5789.

COMPUTER DESK, on wheels, cherry veneer, made by O'Sullivan, model 61925, exc. cond., like new; sell for best offer. 626/449-0997.

COMPUTER, Ultra 10 Sun workstation with monitor, Solaris 8, 440MHz, 28MB/18GB, CD, \$700. 626/578-9720, eve.

CRIB, wood, made in Italy, includes mattress (height adjustable), exc. cond., photo available. \$150/obo. 626/791-6101.

DIAMOND RING, ladies, 10K yellow gold, \$90; COMPUTER, wristtop, Suunto, \$275. 897-1203, Valerie.

DESK, w/matching file cabinet & credenza, black w/brushed silver pulls, from Restoration Hard-

ware, vg quality, sturdy, \$150. 626/797-3110.

DIET TAPES, Jenny Craig, set of 14, \$25; COMPUTER POWER CONTROL CTR., 5 pwr. switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; CARD SHUFFLER, Johnson, collectible, all-metal construction w/carved-wood dowel handles, handle ~6" H x ~9" x 6", \$35. 790-3899.

EVENING GOWN, full length, peach, long sleeves with scarf/shawl, crepe and chiffon materials, sz. 16, exclusive designer, \$50/obo. 626/284-9664.

FURNITURE: 2-piece Bassett sectional (1 pc. is a sleeper), floral print; one 40" coffee table and two 26" end tables (mission style); photos avail.; all in gd cond.; \$500/obo; parts could be sold separately. 626/791-6101.

FURNITURE: office table, right-hand turn; conference room tables; sofa; chairs; sell for best offer. 626/841-8887.

GUITAR, acoustic, Estaban signed, \$200 brand new, sell for \$100/obo; PAINT PUMP, Little Pro 2500, commercial grade, no hoses or gun, \$175/obo. 249-4395 or rem@koroisland.com.

HEADBOARD/FOOTBOARD, queen, brass w/ceramic toppers, exc. cond., \$350; WATERBED FLOATATION SYSTEM with foundation, Somma, queen, \$100. 626/447-6423.

HOMEBREW EQUIPMENT: two 5-gal. Cornelius kegs with ball locks, \$25 ea.; misc. ball-lock hardware, clamps, and hoses, \$20. 323/342-9363.

MICROWAVE, white, Panasonic, \$40; SCANNER, Umax 1220P for Windows, \$15; STEREO, Sony LBT-G2000 w/3-disc CD changer, \$75; BED FRAME, queen size, \$5. 323/342-9363.

MISC: 8' pool table, Brunswick, \$500; tablecloths, 2, slate blue, oval, 18 matching napkins & rings, \$10; car creeper, Huffy, \$5; shovels, \$2 ea.; hoc, \$5; punch bowl set, 18 piece, \$10; mailbox, oversized, green, \$20; sytch (cuts tall grass), paid \$54 in 1970, sell \$10; w/g, red, shoulder length, never used, \$20. 626/357-8210.

MISC: phone/answering machine, digital, cordless, Sony, \$30; speakers, Acoustic Research, \$20; Sony Discman, \$20; tuner/amp, Onkyo, \$50; Zip drive, Iomega, \$20; tensor lamp, halogen, from Ikea, \$20; golf bag, Calloway, \$20; putter, Ping, \$20; mattresses, Serta Perfect Sleeper w/box spring, twin pair, \$250/ea.; computer table from Relax the Back, \$100; grandfather clock, \$400. 213/810-8801.

ORGAN, Yamaha 415 electronic console w/13 pedals, 3 keyboards, 144 rhythm patterns, pd. \$7,500, sacrifice for \$2,000; PORT REPLICATOR, for IBM Thinkpad, works with T20, T21, A20, A21, or X, R series, like new, \$85; CONTROLLER CARD, Ultra ATA with cable, fits into 32-bit PCI 2.1 or 2.2 expansion slot on motherboard; brand new; \$20. 790-3899.

PASADENA SHOWCASE HOUSE OF DESIGN TICKETS, 3, for May 8, 1:30, \$30/ea. 790-2915, Dick.

PIANO, beautiful old upright, plays well, nice touch, bench, selling because we can't get into apt., \$500. 626/287-1025.

REFRIGERATOR, Kenmore Goldspot, 21.6 cu. ft., top mount freezer, like new, 2 1/2 yrs. remaining on full warranty on sealed refrigeration system, org. cost \$940, Sears 9/01, moving sale only, \$450. 240-8384.

SAXOPHONE, alto, Yamaha YAS-23 with soft case, gd. cond., \$500. 626/355-4447, John.

SECTIONAL, needs to be slip covered, frame and cushions in great condition, appx. 9' x 7', \$50; WASHER/DRYER, Maytag, \$100 each. 626/850-4378.

SECTIONAL, 3 piece, leather, corner, oyster, \$400; LOVE-SEAT SLEEPER SOFA, light charcoal, \$100. 626/355-7086.

TENTS, Sears Hillary, 9 x 9 ft., fiberglass poles, vg. cond., 2/\$80. 626/797-6982.

TYPEWRITER, IBM Selectric II, self correcting, wide carriage, exc. cond. 661/917-1569, Debi.

TYPEWRITER, Underwood, antique, with cover, works great, \$60/obo. 626/284-9664.

WASHING MACHINE, Kenmore 90 Series, 1999, good cond., \$75; SEGO PALM, 4 ft. wide, \$50; EXERCISE MACHINE, Weider, \$30. 790-2915.

Vehicles / Accessories

'98 BMW 528i, 56K mi., premium package, sport package, premium audio system, new tires/brakes, \$19,800. 395-6303, John.

'95 CHEVROLET Tahoe LT, 4 x 4, 5.7 V8, silver, exc. cond., 1 owner, 100K, auto, a/c, power windows/doors/locks, CD/cass., running boards, leather, roof rack, grille guard, towing pkg., sheepskin seat covers, LoJack, loaded, \$8,000. 368-6874.

'94 CHEVROLET Camaro, \$6,000/obo. 760/617-7004.

'93 CHEVROLET Suburban 2500, 2 x 4, 350 V8, exc. cond., well maint., low mileage, a/c, power doors/windows, wood trim dash, custom front sheepskin covers, running boards, new tires with Weld wheels, Flowmaster exhaust. 626/359-7666.

'52 CHEVROLET pickup truck, 1/2-ton, 235 cid 6-cylinder, 4-spd, gd. shape, primer gray, \$3,600. 626/794-1621, eves before 8pm, Erik.

'78 DATSUN 280Z, 2 + 2, 4 spd, silver w/black interior, exc. cond., \$4,500. 562/691-6425.

'88 FORD Taurus LX wagon, top of line, loaded, power seats/mirrors, keyless entry, etc., exc. cond., orig. beige finish, carefully maintained, 8 pass. capacity w/rear seat, \$2,900/obo. 626/798-2925.

'99 GMC Yukon Denali, 75K mi., loaded, 4WD, leather, 6-CD changer, exc. cond., \$18,000/obo. 800/937-9200, Levi or Cathy.

'04 HARLEY DAVIDSON motorcycle, custom

built, rigid, blue, 240 rear tire, 96" motor, 5-speed trans, spoke wheels, billet components, all the best, \$22,000. 626/287-1025.

'91 HONDA Accord Ex sedan, 4 cyl, auto, a/c, sunroof, all power, CD player, black ext., cream int., vg cond., \$3,200. 626/398-9836.

'98 ISUZU Trooper SUV, 4 x 4, 3.5L V6, auto, a/c, power windows/locks/heated mirrors, rear wiper/defroster, can select winter or power mode, cruise control, airbags, ABS with 4-wheel disc brakes, very roomy, lots of cargo space, only 60K, \$9,500/obo. 909/702-2326, avbattis@yahoo.com.

'94 ISUZU Trooper LS, 4D, V6, 4WD, 3.2 L, DOHC, automatic, automatic locking hubs, antilock brakes, cruise control, alarm, am/fm stereo, 12-CD player, white, exc. shape, tinted windows, new a/c, new transmission, power steering/windows/locks, tilt wheel, rear window defroster + wiper, exterior spare tire carrier, immaculate, \$5,895/obo. 957-3296.

'98 JEEP Grand Cherokee Special Ed., 5.2L V8, 4WD, 75K mi., pwr. everything, cruise contr., cass., CD, prem. sound, dual airbags, pwr. seats, moonroof, roof rack, tinted windows, tow pkg., tilt wheel, oversized tires w/new spare, prem. wheels, 4-wheel ABS, lots of after-mkt. additions, must sell, great cond., pics. avail., \$9,800/obo. 352-6646, Ben or verdugo_verde@comcast.net.

TIRES for truck, 4, 16", best offer. 897-1203, Valerie.

'00 TOYOTA Camry CE, silver, a/c, 35K mi., exc. cond., must see, \$9,500. 909/596-4302.

'00 TOYOTA Tundra Ltd., 56K mi., ABS, full power, snug top, carpet kit, tow pkg., 6 CD in-dash, new tires, \$16,500. 909/596-9007.

'92 TOYOTA Dolphin motorhome, pastel blue, slps. 5, 16 mpg, 82K mi., V6, automatic, cruise control, awning, roof & cab air, rear bath, microwave, TV antenna, innerspring matr. (not foam), linoleum floor, well-maint., manuals incl., like new inside; see photos: <http://tinyurl.com/36wtv>, \$13,500. 626/798-4510, lv. msg.

'85 TOYOTA Cressida, V6, automatic, 4 dr., runs very well, luxury, moonroof, power everything, air, am/fm radio, 157K mi., burgundy, \$2,000. 626/585-0799, Anton.

VALCO boat, Honda 9.5 HP 4 stroke motor, 12 ft., flat bottom, aluminum, both in vg cond., well taken care of, \$800. 626/398-0921.

'80 VOLKSWAGEN Rabbit, convertible, 2 dr., 5 speed, manual, runs very well, great MPG, perfect second car or short commute to the Lab, 200K, am/fm radio, white w/black roof, passes smog, \$650. 626/585-0799, Anton.

'02 VOLVO V4 wagon, only 12,200 miles, 4 cyl., 1.9L turbo, silver color, a/c, stereo/cassette/CD, dash cover, exc. cond., garage parked, all service records, \$17,490. 626/355-5631, Tim O'Donnell, 6 to 9 pm.

'96 YAMAHA Wave Ventures, matching pair on deluxe dbl. trailer, both in great shape with low hours, ready for the water, \$6,250/obo. avbattis@yahoo.com, 909/702-2326.

Wanted

APRICOTS for canning, will pick and pay. 626/285-1341, Gary.

CARPOOLER, Glendora-based, work hours 7:30 to 4:15 with stop at Woodbury, drive once a week, non-smoker, must have a vehicle that can handle 4 passengers. 4-9524, Ali.

MULAN (Disney), VHS format. 626/850-4378.

FITNESS STEP AND RISERS for step aerobics, Reebok, approx. 4 x 16 x 43". 626/345-0681.

TO RENT house or condo in/near Waikiki for Pasadena-area girls' jr. military drill team, competing May 27-31. 626/703-1619, Linda.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present, for personal use. 790-8523, Marc Rayman.

For Rent

ALTADENA "sabbatical house," 3 bd. + study, boundary Angeles Nat'l. Forest, 3 mi. from JPL (trails to Lab behind house), view, hardwood floors, fireplace, antiques, completely furnished; furniture, dinnerware, pots/pans, linens, down comforters, fine soaps, necessities included; just bring toothbrush & clothes, TV/DVD/VHS, Bose radio/CD, Dish satellite, wireless DSL available, garden, courtyard, BBQ, parking, private, immaculate, month/monthly. 626/798-3235.

ALTADENA house to share in historic Janes Cottage Village, 1 mi. from JPL, 3 bd., 2 ba., completely remodeled in quiet, great neighborhood; large lot w/fruit trees, gardens, etc., dogs in backyard, private rm. + ba., female pref.; \$1,000 util. inc. 626/794-8884.

ALTADENA house, .25 mi from JPL, 3 bd., 2 b.a, hardwood floor, fireplace, French doors to fam. rm., appliances, gardener incl, Jacuzzi, \$2,000. 626/798-0799.

LA CANADA, private rm in home, priv. ba., off-st. parking, BBQ, pool, full kitch, priv, wash/dry, etc., avail. 6/15, \$550 + util. 790-1280.

LA CANADA, very small room, furnished, separate from house, walking dist. to JPL from horse trail, futon, refrigerator, microwave, heat, a/c, cable TV, private entrance w/security gate, temporary OK. 790-1893, leave msg.

PASADENA furn. apt. to share, 3 bd., 3 ba., 2-story townhome-style, cent. a/c, refrig., stove, laundry rm, patio, close to Caltech & JPL, \$625 + util. 626/429-3677 or betryrs@earthlink.net.

PASADENA home for lease, 2 bd., 2 ba., hardwood floors in living + din. rooms, beautiful fireplace, w/hardwd mantle, remodeled kitch., laundry rm, convenient loc. on peaceful treelined st., nr. PCC/Caltech/Rose Parade route/

Metro Gold Line, new paint + carpet, garden-

er, 76 N. San Marino Ave., \$1,695. 790-3336.

PASADENA, housemate wanted, easygoing, non-smoker; sm. bedrm. in 4-bd. house, walking dist. from JPL (2 blocks), central air/heat, fireplace, patio, backyd., laundry + kitchen privileges, no pets, off-st. parking, \$600 + \$300 deposit, util. included. 626/791-1768, Myr.

PASADENA, part of a beautiful home, beautiful garden setting, priv. entr., view, 1 room, bathroom & kitchenette, ideal for 1 person w/ a very quiet lifestyle, \$650. 626/798-4056.

PASADENA, share 2 + 2 + loft apt. with male near Caltech; pool, Jacuzzi, excellent gym, DSL, underground parking, security building, on-site mgmt., furnished except your bed/bath, \$650 + utilities. 626/644-5431, Gary.

PASADENA studio condo, fully furnished, 1115 E. Cordova Ave., gated facility, 2 blocks from Caltech, pool & BBQ, patio, carport, laundry, non-smoker, no pets, \$925, util. pd. except electric. 626/792-9053, Ray or Marilyn.

PASADENA, unfurn. 2 bd., 1.5 ba., 2-story townhome-style apt., central a/c, refrig & stove, laundry room, patio, parking; close to Caltech & JPL; \$1,095 + utilities. 626/429-3677 or betryrs@earthlink.net.

SOUTH PASADENA apt., lg. 1 bd., 1 ba., new carpet and paint, 230 Fair Oaks Ave., \$875. 626/799-2625, 323/258-6868.

Real Estate

ARIZONA, 43 acres w/2-rm. house, nr. Williams, wildlife abounds, 2.5-mile access, house overlooks seasonal creek, total 127 acres, great hideaway from city, pics. at Randall, Mielke. fiji.com, \$48,000 cash or \$58,000 w/15% down, 11% interest over 10 yrs. rem@koroisland.com.

GLENDALE, Rancho San Rafael view home, 4 bd. + office, 3.5 ba., LR, FDR, family rm., spa, many extras & upgrades, community pool, tennis, rec. rm., \$1.2 million. 240-5030, owner.

Vacation Rentals

BIG BEAR LAKEFRONT luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, slps. 6. 949/786-6548.

FLORIDA, New Smyrna Beach, fully furn. condo, 2 bd., 2 ba., full kitchen, 1/2-hr. to Cape Canaveral; quiet, relaxing, overlooking beach; BBQ/pool/gm. rm., great ocean view, easy walk to stores/restaurants; slps 6; weekly or monthly. 909/981-7492, Darlene or dhaughe@yahoo.com.

GREEN VALLEY lake cabin, near Big Bear, sleeps 6, furnished, cable TV, 1 bd., 1 ba., lg. living rm., fully equip'd kitchen, fenced deck; fishing, swimming, hiking, pets OK; \$100/nt. 949/859-2237 or 323/258-4464.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps. 4, laundry fac., low season rate \$115/nite/2, high season \$130/nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

HAWAII, Marriotti's 5-star Ko Olina Beach Club Resort, Oahu; on the beach, 15 min./Waikiki, Aug. 28-Sept. 4, 2 bd. lux. suite, 2 ba., slps. 8; din. rm., fully eq'p'd kitch., oven, microwave, dishwasher, refrigerator, service for 8, built-in laundry facility, vw. TV/CR in every rm.; 50% off - \$1,100 for 7 nts. (Marriott: \$332/nt.); see <http://marriott.com/property/propertyPage.mi?marshaCode=HNLKO>. 790-7916.

HYATT SPECIALS: Puerto Rico, luxurious residential-style studios, furn. kitchenette, May or Oct., \$370/7 nts.; Lake Tahoe, 2 bd., living rm., full kitchen, Sep. 28 - Oct. 2, \$390/4 nts.; Colorado Rockies, 3 bd., living rm., full kitchen, Oct. & Nov., \$300/7 nts. 626/794-9579 or fivestarrsresorts@earthlink.net.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitch. incl. microwave, D/W, cable TV, VCR, phone, balcony w/view to mtns., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt. 626/798-9222 or 626/794-0455 or valeriec@caltech.edu.

OCEANSIDE condo, fully furn. 2 bd., 2 ba., walking, full kitchen, quiet, relaxing, beautiful beachside setting; BBQ, pool/spa, game rm., grt ocean view; easy walk to pier & restaurants, slps 8; weekly or monthly. 909/981-7492, Darlene, or dhaughe@yahoo.com.

OCEANSIDE condo, beachfront, lovely 2 bd., 2 ba., single-level, deluxe, fireplace, white water ocean views, end unit, lux. gated complex on sand w/game rooms, fitness room, pools, BBQ's, Jacuzzi, 10 min. walk to pier/harbor, sleeps 6, JPL discount. 760/433-4459 or www.beachvisitors.com.

OCEANSIDE condo, beachfront, beautiful, 1 bd., 1 ba., deluxe, fireplace, garden view, luxurious gated complex on sand w/game rooms, fitness room, pools, BBQ's, Jacuzzi, 10 min. walk to pier/harbor, sleeps 4, JPL discount. 760/433-4459 or www.beachvisitor.com.

OCEANSIDE condo, on the sand, charming, 1 bd., panoramic view, walk to pier or harbor, pool/spa, game room, slps. 4. 949/786-6548.

RESORTS, 5-star; incl. Carmel, Tahoe, Sedona, Col. Rockies, Florida; lux. residential-style studios w/furn. kitchenette, starts at \$480 for 7 nts; partial weeks & 1-3 bd., w/ kitchen. 626/794-9579 or fivestarrsresorts@earthlink.net.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach, on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.

SAN FRANCISCO, Nob Hill Inn, walking dist. to Union Square, cable cars, Grace Cathedral, financial district and Chinatown, non-smoking property, 15 miles from SFO, unit sleeps 4, one week from 7/30 to 8/6/2004 (LinuxWorld Conference week), \$600. tcfis@apreflix.com.

Editor

Mark Whalen

Design + Layout

David Hinkle, Audrey Steffan/
Design Services

Chief Photographer

Bob Brown/Photo Lab

Advertising

Laurita Borst

Universe is published every other Friday by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.

Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted via e-mail to universe@jpl.nasa.gov and are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

JPL'S ONLINE NEWS SOURCE



<http://dailyplanet>

View this and previous issues of Universe at

<http://universe.jpl.nasa.gov>

3x director reorganized

By Mark Whalen



Dutch Slager/JPL Photolab

Engineering and Science Director John Beckman has outlined plans for a reorganization of the directorate to address the Laboratory's challenges over the coming decade.

Beckman said now is the right time to begin implementation of the reorganization and have it in place for the beginning of fiscal year 2005 in the fall. He noted that the Lab now has six missions in phase C/D but that number will peak to 15 by fiscal year 2007. "The bottom line is if we didn't do it now, it will be really tough later on," he said. "The timing is opportune."

Two years in the making, the directorate's reorganization is based on five major themes:

- Group flight system-level software with critical mission operational software.
- Combine system engineering and mission software to achieve consistent, integrated flight and ground systems.
- Combine guidance, navigation and control in one division, to more effectively enable missions of complex dynamics.
- Create a Project and Engineering Services Division, grouping most hardware, software and support services, charged with the efficient operations of multimission facilities and services.
- Utilize lateral processes more effectively in carrying out ESD work.

Within these themes, seven divisions, based on products and function, will emerge: Systems and Software, Science, Telecommunications, Robotic Systems, Mechanical Systems, Project and Engineering Services, and Instruments and Science Data Systems.

Systems and Software is a relatively new organization, an amalgam of the current Divisions 31 and 36. A new Project and Engineering Services Division will focus on strategic infrastructure needs, offering test and analysis support through best practices in service center management. "To emphasize Dr. Elachi's commitment to this, and mine," Beckman said, "we will ask for a report on the state of the Laboratory's infrastructure within 90 days of the naming of the division manager."

Beckman said 233 of the Directorate's 237 current groups will remain together. Of the 35 current technical sections, 23 will remain intact, with six sections standing to lose one group and six other sections to lose two or more groups.

The new organization chart accounts for all 3,451 of the Lab's technical and science population.

Beckman said an external technical division advisory board advocated integrating the division's work to "lateral processes" that are independent of the organizational structure. Fourteen processes have been identified: system engineering, software engineering, flight hardware, surface access concept development, proposal development, high-performance computing, system test, contracted spacecraft, science, mission operations, future work planning, mission proposal product development, facilities usage and instrument implementation.

Jobs for the six engineering division managers and their deputies will be competed. The Science Division (32) was recently restructured to enhance collaboration between JPL scientists and the academic community, industry and other national laboratories. The results of that restructuring are progressing well, Beckman said; therefore, Division 32 is not included in this plan.

Beckman said changes in the new division managers' jobs will include an increased emphasis on the leadership of the lateral processes—which means an increased emphasis on strategic leadership—and an increased proficiency in decision making, delegation, change management and product line management. "We're expecting division managers to have a significant breadth of experience in these areas," he said.

With the expanded leadership roles, Beckman said, "new division managers can expect that the Lab might elect to rotate and reassign them to satisfy other JPL management or business needs in the future. This supports the director's position on executive and senior management personnel rotation at the Lab."

A selection committee representing Divisions 4X, 6X, 7X, 8X and 9X will assist Beckman in the search. Beckman is scheduled to announce the division manager appointments June 18. New division managers will then advertise for and select their deputies. The new divisions will be structured by their managers and a technical change control board, a process that is set to be formalized by mid-July. Section managers and their deputies will then be selected, and a sub-unit design team will formalize the new group structure by late August.

Until late September, reorganization efforts will focus on the mapping of people and cost accounts to the Oracle structure, as well as reorganization Oracle processing. The reorganization is scheduled to "go live" Sept. 27.

For more details on the reorganization, log on to <http://esd> and click on "2004 Reorganization."

Rover circles crater's rim

By Guy Webster

JPL's Mars Exploration Rover Opportunity has begun sampling rocks blasted out from a stadium-sized impact crater the rover is circling, and the very first one may extend our understanding about the region's wet past.

Opportunity is spending a few weeks examining the crater, informally named "Endurance," from the rim, providing information scientists will use for a decision about whether to send the rover down inside. That decision will take into account both the scientific allure of rock layers in the crater and the operational safety of the rover. Opportunity has completed observations from the first of three planned viewpoints located about one-third of the way around the rim from each other. Mission controllers at JPL are sending the rover around the crater's rim counterclockwise.

"As we were proceeding from our first viewpoint toward our second viewpoint, we saw a rock that looked like nothing we'd ever seen before," said Dr. Steve Squyres of Cornell University, principal investigator for the science instruments on both rovers. The rock appears to have come from below the area's current surface level, tossed up by the impact that excavated Endurance Crater.

This rock, dubbed "Lion Stone," is about 10 centimeters tall and 30 centimeters long (4 inches by 12 inches). In some ways it resembles rocks that provided evidence of past water at the smaller crater, "Eagle Crater," in which Opportunity landed. Like them, it has a sulfur-rich composition, fine layering and spherical concretions, and likely formed under wet conditions.

"However," Squyres said, "it is different in subtle ways from what we saw at Eagle Crater: a little different in mineralogy, a little different in color. It may give us the first hint of what the environment was like before the conditions that produced the Eagle Crater rocks."

Inside Endurance Crater are multiple layers of exposed rocks that might provide information about a much longer period of environmental history. From the viewpoints around the rim, Opportunity's miniature ther-

mal emission spectrometer is returning data for mapping the mineral composition of the rocks exposed in the crater's interior.

"We see the coarse hematite grains on the upper slopes and basaltic sand at the bottom," said Dr. Phil Christensen of Arizona State University, lead scientist for that spectrometer. "Most exciting is the basalt signature in the layered cliffs." Basalt is volcanic in origin, but the thinness of the layers visible in the cliffs suggests they were emplaced some way other than as flows of lava, he said.

"Our working hypothesis is that volcanically erupted rock was broken down into particles that were then transported and redeposited by wind or by liquid water," Christensen said.

At a May 17 press conference in Montreal, Christensen and Squyres presented previews of rover-science reports scheduled at a joint meeting of the American Geophysical Union and the Canadian Geophysical Union.

Although the stack of rock layers at Endurance is more than 10 times thicker than the bedrock exposure at Eagle Crater, it is still only a small fraction of the 200-meter-thick (650-foot) stack seen from orbit at some other locations in Mars' Meridiani Planum region. A close-up look at the Endurance Crater rocks could help with interpreting the other exposures seen from orbit. "It's possible that the whole stack was deposited in water—some particles washed in by flowing water and others chemically precipitated out of the water," Christensen said. "An alternative is that wind blew sand in."

Halfway around Mars from Opportunity, Spirit is driving toward highlands informally named "Columbia Hills," where scientists hope to find older rocks than the ones on the plain the rover has been crossing. The rover could reach the edge of the hills by mid-June. "Spirit is making breathtaking progress," Squyres said. "The other day it covered 124 meters (407 feet) in one day. And that's not a parking lot we're crossing. It's hilly, rock-strewn terrain. This kind of pace bodes well for having lots of rover capability left when we get to the hills."



News Briefs

CloudSat radar tests in open air

The CloudSat project's Cloud Profiling Radar successfully completed open-air tests in early May.

The instrument was moved from the Spacecraft Assembly Facility High Bay 1 test area to the airlock area. During the test, with the SAF door open half-way, the radar transmitted 94-GHz radio frequency signals via the 1.85-meter antenna out to the atmosphere at the elevation angles between 15 and 45 degrees. The radar echoes back-scattered from the atmospheric targets (cloud particles) within the radar's field-of-view were captured by the antenna and receiver. The echoes (analog) were then converted to digital signals and recorded. Subsequent processing will remove noise and deduce the cloud intensity and thickness information.



Photo courtesy of Eastwood Im

The CloudSat Cloud Profiling Radar Instrument Team.

CloudSat's launch is scheduled for no earlier than January 2005. CloudSat's trio of satellites will be the first spacecraft to study clouds on a global basis. Their data will contribute to better predictions of clouds and their role in climate change.

Spitzer shares the wealth

Like a philanthropist donating a private collection to a museum, the JPL-managed Spitzer Space Telescope has opened a virtual vault rich with scientific data. The Spitzer Science Archive provides astronomers access to the infrared telescope's data well before the mission's one-year anniversary in space.

For members of the science community it's as easy as going to the Spitzer home page and using a browser interface to download the data. To mark the occasion, NASA is releasing two new dazzling Spitzer images. Non-scientists can view a sample of Spitzer images at <http://www.spitzer.caltech.edu/Media/mediaimages/data.shtml>.

Spitzer was launched last August. Its high-tech infrared eyes observe galaxies, infant stars and newly forming planetary systems that have escaped the view of other observatories.

Ethics training now available

The Ethics Office is now scheduling classes for various group, section or division presentations. Invite an ethics advisor to an upcoming staff meeting. Training sessions last about one hour. Once you have a location, contact MARTHA AVIÑA at ext. 4-3154 or by e-mail to schedule your ethics training.

Training will also be available Lab-wide in the larger conference rooms. Log on to <http://hr/et> to view the class schedule and enroll.

Online ethics training will be available in the near future. Ethics training must be completed by Sept. 30.

Two architectures chosen for TPF

Included in the nation's new vision for space is a plan for NASA to "conduct advanced telescope searches for Earth-like planets and habitable environments around other stars." To meet this challenge, NASA has chosen to fly two separate missions with distinct and complementary architectures to achieve the goal of the JPL-managed Terrestrial Planet Finder. The purpose will be to take family portraits of stars and their orbiting planets and to study those planets to see which, if any, might be habitable, or might even have life. Both missions would launch within the next 10 to 15 years.

The two missions:

- Terrestrial Planet Finder-C: a moderate-sized visible-light telescope, similar to the 4- by 6-meter (13.1- by 19.6-foot) version currently under study, to launch around 2014. Onboard coronagraph instrumentation will use a central disc and other specialized techniques to block the glare of a star, allowing detection and characterization of dimmer planets around it.

- Terrestrial Planet Finder-I: multiple spacecraft carrying 3- to 4-meter (9 to 13 foot) infrared telescopes flying in precise formation, to launch before 2020, and to be conducted jointly with the European Space Agency. Combining the infrared, or heat radiation, gathered by the multiple telescopes using a technique called interferometry, will simulate a much larger telescope. This will enable the mission to detect and study individual planets orbiting a parent star observed by TPF-C and also new ones beyond the reach of TPF-C.

Earth science conference signups

NASA's Earth Science Technology Office is presenting the fourth annual Earth Science Technology Conference in Palo Alto, Calif., June 22-24. The conference will showcase a wide array of technology research related to NASA Earth science efforts. Attendees will encounter new developments in information systems, computing, instruments and component technologies, and will learn about the vision and future needs for Earth science technology.

For more information and to register, log on to <http://esto.nasa.gov/conferences/estc2004>.

New Explorer Schools selected

NASA has selected 50 new Explorer Schools from 34 states, including five from Southern California. The Explorer Schools Program is a major NASA education effort to inspire the next generation of explorers.

The five Southern California schools recently selected are Lake View Elementary in Huntington Beach, Lakewood High School in Lakewood, Flory School in Moorpark, North Ridge Elementary in Moreno Valley, and Mesa Union Elementary in Somis.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parents Group for Children With Special Needs—Meets the second Thursday of the month at noon in Building 167-111 (the Wellness Place).

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, May 21

Von Kármán Lecture Series—Nagin Cox, deputy team chief on the Mars Exploration Rover Project's Spacecraft Rover Engineering Team, will present "Step by Step. Robotically at the Red Planet," at 7 p.m. in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. For more information, call Public Services at ext. 4-0112.

Wednesday, May 26

JPL Library Orientation—Come to Building 111-104 from 11:30 a.m. to noon for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desktop. For more information, call the JPL Library Reference Desk, ext. 4-4200.

JPL Toastmasters Club—Meeting at 5 p.m. in conference room 167. For more information, call Debbi Llata, ext. 4-8374.

Volunteer Professionals for Medical Advancement—Meeting at 10:30 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, May 27

Caltech Architectural Tour—The Caltech Women's Club offers this free tour, which is open to the public. Meet at the Athenaeum front hall, 551 S. Hill Ave., Pasadena. Tour begins at 11 a.m. and lasts 1 1/2 hours. For reservations, call Susan Lee at (626) 395-6327.

JPL Golf Club—Meeting at noon in Building 306-302.

Fri., May 28; Sun., May 30

Piano Recitals—Caltech Pianist-in-Residence James Boyk will perform free concerts at 8 p.m. Friday and 2:30 p.m. Sunday, each in Ramo Auditorium. For more information, call (626) 395-4652.

Tuesday, June 1

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-271.

Wednesday, June 2

JPL Library Orientation—Come to Building 111-104 from 11:30 a.m. to noon for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desktop. For more information, call the JPL Library Reference Desk, ext. 4-4200.

Thursday, June 3

Clogging Class—Meeting at noon in Building 300-217. For more information, call Shary DeVore at ext. 4-1024.

JPL Gun Club—Meeting at noon in Building 183-328.

Sunday, June 6

Chamber Music—Calico Winds will perform a free outdoor concert at 2:30 p.m. at Old Mill, 1120 Old Mill Rd., San Marino. This is part of Caltech's chamber concert series and is performed off campus during Dabney Lounge's remodeling. For more information, call (626) 395-4652.

Tuesday, June 8

JPL Stamp Club—Meeting at noon in Building 183-328.

Wednesday, June 9

JPL Amateur Radio Club—Meeting at noon in Building 238-543.

JPL Toastmasters Club—Meeting at 5 p.m. in conference room 167. For more information, call Debbi Llata, ext. 4-8374.

Thu.-Fri., June 10-11

Von Kármán Lecture Series—Dr. Charles Beichman, executive director of Caltech's Michelson Science Center, will present "Finding Planets and Searching for Life: Worthy Goals for 21st Century Science," at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Thursday's lecture will be webcast at <http://www.jpl.nasa.gov/events/lectures/jun04.cfm>. For more information, call Public Services at ext. 4-0112.

Lab contractor wins Low award

MER Project Manager Richard Cook, right, presents a congratulatory gift from JPL to Spectrolab President Dr. David Lillington.

JPL contractor Spectrolab recently received NASA's George M. Low Award, the agency's highest honor for quality and technical performance. It is the nation's oldest award for organizational quality.

NASA Administrator Sean O'Keefe presented the awards to three U.S. companies at the NASA Continual Improvement and Reinvention Conference. Spectrolab, a Boeing Company based in Sylmar, received the award in the Large Business Product category.

Spectrolab was nominated by JPL for a body of work supporting NASA's mission, including the Mars Exploration Rovers (for which Spectrolab provided solar panel arrays) and Mars Reconnaissance Orbiter missions.

"This is a great honor for Spectrolab and our associates, whose dedication and energy have contributed to the success of various NASA programs such as the Mars Exploration Rovers," said Spectrolab president Dr. David Lillington. "We are proud to be part of NASA's programs that continue to push back the frontiers of space."



Bob Brown/JPL Photolab

Spectrolab has provided on-time delivery of high-efficiency space solar cells and panels to meet critical mission requirements on numerous NASA programs, including Mars Global Surveyor, Near Earth Asteroid Rendezvous, High Energy Solar Spectroscopic Imager, Far Ultraviolet Spectroscopic Explorer and the Submillimeter Wave Astronomy Satellite.

Companies were evaluated for performance, cost, schedule, innovation, management leadership, customer orientation, adherence to the Total Quality Management philosophy and alignment of organizational goals with NASA's strategic plans.

In attendance from JPL were Deputy Director Eugene Tattini, MER Project Manager Richard Cook, MER Chief Scientist Joy Crisp, Acquisition Section Manager Andre Stefanovich, MER contract technical manager Paul Stella and Office 108 Low Award coordinator Martin Johnson.

Besides the category for which Spectrolab was honored, Low Award categories also include Large Business-Service, Small Business-Product and Small Business-Service.

Johnson noted that nominations for next year's awards are now open. Qualifications include significant performance in customer satisfaction and contract technical performance, schedule, cost, management initiatives responsive to NASA's strategic goals, leadership and continuous improvement, research and development and/or innovative technology breakthroughs, and items of special interest to NASA.

If you know of a subcontractor whose performance you believe deserves consideration for a GML nomination, contact Johnson at ext. 3-6060 or via e-mail, or contact the acquisition subcontract manager working with the subcontractor up for consideration.



25

EARN LEVEL A BONUS AWARD

HONOR IS

HIGHEST LEVEL

IN JPL'S AWARD

PROGRAM

Twenty-five of JPL's top performers were formally honored at a Level A Bonus Award ceremony held May 5. The first-of-its-kind event was held at the Brookside Country Club in Pasadena.

JPL Director Dr. Charles Elachi, Deputy Director Gene Tattini, former Director Dr. Ed Stone and several of JPL's senior managers, including the Executive Council, joined honorees and their guests. "Tonight, the senior management team at JPL has set aside this time to formally recognize the honorees by showing our appreciation for excellence in performance and congratulating you on a job well done," Tattini told the gathering.

The JPL Bonus Award Program was established in 1999. Today it consists of five different monetary awards for individuals and teams. The Level A Bonus Award is based on four categories of excellence and is the highest award level in JPL's program. Award categories are Scientific and Technical Excellence, Effective Business Management, Effective Partnerships and Relationships and Strategic Leadership. "These categories are critical elements and part of the JPL Implementation Plan," Elachi said. "Excellence in these areas will ensure JPL's success today and help us plan for an exciting future."

Four individuals were also honored with the Dr. Edward Stone Award for Outstanding Research Publication, presented jointly by Stone and Chief Scientist Dr. Tom Prince.

Elachi closed the ceremony by thanking the honorees. "Your contributions and achievements have enabled JPL to enjoy much success over the last couple of years. You are the Laboratory's greatest asset and we are proud to have you on our team."

The 2004 Level A Bonus Award Honorees:

Scientific and Technical Excellence

Mark Adler: Technical leadership of the Mars Exploration Rover landing site selection team.

Magdy Bareh: Technical contributions to the Spitzer Space Telescope flight and ground system capabilities, and team building with JPL partners at Lockheed and Ball.

Yoaz Bar-Sever: Technical contributions to the NASA real-time global differential GPS system for low-Earth and terrestrial navigation and monitoring.

Joy Crisp: Technical leadership as the project scientist for the generation of landing site environmental information for the Mars Exploration Rover mission, leading to a successful landing on Mars.

James Donaldson: Technical contributions and leadership as the lead systems engineer of the Mars Exploration Rover mission avionics subsystem and for efforts resolving the Spirit Rover malfunctions.

Joel Krajewski: Technical contributions to the Mars Exploration Rover mission through the technical planning, design and development of the impact-to-egress mission phase.

Wayne Lee: Technical contributions as lead systems engineer for the performance assessment and simulation modeling of entry, descent and landing for the Mars Exploration Rover mission.

Susan Linick: Technical leadership in planning and managing the in-orbit checkout of the Spitzer Space Telescope.

Robert Manning: Technical contributions and leadership as the lead flight systems engineer for the Mars Exploration Rover mission.

Tracy Neilson: Technical contributions to the Mars Exploration Rover avionics systems and flight software and resolving the Spirit Rover malfunction.

Glenn Reeves: Technical contributions and leadership in the design, development and implementation of mission-critical Mars Exploration Rover flight software.

Eric Rignot: Technical contributions to the scientific understanding of the evolution and physics of glaciers in Greenland and Antarctica.

Alejandro San Martin: Technical contributions and leadership in the development of the Mars Exploration Rover guidance and control systems.

Jason Willis: Technical contributions and leadership as the lead systems engineer for the Mars Exploration Spirit Rover entry, descent and landing subsystems.

Effective Business Management

Amanda Beckman-Hezel: Leadership in developing and implementing significant acquisition process improvements for major institutional procurements.

Penny Carter-Lockert: Leadership of the JPL team that effectively communicated and implemented major healthcare plan revisions.

Effective Partnerships and Relationships

Harrel Crenshaw: Contributions to implementing and operating a comprehensive Procurement Quality Assurance system at JPL.

Strategic Leadership

David Crisp: Leadership in the selection of the Orbiting Carbon Observatory, the first Earth System Science Pathfinder mission with a NASA center principal investigator.

Gregory Hickey: Leadership in the development and demonstration of new lightweight nanolaminate mirror technology for future astronomy and physics missions.

Edward Hirst: Leadership of the Stardust mission design team contributing to the successful flyby of comet Wild 2.

Michael Werner: Scientific and technical leadership as the Spitzer Space Telescope project scientist and science working group chair.

Edward Stone Award For Outstanding Research Publication

Steven Chesley: Scientific research and publication on the effects of thermal re-radiation (Yarkosvky effect) on the orbital motion of asteroids.

Peter Day: Scientific research and publication demonstrating superconducting kinetic inductance detectors suitable for multiplexing into large-format imaging arrays.

Ian Joughin: Scientific research and publication of ice stream dynamics based on satellite and in-situ observations of the West Antarctica Siple Coast Ice Streams.

Christopher Webster: Scientific research and publication on water isotope mapping to improve our understanding of atmospheric water vapor.

JPL's May 15-16 Open House was once again a smash hit with the public, drawing an estimated crowd of 20,000 each day. Here is a sample of the activities as captured by the Photolab's Bob Brown. Clockwise, from above right: Guests at the Mars exhibit chat with JPL Director Dr. Charles Elachi and Dr. James Cutts, chief technologist of the Solar System Exploration Programs Directorate; an astronaut suit at NASA's exhibit; visitors queue for a peek through a solar telescope; and a Mars Exploration Rover full scale model standing sentinel.

Lab shows off its best at

OPEN HOUSE



Building 97 gets 86'd



Bob Brown/JPL Photolab

To mark the beginning of the Lab's infrastructure renewal, JPL Deputy Director Eugene Tattini (left) and Associate Director/Chief Financial Officer Fred McNutt last month helped begin the demolition of Building 97, which had been unoccupied for about two years. The building and its surrounding area north of Explorer Road have been designated for additional parking in JPL's Facilities Master Plan. Construction of the Flight Projects Center, the first of three large buildings identified in the Master Plan, has been twice delayed, but is now scheduled to begin in FY '06.

Passings

PADDY JOHNSTON, 77, a retired Deep Space Network operations engineer, died March 29.

Johnston came to JPL in 1967 from the DSN facility in Canberra, Australia. He joined Section 337 as an assistant project engineer for Mariner Mars 69 and later served as the DSN project engineer for the Viking Project. He also worked as DSN frequency coordinator in the Telecommunications and Mission Operations Directorate, Section 440, and later moved to NASA Headquarters as a detailee on frequency allocation and management.

Johnston leaves his wife, Marguerite, three daughters and seven grandchildren. In lieu of flowers, contributions may be made in his memory to the Alvin A. Dubin Alzheimer's Resource Center, 10051 McGregor Blvd., Suite 101, Ft. Myers, FL 33919.

Letters

I would like to thank all of my JPL friends and colleagues for their kind words, the sympathy cards, and the beautiful plant that I received following the death of my mother. These expressions of condolence are greatly appreciated.

Louis D'Amario

A very sincere thanks to my Voyager family for their outpouring of sympathy on the passing of my mother-in-law. Also, I would like to thank to the JPL ERC for the beautiful plant.

Jefferson Hall

To my many friends and co-workers, I would like to extend a sincere "thank you" for making my many years at JPL an outstanding and memorable experience. I also want to thank those who attended my retirement celebration at von Kármán, where I was presented with some very touching words of congratulations, recognition and terrific award plaques. JPL has been my home for 43 years and having the opportunity and pleasure to have worked 20 spacecraft launch projects with many outstanding team members is something that will remain in my thoughts forever. What a heart full of memories you friends and co-workers have given me. You all will be greatly missed and I look forward to the day when our paths will cross again. Thanks for the memories.

Tom Shain

Classifieds

For Sale

AIR CONDITIONERS: Kenmore, 8000 BTU, exc. cond., \$200; Amana, 6550 BTU, gd. cond., \$50; **CEILING FAN,** Casa Vieja, white/gold, 5-blade, 3 spd., 4 lights, vg cond., \$75. 626/633-0073. **BEDS,** trundle, twin sizes, mattress, black metal frame, upper matr. gd. cond., lower matr. like new, orig. pd. \$750, sell for \$100, will bring to JPL when sold. 909/596-9202, evs. **BOOK + BINDER,** guitar accompaniment for English hymns, Oregon Catholic Press, Vol I-II, 2003, barely used, \$40. 626/840-0955, Mary. **CLOTHES:** lady's jacket, leather, black, medium size, \$50; men's slacks, size 42 x 44, \$8; men's sport coats, XL, \$10; dress shirts, new, 17-33 x 34L, \$5 ea; ties, \$1. 790-6060. **CLOTHES,** infant: jacket, navy blue, zip-up w/hood, by Rothschild, size 3T, exc. cond., \$7/obo; jacket, red/navy blue, zip-up w/hood, Old Navy, size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, button, size 3T, \$1/obo; photos available. 626/791-6101. **COCKATIELS,** 2 males, each has own cage w/accessories, \$75/ea. w/cage, \$125/both w/all accessories; to a good home. 310/753-9123. **COMPUTER DESK,** on wheels, cherry veneer, made by O'Sullivan, model 61925, exc. cond., like new; best offer. 626/449-0997. **COMPUTER MONITOR,** Dell, 21" CRT, 2.5 yrs. old, low usage at home, exc. cond., costs \$630 new from Dell today, sell for \$300/obo. 626/794-7498. **COUCH** (6 1/2 ft.) & loveseat (5 ft.), floral pat-

tern upholstery, exc. cond., \$150/obo; **COFFEE TABLE,** wrought iron, great in any living room, den or rec. room, \$50. 626/446-4338.

DODGER TICKETS, selected games from season ticket pkg., loge level (orange), aisle 132, inside 1st base, 2 tickets/gm., face value (no tickets avail. for Yankees series), \$30 ea., see www.delunac.net/tickets. 626/296-1253.

DRYER, Roper, electric, extra lg., 4 cycles, 3 temps., 5 years old, gd. cond., \$50. 957-2805.

EXERCISE MACHINE, Nordic Trak Pro Ski, gd. shape, Monrovia area, \$65/obo. 626/358-3730.

FURNITURE: desk, carved oak 50" W x 24" D, 2 matching bookcases, 50" H x 25" W x 12" D, \$500; Techline, office, white, 6 pcs., \$350; rug, Spanish, hand-made, 7' x 9', bright pink & orange, \$200; mirror, framed, tall, wood, \$25; server, mission, oak, 38 W x 20 D x 37 H, \$300; 2 lamps, ceramic, dusty rose, \$30. 626/584-0860, day; 626/794-3144, eve., Donna.

FURNITURE: sofa, floral; dresser set w/glass top, 2 end tables & large mirror; chest, black, Chinese style, desk & chair, brown. 790-3543.

FURNITURE: 2-piece Bassett sectional (1 pc. is a sleeper), floral print; one 40" coffee table and two 26" end tables (mission style); photos available; all in good condition; \$500/obo; parts could be sold separately. 626/791-6101.

GOLF SET, complete, left handed, 9 irons (3-SW), 3 woods (1, 3 & 5), bag, balls, glove, covers, towel, jacket, tees, everything, buy today, play tomorrow, \$200. 805/403-9864, Ed. **GUITAR,** electric, Parker Nitely M, USA-made, solid mahogany body, two humbuckers, piezo bridge, only a few mo. old, gig bag, stereo cable, \$850/obo. reverb202@yahoo.com.

HOUSEHOLD: sofa, 90," fine cond., \$150; chairs, 6 arrow-back mid-19th Cent. rush-bottom, \$300; collectibles: Stengelware from Trenton, NJ, pitcher, 12 goblets, large platter, \$50; antiques: Old Wedgewood plates, reasonable prices; beer light, Olympia neon, \$40; potted cacti plants. 248-9000, Bob.

JUICE FOUNTAIN, Breville, stainless steel, great for daily use, bought 10/03, used 2-3 times only, orig. pkg., \$100/obo. 626/840-0955.

LENS, Canon EF, 28-200M USM 200M, for Canon EOS cameras, exc. cond., \$250. 661/297-5234.

MIRROR DOORS, 2, double sliding, w/rails, as new, 80" H x 30" W, \$25/pair. 626/309-0205.

MISC: pool table, 8', \$500; tablecloths, 2, slate blue, oval & 18 matching napkins/rings, \$10; shovels, \$2 ea; hoe, \$5; punch bowl set, 18 pc., \$10; mailbox, oversized, \$20; sytch, \$10; wig, red, shoulder length, \$20; cedar chest, antique (lid needs repair), \$45; food-saver w/bags, \$20; oil painting, lg., landscape, gold tones, paid \$175, sell \$75. 626/357-8210.

MOVING SALE, vg cond.: couch, 8' white; bedroom sets; dressers, beautiful; chairs, antique, classic; sofa/hide-a-bed; china hutch and credenza; file cabinets; bookshelves; dining room set; end tables; books; VHS tapes. 909/981-7492, Darlene or dhauge@yahoo.com.

PHOTOGRAPHIC DARKROOM EQUIPMENT, Beseler 67CS enlarger, 50 mm/f2.8 Nikon EL-Nikkor lens, Beseler filters, Grabal 300 enlarging timer, Omega CS-10 timer, Bogen enlarging easel, editing tools, negative developing tank, 6 lg. darkroom trays, thermometer, graduated cylinder, more, vg. cond., orig. owner, \$175 for enlarger, lens, filters, timer; \$50 for everything else. 790-5902, Carol.

SCOOTER, for disabled, Pacesaver, 4 wheel with basket, etc., new batteries, exc. cond., looks new, \$750/obo. 790-6060.

THEATER TICKETS, 2, Little Shop of Horrors, Ahmanson Theatre, Aug. 26, 8 p.m., seats in mezzanine, \$140. 790-8523.

TRAYS, "Han-D" lithographed, metal (~20), w/ 5 unopened pkgs. of paper plates, coated, divided "plates" are ~ 9" x 14", for patio, picnics, etc. 909/593-4046, vividavies@earthlink.net.

VIDEO EDITING SYSTEM, Panasonic WJ-MX12 digital audio-video mixer, 2 Sony PVM 1341 13" in/out monitors, unused; cost \$2,750, sell for \$500. 248-9000, Bob.

WASHER & DRYER, gas, Whirlpool, gd. cond., \$100 for both. 352-4102.

Vehicles / Accessories

'98 ACURA Integra, 2-dr., gd. cond., 5 spd., black, 72K mi., 100K mi. warranty, am/fm/CD, \$9,700/obo. 626/705-1312 or sorozco@cfcu.org.

'96 BMW 328IS, great cond., butter smooth power, wonderful handling; a joy to drive, sports package, sunroof, 6-CD changer, premium sound, loaded, \$9,500/obo. 790-2799.

'91 BMW 525i, 4-dr., gd. cond., automatic, burgundy, 172Kmi., pwr moonroof, alarm, keyless entry, am/fm/cass., 6-CD changer, \$6,300/obo. 626/705-1312 or sorozco@cfcu.org.

CARGO CARRIER, roof mount, aluminum construction, interface includes all mounting hardware, \$50/obo. 626/358-3730.

'97 CHEVROLET Suburban LS, V8, driver & passenger airbags, power everything, no accidents, flawless condition, e-mail for pics: vake3377@yahoo.com. 846-0053.

'95 CHEVY Tahoe LT, 4 x 4, 5.7 V8, silver, exc. cond., 1 owner, 100K, auto., a/c, pwr windows/doors/locks, CD/cass., running boards, leather, roof rack, grille guard, towing pkg., sheepskin seat covers, LoJack, loaded, \$8,000. 368-6874.

'93 CHEVROLET Suburban 2500, 2 x 4, 350 V8, exc. cond. inside/out, well maint., low mileage, a/c, power doors/windows, wood trim dash, custom front seat sheepskin covers, running boards, new tires w/Weld wheel, Flowmaster exhaust and Street Scene grill insert, \$8,900. 626/359-7666.

CHEVROLET, Tonneau bed cover, for pickup, hard fiberglass, made by snug-top, white gelcoat, fits '88-'98 shortbed, incl. all mounting hardware & shocks, exc. shape, \$250/obo. 626/358-3730.

'99 FORD Taurus LX sedan, white, very clean; like new interior, cass., player, pwr windows/doors/mirrors, well maint., exc. cond., \$4,550. 310/836-0779.

'96 FORD F250 Crew Cab XLT, auto, V8, 7.5L, 60K mi., orig. owner, short bed, camper shell, tow pkg. (never used for towing), lumbar support seats, well-maint., garaged, white w/blue interior, exc. cond., must sell, \$9,800. 626/585-8213.

'88 FORD Taurus LX wagon, top of line, loaded, power seats/mirrors, keyless entry, etc., exc. cond., orig. beige finish, carefully maintained, 8 pass. capacity w/rear seat, \$2,900/obo. 626/798-2925.

'01 HONDA 929RR, exc. cond., 4K mi., \$6,500. 661/993-9091, Matt.

'01 HONDA Accord EX, 23.9K mi., 6 CD in dash w/cass., sunroof, fog lamps, cloth int., 5-speed manual, ext. warranty, LoJack, silver, car bra, a/c, great on gas, \$18,500. 949-4429.

'93 HONDA Nighthawk 750 motorcycle, black, gd. cond., 23K mi., \$1,500. 241-0444.

'94 ISUZU Trooper LS, 4D, automatic, 4WD, V6, 3.2L, DOHC, locking hubs, antilock brakes, cruise control, alarm, am/fm stereo, 12-CD player, white, exc. shape, tinted windows, new a/c, new transm's n, pwr. steering/windows/locks, tilt wheel, rear window defroster, rear window wiper, exterior spare tire carrier, immaculate, \$5,200/obo. 406-5104.

'00 JEEP Cherokee Grand Laredo, 46K mi., exc. cond., power door, air, CD, gray color, \$11,250/obo. 731-0470.

'96 LEXUS SC300, V6, loaded, 48K mi., power leather seats, moonroof, alloy wheels, 12-CD changer, premium sound, spoiler, gold color, exc. cond., \$12,750. 909/599-3230.

'95 MAZDA Millenia, 77K mi., 1 owner, well maint., all service records, auto, a/c, leather, 6-CD player, moonroof, cruise and climate control, power seats, new tires, \$4,800/obo. 790-4703.

'89 MERCEDES BENZ 260E, 4-door, gold, 147K original miles; garage-kept, interior perfect, looks and runs great, new tires, brakes; \$4,500. 626/794-6860.

'94 MERCURY Sable wagon, V6, 3.8L, auto, 80K mi., power steering/brakes, cruise control, dual front airbags, am/fm/cass., a/c, garaged, well-maintained, vg cond., \$2,995. 626/585-8213.

'99 REXHALL AERBUS motorhome, Ford V10, 35", only 7K mi., slideout, Levelors, 6.6 Kw gen., Corian counters, hardwd. floor, backup camera, side-by-side fridge, microwave/convection oven, 2 TVs, VCR, CD, auto. roof vents, gelcoat exterior, much more, immac. in/out, finest quality, view at <http://www.rvsearch.com/findrv/index.cfm?a=d&t=36261&id=81429>, below Bluebook, \$65,000. 909/944-1064.

'96 TOYOTA 4-Runner, exc. cond., new set of tires, \$7,000/obo. 626/484-1723.

'92 TOYOTA Dolphin motorhome, pastel blue, slps. 5, 16 mpg, 82K mi., V6, automatic, cruise control, awning, roof & cab air, rear ba., microwave, TV ant., innerspring mattress (not foam), linoleum floor, well-maint., manuals incl., like new inside, see photos: <http://tinyurl.com/36wvt>, \$13,500. 626/798-4510, lv. msg.

'02 VOLKSWAGEN Passat GLS, 1.8 turbo, 31K mi., loaded, premium sound system, moonroof, leather seats, alloy wheels, exc. cond., \$15,500. 909/599-3230.

'99 VW Golf GL (new body style), 2 dr., 5-spd., manual, red ext., dark cloth int., 58,300 mi., perfect cond. in & out, new tires, new roof rack, see <http://spider.ipac.caltech.edu/staff/rafael/golf>, \$8,550. 323/644-5607.

'03 YAMAHA Vstar 1100 "Silverado," less than 1,000 miles, estate sale, \$8,500. 352-1991.

Free

BBQ, natural gas, Charmglow cart model, used regularly, needs cleaning, dual burner but only one side working. 626/798-5855.

Wanted

BICYCLES & PARTS, Schwinn, preferably older models, 1960s-'80s. 626/358-3730, Randy. **CARPOOLERS** from Diamond Bar, non-smoker, leaving (about) 7 a.m. 4-9329, Shu. **FITNESS STEP + RISERS** for aerobics, Reebok, approx. 4 x 16 x 43." 626/345-0681.

HOUSE TO RENT, mature couple seeking unfurn., for about 1 yr, perhaps longer, have 2 cats + 1 dog, if you called from last ad, please call back, I lost your number. 235-4015.

MATH TUTOR, Jr. & Sr., high school level classes, pre-algebra, geometry, algebra I & II, SAT, etc. 888/784-1639, David, evs and/or weekends, leave msg.

MUSICIANS, guitarist seeks for informal jams, rock/blues, etc. reverb202@yahoo.com.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present, for personal use. 790-8523, Marc Rayman.

TUTOR, biology & math for high school student, Pasadena area. 626/241-5954, Dana Lin. **VANPOOL RIDERS,** from Victor Valley to JPL, Ext. 4-1424, Scott.

For Rent

ALHAMBRA townhouse, 2 + 2 1/2, 1,350 sq. ft., new stove/carpet/pain/dishwasher, refrigerator, laundry hookup, fireplace, patio, pool,

park views, nice area, close to shopping, movies, freeways, 20 min. to JPL, adjacent to South Pasadena + San Marino, 110 N. Chapel Ave. 213/925-2662, Nhien or Marcello Barros. **ALTADENA** home for lease, charming French Normandy architecture in private cul-de-sac w/quaint wishing well, walk to Altadena Golf Course, 2 bd., 1.5 ba., living room w/fireplace, washer/dryer, dining room, impeccable hardwood floors throughout, refrig. & stove, cent. a/c & heat, enclosed garden, \$2,000, incl. water & gardener. 626/399-1710, Ray Lemus.

ALTADENA house, 1 mile from JPL, 2 bd., beautiful hardwood floors, wood-burning fireplace, French doors, remodeled kitchen & bathroom, dishwasher, a/c, washer/dryer, gardener included, detached 2-car garage, gated back yard w/patio, \$1,500. 626/791-7081.

ALTADENA "sabbatical house," 3 bd. + study, boundary Angeles Nat'l Forest, 3 mi. from JPL (trails to Lab behind house), view, hardwood floors, fireplace, antiques, completely furn.: furniture, dinnerware, pots/pans, linens, down comforters, fine soaps, necessities incl.: just bring toothbrush & clothes, TV/DVD/VHS, Bose radio/CD, Dish satellite, wireless DSL, available, garden, courtyard, BBQ, parking, private, immac., month-month. 626/798-3235.

LA CANADA, private room in home, private bath, off-street parking, BBQ, pool, full kitchen priv., wash/dry, etc., available 6/15, \$550 + utilities. 790-1280. **MONTEREY HILLS** condo, 2 bd., 1 ba., 3rd flr./private end unit, open and airy with nice view, fireplace, hardwood flrs. & carpet, central air/heat, dishwasher, stove, laundry rm. (w/washer/dryer hookups), pool, secure ground-level parking, close to 110 fwy, 15 min. from JPL, \$1,200, cable, trash, gas and water included. 626/296-9073.

PASADENA condo, spacious 1 bd., 1 ba., walking distance to Caltech, close to 210 fwy., near Gold's Gym, \$1,000. 790-0308.

PASADENA condo, spacious 2 bd., 2 ba., 2-car gar., in-unit washer/dryer, fireplace, storage, 1/4 mile to Caltech, <http://rental.kvon.com>, \$2,295. 626/233-9496, Kevin.

PASADENA studio condo, fully furnished, 1115 E., Cordova Ave., gated facility, 2-blocks from Caltech, pool & BBQ, patio, carport, laundry, utilities paid except electric, non-smoker, no pets, \$925. 626/792-9053, Ray or Marilyn.

PASADENA unfurn. 2 bd., 1.5 ba., 2-story townhome-style apt., central a/c, refrig & stove, laundry room, patio, parking; close to Caltech & JPL; \$1,095 + utilities. 626/429-3677 or bettyrs@earthlink.net.

Real Estate

GLENDALE, ranch-style house, upper Ross-moyne, newly remodeled, 4 bd., 2.5 ba., brand new family rm. & 2-car gar.; kitchen has new granite counter tops, GE Monogram stainless steel appliances; spacious master suite, formal dining rm., 2 fireplaces (1 in liv. rm., 1 in bdrm.), new deck overlooks park-like 13,490 sq. ft. lot, near end of cul-de-sac, 1444 Cordova, \$1.05M. 249-4536, Steve or Shelley.

NATIONAL FOREST, 68 acre, 2 lg. bd., 1 ba., lg. den w/fireplace, kitchen, 2 refrig., pantry, washer/dryer, tools, electric, propane 288 gal., barn, workshop, tractor w/attach., \$289,900. 790-5586, Chris Thomas, Realtor.

Vacation Rentals

BALBOA ISLAND, cute 2 bd., 1 ba., apt., avail. weekly July-September, fully furnished, sleeps 5, covered deck, laundry, steps to bay and canal, \$1,200-\$1,500/wk. 626/429-3677 or bettyrs@earthlink.net.

BIG BEAR LAKEFRONT luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, slps. 6. 949/786-6548.

CABO SAN LUCAS, very nice condo on beach, Sea of Cortez, 3 mi. north of town, peaceful & quiet, 2 bd., 2 ba., slps. 6, pools/Jacuzzis, BBQs, tennis, next to Calinda Hotel at Plaza Calafia, avail. June 26 - July 3, \$1,000. 626/791-2321 or edobinson@earthlink.net.

CAMBRIA house, ocean front, exceptional whitewater view, accom. up to 4 people, all amenities provided. 702/256-1359.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps. 4, laundry fac., low season rate \$115/nite/2, high season rate \$130/ nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

HAWAII, 2 bd. condo in luxury 5-star Kona resort, full kitchen, pool, beach front, snorkeling, scuba, golf nearby; available June 5-12, \$950/obo. 248-0871, Cathie.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc nt. 626/798-9222 or 626/794-0455 or valeriec@caltech.edu.

OCEANSIDE condo, on the sand, charming, 1 bd., panoramic view, walk to pier or harbor, pool/spa, game room, slps. 4. 949/786-6548.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.

SAN FRANCISCO, Nob Hill Inn, walking dist. to Union Square, cable cars, Grace cathedral, financial district and Chinatown, non-smoking property, 15 mi. from SFO, unit sleeps 4, one week from 7/30 to 8/6/2004 (Linux World Conference week), \$600. tcfcs@aprefix.com.

Editor

Mark Whalen

Design + Layout

David Hinkle, Audrey Steffan/
Design Services

Chief Photographer

Bob Brown/Photo Lab

Advertising

Laurita Borst

Universe is published every other Friday by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.

Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted via e-mail to universe@jpl.nasa.gov and are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

JPL'S ONLINE NEWS SOURCE



<http://dailyplanet>

View this and previous issues of Universe at

<http://universe.jpl.nasa.gov>

E-mail us at

universe@jpl.nasa.gov