

News Briefs 2	Moonrise sample return 3
Special Events Calendar 2	Letters 4
Spirit data online 3	Classifieds 4

Cassini uncovers new radiation belt

By Carolina Martinez

This artist's concept shows how Cassini is able to detect radio signals from lightning on Saturn.

The Cassini spacecraft, which began its tour of the Saturn system just over a month ago, has detected lightning and a new radiation belt at Saturn.

The spacecraft's radio and plasma wave science instrument detected radio waves generated by lightning. "We are detecting the same crackle and pop one hears when listening to an AM radio broadcast during a thunderstorm," said Dr. Bill Kurth, deputy principal investigator on the radio and plasma wave instrument, University of Iowa, Iowa City. "These storms are dramatically different than those observed 20 years ago."

Cassini finds radio bursts from this lightning are highly episodic. There are large variations in the occurrence of lightning from day to day, sometimes with little or no lightning, suggesting a number of different, possibly short-lived storms at middle to high latitudes. Voyager observed lightning from an extended storm system at low latitudes, which lasted for months and appeared highly regular from one day to the next.

The difference in storm characteristics may be related to very different shadowing conditions in the 1980s than are found now. During the Voyager time period when lightning was first observed, the ring cast a very deep shadow near Saturn's equator. As a result, the atmosphere in a narrow band was permanently in shadow — making it cold — and located right next to the hottest area in Saturn's

atmosphere. Turbulence between the hot and cold regions could have led to long-lived storms. However, during Cassini's approach and entry into Saturn's orbit, it is summer in the southern hemisphere and the ring shadow is distributed widely over a large portion of the northern hemisphere, so the hottest and coldest regions are far apart.

A major finding of the magnetospheric imaging instrument is the discovery of a new radiation belt just above Saturn's cloud tops, up to the inner edge of the D-ring. This is the first time that a new Saturnian radiation belt has been discovered with remote sensing.

This new radiation belt extends around the planet. It was detected by the emission

of fast neutral atoms created as its magnetically trapped ions interact with gas clouds located planetward of the D-ring, the innermost of Saturn's rings. With this discovery, the radiation belts are shown to extend far closer to the planet than previously known.

"This new radiation belt had eluded detection by any of the spacecraft that previously visited Saturn. With its discovery we have seen something that we did not expect, that radiation belt particles can 'hop' over obstructions like Saturn's rings, without being absorbed by the rings in the process," said Dr. Donald G. Mitchell, instrument scientist for the magnetospheric imaging instrument at the Johns Hopkins University Applied Physics Laboratory, Laurel, Md.

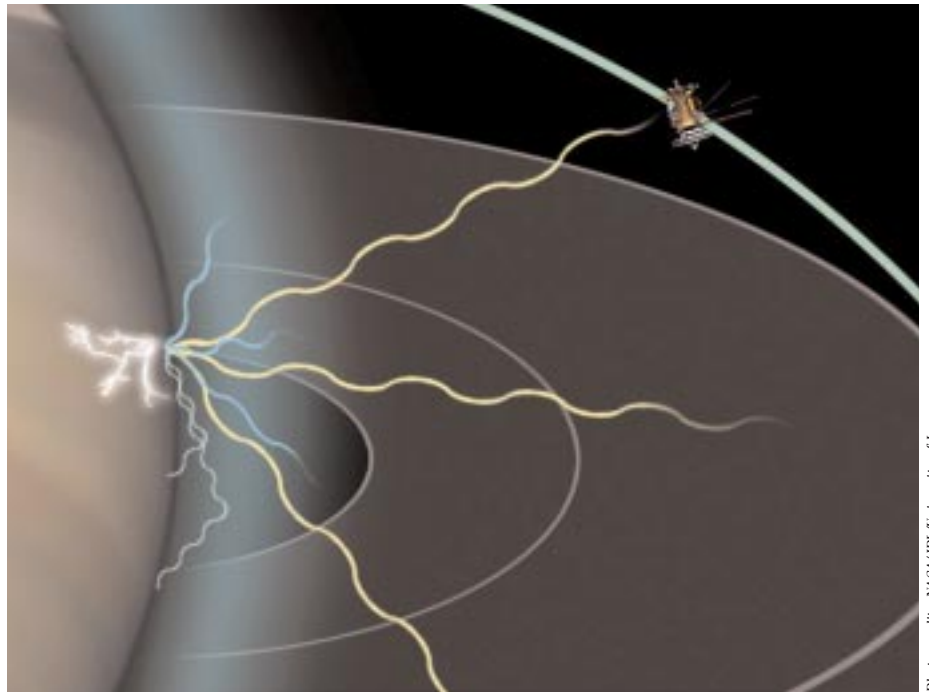


Photo credit: NASA/JPL/University of Iowa

Dying star goes out with a ring

By Whitney Clavin

Nearly one year since its launch, the Spitzer Space Telescope is busy capturing intriguing views of the cosmos.

In this new picture, the observatory has revealed a never-before-seen ring of material amidst the shimmering embers of a dying star. "Spitzer's infrared vision has revealed what could not be seen before — a massive ring of material that was expelled from the



dying star," said Dr. Joseph Hora, a Spitzer scientist at the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass. "The composition of the ring and how it formed are mysteries we hope to address with further Spitzer studies."

The dying star is part of a "planetary nebula" called NGC 246. When a star like our own Sun begins to run out of fuel, its core shrinks and heats up, boiling off the star's outer layers. Leftover material shoots outward, expanding in shells around the star. This ejected material is then bombarded with ultraviolet light from the central star's fiery surface, producing huge, glowing clouds — planetary nebulas — that look like giant jellyfish in space.

NGC 246 is located 1,800 light-years away in the Cetus constellation of our galaxy. Previous observations of this object by visible-light telescopes showed a glistening orb of gas and dust surrounding a central, compact star.

By cutting through the envelope of dust with its infrared eyes, Spitzer provides a more transparent view through and behind the nebula. "What we have seen with Spitzer is totally unexpected — a ring component that may consist of hydrogen molecules."

Ultimately, these data will help astronomers better understand how planetary nebulas take shape, and how they nourish new generations of stars. A scientific paper on this and other planetary nebulas observed by Spitzer will be published on Sept. 1 in *The Astrophysical Journal Supplement*, along with 75 other papers reporting Spitzer early mission results.

Spitzer was launched on August 25, 2003, from Cape Canaveral Air Force Station, Florida. Additional images and information about the Spitzer Space Telescope are available at <http://www.spitzer.caltech.edu>.

News Briefs

JPL Origins proposal selected

NASA has selected nine studies, including one from JPL, to investigate new ideas for future mission concepts within its Astronomical Search for Origins Program.

Some of the new mission ideas will survey 1 billion stars within our own galaxy; measure the distribution of galaxies in the distant universe; study dust and gas between galaxies; study organic compounds in space and investigate their role in planetary system formation; and create an optical-ultraviolet telescope to replace NASA's Hubble Space Telescope.

The products from these concept studies will be used for future planning of missions complementing the existing suite of operating missions, including the Hubble and Spitzer Space Telescopes, and developmental missions such as the James Webb Space Telescope and Terrestrial Planet Finder.

Each of the selected studies will have eight months to further develop and refine concepts for missions addressing different aspects of Origins Program science. The Origins Program seeks to address the fundamental questions "Where did we come from?" and "Are we alone?" NASA received 26 proposals in response to this call for mission concepts.

JPL's Matt Bradford is the principal investigator of "A Background Limited Infrared-Submillimeter Spectrograph for Spica: Revealing the Nature of the Far-Infrared Universe." The study will enable far-infrared spectroscopy of the galaxies that make up the far-infrared background out to distances of some of the farthest galaxies known today. Its spectral surveys will chart the history of creation of elements heavier than helium and energy production through cosmic time. Spica is a Japanese mission.

Transformation Dialogue at JPL

The next Transformation Dialogue will be held Aug. 20 at 12:30 p.m. It will be broadcast live on NASA TV, from JPL and will feature Dr. Charles Elachi, JPL Director, and Director of Advanced Planning at NASA Headquarters, and Kevin Petersen, Dryden Flight Research Center Director. Johnny Stephenson, the One NASA Implementation Team Lead from NASA Headquarters will moderate. The Dialogue topic will be "Competition vs. Collaboration: When Should NASA Centers Compete and When Should They Collaborate?"

To participate in a NASA-wide, online dialogue already underway, visit the "NASA Transformation" section of the Inside NASA website at <http://insidenasa.nasa.gov>. To submit a question to be addressed during the broadcast, e-mail it to transformation@nasa.gov before or during the show.

If you would like to be part of the live audience, contact Andrea Vanacore at 4-3359. Space is limited.

Trajectory maneuver brings Genesis closer to home

Thirty days before its historic return to Earth with NASA's first samples from space since the Apollo missions, the Genesis spacecraft successfully completed its twentieth trajectory maneuver.

At 12:00 Universal Time (5:00 a.m. PDT), Mon., August 9, Genesis fired its 90-gram (0.2 pound) thrusters for a grand total of 50 minutes, changing the solar sampler's speed by 1.4 meters per second (about 3.1 miles per hour). The maneuver required half a kilogram (1.1 pounds) of hydrazine monopropellant to complete.

"It was a textbook maneuver," said Ed Hirst, Genesis's mission manager at JPL, Pasadena, Calif. "After sifting through all the post-burn data, I expect we will find ourselves right on the money."

The Genesis mission was launched in August 2001 on a journey to capture samples from the storehouse of 99 percent of all the material in our solar system — the Sun. The samples of solar wind particles, collected on ultra-pure wafers of gold, sapphire, silicon and diamond, will be returned for analysis by Earth-bound scientists. The samples Genesis provides will supply scientists with vital information on the composition of the Sun, and will shed light on the origins of our solar system.

Relays from Mars show international interplanetary networking

One of NASA's Mars rovers has sent pictures relayed by the European Space Agency's Mars Express orbiter for the first time, demonstrating that the orbiter could serve as a communications link if needed.

The link-up was part of a set of interplanetary networking demonstrations paving the way for future Mars missions to rely on these networking capabilities. The American and European agencies planned them as part of continuing efforts to cooperate in space exploration.

On Aug. 4, as Mars Express flew over NASA's Mars Exploration Rover Opportunity, the orbiter received data previously collected and stored by the rover. The data, including 15 images from the rover's nine cameras, were subsequently forwarded to the European Space Operations Centre, Darmstadt, Germany, and immediately relayed to the rover team based at JPL.

Mars Express also is demonstrating two other networking modes with Opportunity and the twin rover, Spirit, between Aug. 3 and Aug. 13. Two NASA orbiters, Mars Odyssey and Mars Global Surveyor, have relayed most of the data the rovers have produced since they landed in January.

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.

Tues.-Wed., Aug. 17-18

Blood Drive: A pint for a pint—Held in von Kármán Auditorium from 10 a.m. to 4 p.m. Tuesday and from 7 a.m. to 1:00 p.m. Wednesday. All participants will receive a coupon for a pint of Baskin Robbins ice cream. Advance sign up 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 sign ups, or to change your appointment, call the Red Cross at (626) 960-6956 x225.

Tuesday, August 17

JPL Hiking Club—Retired Pomona College professor Bob Herman will discuss historical buildings in downtown Los Angeles at noon in Building 238-543.

Wednesday, August 18

TIAA/CREF Enrollment Meeting—This workshop at noon in T1720-137 is designed to assist employees newly eligible for the Caltech/JPL retirement plan with investment options and the completion of their enrollment forms.

Thursday, August 19th

Claremont Graduate University/The Peter F. Drucker and Masatoshi Ito Graduate School of Management open house—from 3:30 to 5 p.m. in the

180-101 conference room. Certificates are available in General Management, Leadership and Strategy. There are also EMBA (Executive Master of Business Administration) and MSAM (Master of Science in Advanced Management) programs available. Certificate courses may be offered on Lab during the early evenings depending on demand. For more information, call Professional Development at 4-3750.

Thu.-Fri., August 19-20

Von Kármán Lecture Series—Orbiting Carbon Observatory deputy principal investigator Charles Miller will present "Understanding Atmospheric CO₂ and Its Impact on Climate Change" 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/aug04.cfm>. For more information, call Public Services at ext. 4-0112.

Friday, August 20

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

Saturday, August 21

Caltech/JPL Day at Dodger Stadium—The festivities start at 11 a.m. with a carnival for all the family, followed by the game between the Dodgers and the Atlanta Braves at 1:10 p.m. Tickets are \$4 and are on sale at the JPL Store, the credit union in Building 218 and the credit union branch in La Cañada.

Tuesday, August 24

Noon-1:00 p.m., Section 367 will present "A Word Is Worth A Thousand Pixels: Data Mining in Large Collections of Science Images," featuring Dominic Mazzoni of the Exploration Systems Autonomy Section, in the 167 Conference Room. Mazzoni will discuss two specific approaches to image data mining that his group has used successfully in several different science domains.



Wednesday, August 25

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Dirk Rounge at ext. 3-0465 for information.

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

How much is that doggie in the window?...



Aibee, an interactive robot art project, performed in the Mall July 30. The robotic dog interacts with people bringing origami flowers into its hive tent.

As a member of the NASA Faculty Fellowship Program, Professor Sheila Tejada from the University of New Orleans has been collaborating this summer with Dr. Ayanna Howard in the Tele-Autonomous Research group on robot construction workers

for building habitats on the Moon and Mars.

Aibee employs the Virtual Synergy Interface developed by Tejada. Virtual Synergy combines a three-dimensional graphical interface with robots to allow for collaboration among several people, simulated software agents and robots.

For more information on the Aibee project, visit <http://www.aibee.org/>.



This self-portrait of NASA's Mars Exploration Rover Opportunity comes courtesy of the Sun and the rover's front hazard-avoidance camera. The dramatic snapshot of Opportunity's shadow was taken as the rover continues to move farther into "Endurance Crater." The image was taken on sol 180 (July 26, 2004), a date that marks achievement of fully double the rover's primary 90-sol mission.

Spirit data now online

Millions of people have viewed pictures from NASA's Spirit on the Mars rovers' home page and other Internet sites. A more complete set of science data from Spirit's first 30 martian days is now posted on a site primarily for scientists and technical researchers, but also available to anyone who's interested.

The first installment of images, spectroscopic measurements, daily reports and other information from NASA's Mars Exploration Rover mission has been posted on NASA's Planetary Data System site. It is available with a new "Analyst's Notebook" user interface at <http://pds-geosciences.wustl.edu/meran>. Home page for the Planetary Data System is <http://pds.jpl.nasa.gov>. Images are also available from the system's Planetary Image Atlas, at http://pdsimg.jpl.nasa.gov/cgi-bin/MER/search?INSTRUMENT_HOST_NAME=MARS_EXPLORATION_ROVER.

Data from Opportunity's first 30 martian days, or "sols," will be added Aug. 24, and data from later portions of both rovers' missions will be added in October.

"All the raw images and selected processed images and other information have been shared with the public since the rovers first reached Mars in January. This release adds other derived images and maps used for planning, all the non-image data from the spectrometers, daily operational reports and activity plans," said Dr. Ray Arvidson of Washington University, St. Louis, deputy principal investigator for the twin rovers' science payload.

"The 'Analyst's Notebook' is designed to help you navigate through the data and understand the synergies," he said. "You can't deal with the Moessbauer spectrometer readings from a given sol without information about other observations that go with it."

"We are proud to be releasing such a comprehensive set of data from the surface science mission of the twin rovers so quickly," said Dr. Jim Garvin, NASA's chief scientist for Mars. "It's a testament to the dedication and commitment of the science and engineering teams that this remarkable collection of information is now available to the entire world for interpretation, education and to help guide NASA's new exploration focus," added Garvin.

Images and additional information about the project are available from JPL at <http://marsrovers.jpl.nasa.gov> and from Cornell University, at <http://athena.cornell.edu>. The Planetary Photojournal, at <http://photojournal.jpl.nasa.gov>, is another resource for easy public access to images of Mars and other worlds.

Moonrise proposes to return lunar samples for NASA's New Frontiers Program

In the July 30 issue, Universe profiled "Juno," one of two proposed missions selected by NASA earlier last month for detailed study in the agency's New Frontiers Program. The other proposal chosen by NASA as a New Frontiers candidate is "Moonrise: Lunar South Pole-Aitken Basin Sample Return Mission." This investigation proposes to land on the far side of the moon, inside a large basin, and to return two kilograms (about five pounds) of lunar materials from a region of the moon's surface believed to harbor materials from the moon's mantle.

The proposal teams Dr. Michael Duke of the Colorado School of Mines, principal investigator with JPL and Lockheed Martin, and a science team that resembles a who's who listing of experts in the field of planetary science and sample analysis. The project scientist at JPL is Dimitri Papanastassiou (Section 3264).

The proposed mission would have many firsts — "Moonrise" would be the first US planetary surface robotic sample return; it would be the first mission to return a sample from the surface of the moon in more than 35 years and the first time that JPL will have a significant role in flight system development for a competed mission.

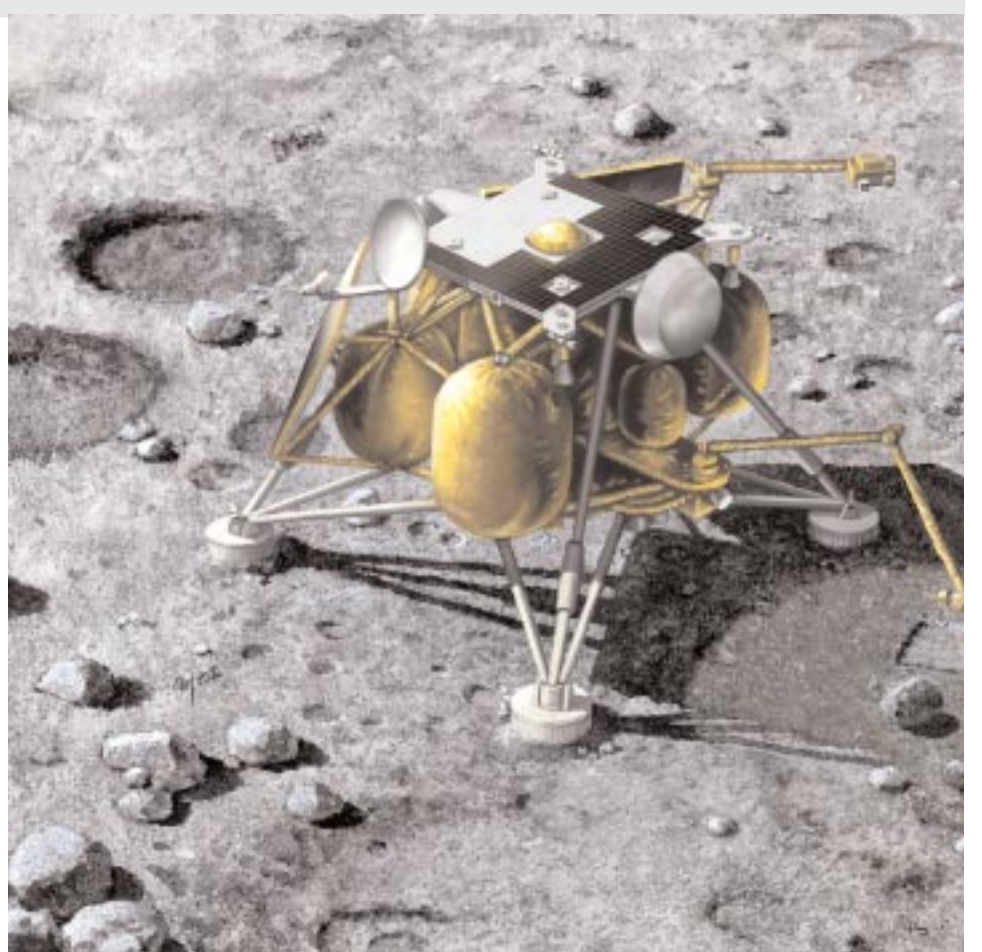
The primary scientific goal of Moonrise is to investigate the evolution of the solar system, through the fate of large impactors in the inner solar system, in the first half billion years of solar system history. Dating of returned Apollo and Luna samples has long indicated a concentration in time of large basin formation by impacts at about 4 billion years ago, for the basins on the front, Earth-facing side, of the moon. Competing theories suggest that the observations were either due to a large, late spike in the frequency of impacts on the moon, and also the early Earth, dubbed the Lunar Cataclysm. Or, alternatively, the data represent the tail-end of the impact history, with many of the impacts on the moon prior to 4 billion years having been obscured by the events around 4 billion years ago. Earth must have also

been subject to the same type of impacts, but the surface of Earth is active and this evidence has not been preserved. The fate of impactors is important to understand the evolution of the inner solar system and may be related to the emergence of life on Earth, more recently than 4 billion years ago. As the largest and oldest basin on the moon, the South Pole-Aitken Basin can serve as a starting point to understand lunar impact history between the time of its formation and the age of the near-side basins.

"The moon contains a unique record of the external environment within which the Earth's surface took shape in the period when life was just starting. The moon has been and will continue to be the scientific cornerstone for our understanding of the early evolution of the terrestrial planets," said Dimitri Papanastassiou, senior research scientist and JPL project scientist for the mission.

Sample analysis is the only way in which the composition and age of mixed rock fragments in the lunar regolith can be precisely determined and is therefore critical to science objectives of the Moonrise mission. Moonrise will return samples for analysis in laboratories on Earth, where the expertise of the science team and the full diversity of techniques available can yield valuable science data.

Speaking about the selection of the Moonrise and Juno missions, Dr. Ed Weiler, NASA's associate administrator for space science, said "These two outstanding proposals were judged to be the best science value among the seven submitted to NASA in 2004. It was a very tough decision, but we're excited at the prospect of the discoveries either of



them could make in continuing our mission of exploration of the solar system, and what they could tell us about our place in the universe."

Each proposal will now receive up to \$1.2 million to conduct a seven-month implementation feasibility study focused on cost, management and technical plans, including educational outreach and small business involvement.

Following detailed mission concept studies by Moonrise and Juno, due for submission by March 2005, NASA intends to select one of the mission proposals for full development as the second New Frontiers mission by May 2005. The selected New Frontiers science mission must be ready for launch no later than June 30, 2010, within a mission cost cap of \$700 million.

The two selected proposals were submitted to NASA in February 2004, in response to the New Frontiers Program 2003 and Missions of Opportunity Announcement of Opportunity. The New Frontiers Program is designed to provide opportunities to conduct several of the medium-class missions identified as the top priority objectives in the Decadal Solar System Exploration Survey, conducted by the Space Studies Board of the National Research Council.

Letters

Sincere thanks to my friends and co-workers for their support and their words of concern and sympathy during the illness and recent death of my father. My family and I appreciate your thoughtfulness. Thanks also to JPL for the beautiful plant that was sent to my home.

Julie Cooper and family

On behalf of the Ferren family, I would like to thank my co-workers and colleagues in Div. 27, and the many friends here at JPL for their kind words, thoughts and condolences on the recent passing of my mother. To the entire JPL community, thank you. Through the many years my family has been associated with JPL, your astonishing achievements never ceased to amaze her. Thanks also to JPL for the beautiful plant.

Dennis Ferren

I would like to thank my friends and co-workers for their kind words of support and sympathy on the passing of my mother. Thank you also to JPL for the beautiful plant.

Robyn Lefler

Classifieds

For Sale

AUDIO RECEIVER, Onkyo, TX-SV9191thx, home theater, 110 w/ch rms @ 8 ohms, \$200. 626/305-6166.

BAR STOOLS, new, mesquite & brown leather, 30" H, \$250 pr. 653-9561, Sue. BICYCLE, tandem, Schwinn, 5 speed, red, gd. cond. (some rust), saddle bags and pump, \$150. 248-8619, Tom Farr.

CAMERA, digital, Olympus Camedia 2040ZOOM, 3x optical zoom, 2 megapix, very bright, large lens, fantastic pictures, 128 MB card, exc. cond., \$189/obo; DVD RECORDER, Panasonic, DMR-E50P, DVD-R/RW/DVD-RAM, exc. recording quality, up to 6 hr./DVD, <1yr. old, time slip, remote, exc. cond., \$199/obo. 909/592-2279.

CARPET nearly-new, light-mauve, high-quality, 1 piece about 16 x 17, 1 piece about 12 x 11, \$125 & \$80. 626/794-1432.

CARTRIDGE, for Brother fax machine, model PC-102RF, brand new, \$20; DIET TAPES, Jenny Craig, set of 14, \$25; CONTROL CENTER, computer power, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; CARD SHUFFLER, Johnson, collectible item, all-metal construction with carved-wood dowel handles, stands ~6" handle-high, and ~9" by 6", \$35. 790-3899.

CLOTHES, infant: jacket, red/navy blue, zip-up w/hood (old navy), size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, buttons, size 3T, \$1/obo; zipper shoes, Spongebob motif, size 11M, exc. cond., \$6/obo; photos available. 626/791-6101.

COMPUTER, Dell Dimension 4100, desktop, P3 933MHz, 8G HDD, no bad sector, 384M RAM, Sony 15" CRT/usb/lan/modem/sound/vga, mouse/keyboard/all orig. Dell CDs, manuals, boxes, perfect working order, VG cond., sell due to upgrade, \$120/obo. 626/304-9249.

COMPUTER, Pentium, 300 MHz, 128 MB RAM, 3 G byte HD, Win. 98, \$100/obo; monitor, Radius, \$75; speakers, Cambridge, \$10; keyboard & mouse, \$5; everything, \$175. 626/282- 8515.

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

DINING ROOM SET, Spanish revival, table and 8 high-back chairs, exc. cond., \$1,200. 626/799-3087 or 626/644-2889.

DINING TABLE, smoked glass top, 72" x 42" W, 6 upholstered fabric chairs, exc. cond., \$149/obo. 909/592-2279.

DINNER JACKET, men's, formal, 42 long, burgundy color, tuxedo quality, like new, \$25 (\$125 value). 626/793-1895, Albert.

DODGER TICKETS, selected games from season ticket package, Loge level (orange), Aisle 132 (at first base), two tickets per game at face value of \$30 per ticket, see www.delunac.net/tickets. 626/296-1253 for details and available games.

DODGER TICKETS, up to 4 seats in Loge 164, row J, from my season ticket package, available for most remaining games, \$14 ea. 542-9828 or kimandgene@earthlink.net.

DRYER, apartment size, clothes, \$70. 626/794-1432.

FURNITURE, antique: dresser, pine and enamel, 4 drawers, 34" W x 39" H, \$75; secretary's desk, fold-down front, 26" W, painted, \$30; rocking chair, oak, \$75; desk shelf, not-so-antique, oak, 48" W, \$20; three shelves, hanging set, \$20; all in exc. cond. 626/584-6518.

BEDROOM SET, queen headboard, oak, traditional style, gd. cond., \$375. 626/359-7666.

HITCH, Equal-i-ler sway control, complete

system, the best sway control hitch available, exc. cond., \$160. 626/359-7666. ICEBOX, antique, oak, exc. cond., made around 1915, 44" H x 32" W x 18" D, \$600. 352-4033, after 5 p.m..

LUMBER, white oak FAS, 4/4, \$3 bd. ft.; Cherry \$5; also 1C and thickness to 16/4. 626/798-5110.

MATTRESS, box springs and heavy frame, Cal. king, Simmons Beautyrest, Dresden-Firm, new 4/02, used 1-1/2 years, perfect cond., paid over \$1,100 on sale, sell for \$390. 805/955-0331.

MISC: bed pillows, 2, non-allergenic, full size, new, \$5 ea.; blanket, pink, new, full size, \$7; sleeping bag, adult roll-up, inside like new, \$10. 626/793-1895.

MISC: bicycles, 3, 10-speed, \$50/obo ea; toaster ovens, 4, \$6 ea; convection oven, Farberware, \$45; floor lamp, Xenon, 6', black, \$20. 626/282-5815.

MISC: 8' pool table, \$500; table cloths, punch bowl set, 18 piece, \$10; mailbox, oversized, green, \$10; wig, red, shoulder length, never used, \$20; electric frying pan, \$10; answering machine, \$5; portable basketball set (needs net) \$200; fishing pole (saltwater), \$25; bunk bed \$50. 626/357-8210.

MISC: exercise benches, 2, flat, \$50; incline bench, \$50; dumbbells, free while they last; microwave, Sharp Carousel, \$50; aluminum fry pans, 12" and 14", non-stick, restaurant quality, \$15 ea.; bike, woman's, Trek 700, \$150; ski rack, used once \$25; ski boots, men's, used once, \$25, all in exc. cond., 626/449-6799, Bob.

MISC: refrigerator, Sanyo 4.5, like new, less than 1 yr. old, perfect for home and office, \$100; printers, 3, new with manuals, great for high school & college; 2 computers, 1 laptop, all hardly used, gd. cond., see to appreciate, prices negotiable. 626/398-5761.

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

PIANO, Yamaha, digital, Clavinova CLP150C, cherry, superb cond., w/bench, manuals (3 languages), music book, CD, headphones, adaptor, buyer arranges pick-up in Glendale, \$1,700. 545-1114, Yumi. PICNIC TABLE, 54" dia., round, varnished redwood w/4 curved benches & 4 side tables, umbrella, base, exc. cond., \$50. 626/584-6518.

REFRIGERATOR, Kirkland by Whirlpool, 18 cu. ft., white, top freezer, great for apartment or garage, 9 mos. old, must sell, moving, \$300. 731-8791.

SCUBA EQUIPMENT, masks, flippers, wetsuits, drysuits, BCS, etc., 3 different sizes. 626/447-4734.

SCULPTURES, wizards, 3, ceramic, exc. cond., not antiques but unique, only 200 of each in the world, each is different, holds a small clear ball in hand, has beard, about 10" H; if you're into Lord Of The Rings, these are for you, \$100/ea. 352-4033, after 5 p.m.

SOFA, sectional, 2-piece, Bassett (1 piece is a sleeper), floral print, photo & dimensions available, cushions need new covers, rest in gd. cond., \$300/obo. 626/791-6101.

SOFA grouping, light beige color, exc. cond., \$375. 626/305-6166.

SOFA, hide-a-bed, 6 ft., \$25/obo; arm chair, maple, \$10/obo, both in gd. cond. 249-3602.

THEATER TICKETS, 2, Little Shop of Horrors, Ahmanson Theatre, Aug. 26, 8 p.m., seats in mezzanine, orig. \$140 + fees for pair, sell \$100. 790-8523.

TOASTING FLUTES, Marvin & Mrs. Martian, wedding, new, beautiful, pewter and hand-blown glass, designed by Seagull Pewter exclusively for Warner Bros. Studio stores, edition of only 1,000 sets, comes w/certificate of authenticity, orig. \$145+, yours for only \$30. 468-2421.

TROPICAL FLOWERS, plumerias, variety of colors and sizes; shell fingers. 626/444-6156, Annie or Bob.

WADING POOL, Little Tykes, blue, hard plastic, outer dia. 5', water area 4' dia. & 1' D if filled to brim, small integral slide, drain plug, sell for \$30. 626/303-1927.

WASHER, Whirlpool; DRYER, GE, gas; left from previous home owner, gd. cond., \$150/ea. 626/241-7084, Steve.

Vehicles / Accessories

'88 BMW 323, 85K mi., blk., auto, 2 dr., 1hr., sunroof, new brake pads and rear rotors, new rear tires, great cond., \$10.9K. 310/614-5076.

'95 BUICK LeSabre, loaded, leather seats, 130K mi., runs great, \$2,600. 626/447-6423.

'00 CHEVROLET Tahoe, 4.8L V8, exc. cond., 65K mi., auto., CD/tape/am/fm, running boards, grill guard, a/c, power steering, tint windows, \$24,999/obo. 213/276-8755.

'94 FORD Aerostar, extended minivan, 7-pass., very lg. storage area, white exterior, blue interior, great cond., 167K mi., loaded, new tires/brakes/water pump & hoses, \$2,500, firm. 626/303-2808, eve.

'93 FORD Explorer XLT, 4-dr., 4 x 4, V6, all power, leather, running boards, towing pkg., roof rack, dark green/grey int., runs great, clean, 140K mi., \$3,000. 626/355-2473.

'99 GMC Yukon Denali, 76K, loaded, 4WD, leather, 6-CD changer, exc. cond., \$16,000/obo. 800/937-9200, Levi or Cathy.

'93 HONDA Accord EX, 4-dr., leather, power moon roof, 174K, gd. cond., \$2,500. 956-0602.

'81 HONDA Civic wagon, auto., runs well, gd. transportation, \$1,000. 626/791-0486, David.

'87 MERCEDES BENZ 300E, exc. cond., re-built trans., new ac/tires/battery/struts/injectors/muffler/etc., family car, 120K, sacrifice \$3,500. 626/484-9257.

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

'83 MERCEDES 300TD, 4 dr., auto., turbo, diesel, 5-cyl., only 115K mi., dark blue, "Blueberry" is her name, all leather w/mahogany wood grain, beautiful body & interior, power everything, works great. 404-2202 or tarro@charter.net.

'94 MERCURY Sable, 3.8L, 67K, smog, auto, 4-spd., a/c, cruise, 4-ABS, 2 air, am/fm/tape, leather, power windows/mirrors/seats, remote lock, very clean in/out, \$2,850/obo. 626/584-0410.

'93 MERCURY Sable GS, wagon, 4 dr., V6, 3.8L, silver, second owner, good records, regular maint., 120K, asking \$1,800. 626/795-3329.

'02 TOYOTA Camry LE, V6, loaded, silver, 37K mi., \$12,950. 360-6364.

'02 VOLVO V4 wagon, only 14K mi., 4-cyl., 1.9L turbo, exc. cond., silver, a/c, stereo/cass./CD, dash cover, garage parked, all service records avail., 15K mi. service completed, new rear brakes, both dealer and extra VIP extended warranty (original \$1,530) transferable, \$16,790. 626/355-5631, Tim.

Free

CLEAN FILL DIRT, 23 cu. yards, you haul as little or as much as you like, near Los Robles/Jackson, Pas. 626/ 791-3103.

CORNER CABINET, wood 30" W x 7' H, 4 open top shelves, bottom cabinet w/2 shelves, 14" D (max); DOOR, 36" W x 79" H, 4 glass panels (frame is solid wood) taken out of a vintage home. 626/794-0455. CARPET REMNANT, off-white, approx. 15' x 30', gd. cond. w/thick padding, must pick up in Monterey Park. 626/272-2341 or 626/571-2561, Dennis.

JACKETS, size 18, hardly worn: pink, (Sag Harbor), navy, (Radcliffe), soft floral on beige background, (Radcliffe), all 3 jackets have roll-up sleeves. 626/449-0997.

MISC: grape-stake fence boards, cedar, several hundred, mostly 5' L; work bench, lg., wooden, commercially fabricated, 3 drawers, electrical hook-ups, 35" D x 66" W x 32" H, top shelf 17" D x 66" W; planer, Craftsman, mounted on stand w/wheels, very old, electric, for wood; air-compressor, commercial, gas engine, street tire mounted (trailer), old, lg. 626/794-0455.

Lost & Found

FOUND: around the time of the Cassini SOI, interesting brooch/lapel pin, 301-127 conf. rm., call to identify. 3-9076, Carol.

Wanted

BOOKS, used or new, paper or hardback, or magazine, romance, science-fiction, mystery, etc. 248-0178, engineerbob4449@yahoo.com.

CARPOOLERS, from La Verne area, 7 a.m. to 3:45 p.m. work hours. Ext. 3-2555, Dawn.

HOUSE or condo for mature JPL couple with dog and two cats, need to move in Sept., prefer yard and garage, \$2,000 max. 235-4015, Steve Slaten.

HOUSE, apt., guesthouse, townhouse, or condo to rent or lease, in Pasadena vicinity, 2 bd., 1 ba., willing to move in now or in a couple of months, \$1500 max. 909/964-3998, Alex.

MEMORABILIA, Friends TV show, poster, T-shirt, cap, key-chain, mouse pad, etc. 909/263-5271, Shu.

RENTAL in La Cañada for quiet family of 4, father is engineer at JPL. 889-2419.

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

UTILITY TRAILER, to rent, 4 x 8 or larger, for about three weeks, 12" or larger wheels. 626/355-1209.

VANPOOL RIDERS, from Victor Valley/Hesperia. 4-1424, Scott.

For Rent

ALHAMBRA, roommate wanted for 2 bd., 1 ba. apt., fully furnished, washer/dryer to share, must be okay w/2 indoor cats, non-smoker, permit parking, approx. 7 mi. from Caltech, \$425 + util. 626/293-8497.

ALTADENA, house on cul de sac, 2 bd., 2 ba., 3129 Raymond Ave. 626/798-3640.

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.: dinnerware, utensils, pots/pans, linens, fine soaps, necessities included, just bring toothbrush & clothes, TV/DVD/VHS, Dish satellite, wireless DSL, garden, fruit trees, BBQ, parking, private, immaculate, available for short terms. 626/798-3235, info/visit.

ARCADIA apt., 2 bd. + lg. den, 1 ba., garage, remodeled kitchen, stove, dishwasher, clean, spacious, walking distance to shops, exc. neighborhood, no pets, water/gardener/trash incl., \$1,350 +util. & sec. dep. 626/576-7333 or cpl@caltech.edu.

ARCADIA house, 3 bd., 2 ba., hardwood floors, recently remodeled kitchen w/new appliances, formal living/dining rm., fireplace, fenced backyard w/fruit trees, great location, Arcadia schools, \$2,000 + sec. dep. 626/445-3975, Rula.

GLENDALE, room in lovely home, quiet neighborhood, private bath, cable, use of kitchen, washer/dryer, no pets or smoking, \$600, incl. util. 545-0455.

LA CAÑADA with view, 2 bd., 1 ba., large private patio, new appliances, berber carpets, incredible city lights, 2 min. walk to JPL/Foothill/Shuttle, \$1,395. 957-1009, A.J.

LA CRESCENTA house, above Fthl. blvd., 7 mi. from JPL, 3 bd., 2 ba., lg. living room w/fireplace, lg. dining rm., big kitchen, huge fenced yard, patio, \$2,300. 957-8332.

PASADENA, charming, 2 bd., 1 ba., rear home for lease in Bungalow Heaven Historic Landmark District, 3 mi. from JPL, central heat and a/c, wood floors, wood blinds, stove, refrigerator, disposal, washer, dryer, gardener provided, private fenced yard, dog considered, avail. Sept.1, \$1,500 + \$1,500 dep. 626/798-6865, Nancy.

PASADENA/SIERRA MADRE border, condo, 1 bd., 1 ba., 1 parking place, 1015 N. Michillinda, 13 min. to JPL, walk to shops, \$1,100. 626/799-2909.

SANTA CLARITA, American Beauty Village, light and bright townhome, impeccable unit, approximately 1,000 sq. ft., 2 bd., 2 ba., Pergo floors, tile throughout, fireplace in living room, dining area, breakfast bar, all appliances included, 2-car tandem attached garage, community pool, spa, tennis court, view, \$1,750 + \$1,500 deposit. 805/390-3733.

SAN MARINO house, 3 bd., 2 ba., 2-car garage w/auto, opener, newly painted, remodeled kitchen, dishwasher, a/c, laundry hookups, fireplace, spacious family rm. overlooking yard, no pets, exc. neighborhood & school district, \$3,200 + util. & sec. dep. 626/576-7333 or cpl@caltech.edu.

SUNLAND, large 1 + 1, newly remodeled, walk-in closet, 6-unit bldg., entry floor tile, new carpet, hall cabinets, air, parking, laundry, dining area + bar, \$795. 248-7610.

SUNLAND, extra large, 2 + 2, newly remodeled, 4 huge closets, hall cabinets, patio, new carpet/oven/dishwasher, 4-unit bldg., quiet, laundry, entry floor tile, \$1,295. 248-7610.

TUJUNGA, Crystal View area, small, 1 bd. guesthouse on secure/private 3/4 acre, 15 min. from JPL, storage, W/D, rose garden, patio, fruit trees, car port, \$875, util. incl. 952-7980, Ann.

VAN NUYS, 2 bd., 2 ba., den/fam rm. as bd., pool, 2.5 gar, lg rms., close to fwys, shopping, parks and trans., \$2,500 + security deposit. 786-2289, A.J.

Real Estate

ALISO VIEJO, Orange County, gorgeous, modern, 4 bd., house, ready to move in, built in 2000, great neighborhood, walk to Town Center/shops/schools, only 7 mi. from beach, asking \$699,000/obo. 949/916-6635.

Vacation Rentals

ARROWHEAD cabin, sleeps 8, all knotty pine, \$180/wkends., \$425/wk., sec. dep. required. 952-6221, Mon-Thur.: 909/337-1036, Fri-Sun.

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

CAMBRIA house, ocean front, exceptional white water view, accom. up to 4 people, all amenities provided. 702/256-1359 & ereynolds2@cox.net.

FLORIDA condo on the surf of New Smyrna Beach, beautifully furnished, 2 bd., 2 ba., full kitchen, only 30 min. to Cape Canaveral and 90 min. to Walt Disney World, quiet, relaxing, overlooking beach, barbeque, pool, game rm., great Atlantic Ocean view, easy walk to stores and restaurants, sleeps 6, avail. weekly or monthly. 760/439-7821, Darlene or dfhauge@yahoo.com.

GREEN VALLEY LAKE, cabin, sleeps 6, near Big Bear, furnished, cable TV, fully equipped kit., fenced deck, BBQ, pets okay, trout fishing, swimming, hiking, \$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 rate \$130/ nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

LAS VEGAS timeshare, 5-star resort, 7 nights, 1 bd., sleeps 4, must be 21 to register, Oct. 8-15, dates and location (Palm Springs, Tahoe, Utah, Dana Point, Ramona) can be changed, need not be full week. 626/447-4734.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen 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 valerlee@caltech.edu.

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

RESORTS, five-star Hyatt and Marriott, includes Carmel, Tahoe, Sedona, Colorado Rockies, Florida and Puerto Rico, luxurious residential-style studios with furnished kitchenette, starting at \$480 for 7 nights, Palm Springs, Orlando, Puerto Vallarta specials, studio with full kitchen, \$399 for 7 nights, 1 and 2 bds., w/full kitchens, partial weeks also avail. 626/794-9579 or fivestarresorts@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.

TIMESHARE, world-wide locations, see directory at www.IntervalWorld.com, \$850 for 7 nights, 2 bd., 2 ba., accommodate up to 6 adults, 4 or 5-star resorts, need 2-month advance planning. 323/257-5703, or Edward1@gmail.com

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

Universe

Editor
Mark Whalen

Design + Layout
*Adriane Jach, Audrey Steffan/
Design Services*

Chief Photographer
Bob Brown/Photo Lab

Advertising
Susan Braunheim-Kalogerakos

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.

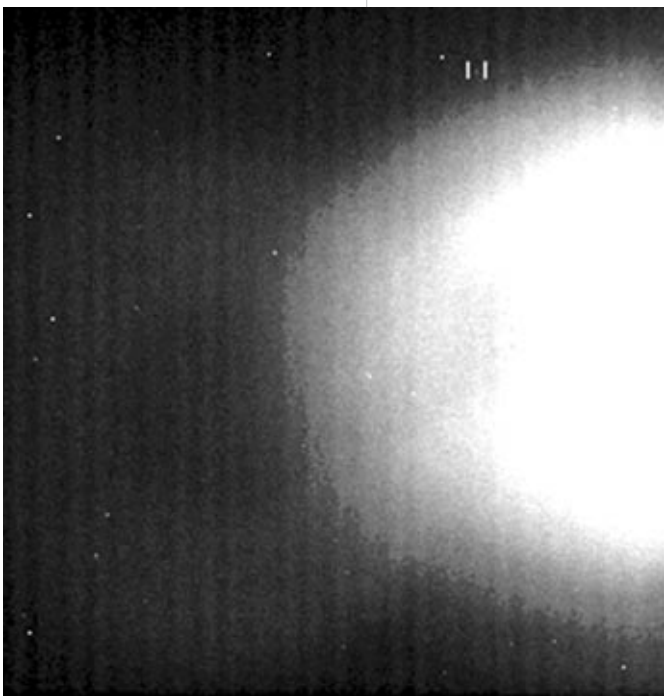
All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

Cassini discovers two new moons

By Carolina Martinez

With eyes sharper than any that have peered at Saturn before, the Cassini spacecraft has uncovered two moons that may be the smallest bodies so far seen around the ringed planet.

The moons are approximately 3 kilometers (2 miles) and 4 kilometers (2.5 miles) across—smaller than the city of Boulder, Colo. The moons, located 194,000 kilometers (120,000 miles) and 211,000 kilometers (131,000 miles) from the planet's center, are between the orbits of two other saturnian moons, Mimas and Enceladus. They are provisionally named S/2004 S1 and S/2004 S2. One of them, S/2004 S1, may be an object spotted in a single image taken by JPL's Voyager spacecraft 23 years ago, called at that time S/1981 S14.



This image is from an animation showing the orbit of S/2004 S2 as it makes its way around Saturn.

To view the animation, visit <http://photojournal.jpl.nasa.gov/catalog/PIA06106>.

"One of our major objectives in returning to Saturn was to survey the entire system for new bodies," said Dr. Carolyn Porco, imaging team leader, Space Science Institute, Boulder, Colo. Porco planned the imaging sequences. "So, it's really gratifying to know that among all the other fantastic discoveries we will make over the next four years, we can now add the confirmation of two new moons, skipping

unnoticed around Saturn for billions of years until just now."

The moons were first seen by Dr. Sebastien Charnoz, a planetary dynamicist working with Dr. Andre Brahic, imaging team member at the University of Paris. "Discovering these faint satellites was an exciting experience, especially the feeling of being the first person to see a new body of our solar system," said Charnoz. "I had looked for such objects for weeks while at my office in Paris, but it was only once on holiday, using my laptop, that my code eventually detected them. This tells me I should take more holidays."

The smallest previously known moons around Saturn are about 20 kilometers (12 miles) across. Scientists expected that moons as small as S/2004 S1 and S/2004 S2 might be found within gaps in the rings and perhaps near the F ring, so they were surprised these small bodies are between two major moons. Small comets careening around the outer solar system would be expected to collide with small moons and break them to bits. The fact that these moons exist where they do might provide limits on the number of small comets in the outer solar system, a quantity essential for understanding the Kuiper Belt of comets beyond Neptune, and the cratering histories of the moons of the giant planets.

"A comet striking an inner moon of Saturn moves many times faster than a speeding bullet," said Dr. Luke Dones, an imaging team member from the Southwest Research Institute, Boulder, Colo. "If small, house-sized comets are common, these moons should have been blown apart many times by cometary impacts during the history of the solar system. The disrupted moon would form a ring, and then most of the material would eventually gather back together into a moon. However, if small comets are rare, as they seem to be in the Jupiter system, the new moons might have survived since the early days of the solar system."

Moons surrounding the giant planets generally are not found where they originally formed because tidal forces from the planet can cause them to drift from their original locations. In drifting, they may sweep through locations where other moons disturb them, making their orbits eccentric or inclined relative to the planet's equator. One of the new moons might have undergone such an evolution.

Upcoming imaging sequences will scour the gaps in Saturn's rings in search of moons believed to be there. Meanwhile, Cassini scientists are eager to get a closer look, if at all possible, at their new finds. Porco said, "We are at this very moment looking to see what the best times are for retargeting. Hopefully, we haven't seen the last of them."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL manages the mission for NASA's Science Mission Directorate. For images and information about the mission, visit <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini>. Images are also available at the Cassini imaging team home page, <http://ciclops.org>.

Gusev Crater bedrock hints at watery past

By Guy Webster

Now that JPL's Mars Exploration Rover Spirit is finally examining bedrock in the "Columbia Hills," it is finding evidence that water thoroughly altered some rocks in Mars' Gusev Crater.

Spirit and its twin, Opportunity, completed successful three-month primary missions in April and are returning bonus results during extended missions. They remain in good health though beginning to show signs of wear.

On Opportunity, a tool for exposing the insides of rocks stopped working on Aug. 15, but engineers are optimistic that the most likely diagnosis is a problem that can be fixed soon. "It looks like there's a pebble trapped between the cutting heads of the rock abrasion tool," said Chris Salvo, the rover mission manager at JPL. "We think we can treat it by turning the heads in reverse, but we are still evaluating the best approach to remedy the situation."

It took Spirit half a year to reach bedrock in Gusev Crater. Now, Spirit's initial inspection of an outcrop called "Clovis" suggests that water may once have been active at Gusev.

"We have evidence that interaction with liquid water changed the composition of this rock," said Dr. Steve Squyres of Cornell University, principal investigator for the science instruments on both rovers.

For more details, visit <http://marsrovers.jpl.nasa.gov>.

Genesis prepares for copter catch

By DC Agle



In a dramatic ending that marks a beginning in scientific research, JPL's Genesis spacecraft is set to swing by Earth and jettison a sample return capsule filled with particles of the Sun that may ultimately tell us more about the genesis of our solar system.

On Sept. 8, the drama will unfold over the skies of central Utah when the spacecraft's sample return capsule will be snagged in midair by helicopter. The rendezvous will occur at the Air Force's Utah Test and Training Range, southwest of Salt Lake City.

"What a prize Genesis will be," said Genesis Principal Investigator Dr. Don Burnett of Caltech. "Our spacecraft has logged almost 27 months far beyond the moon's orbit, collecting atoms from the Sun. With it, we should be able to say what the Sun is composed of, at a level of precision for planetary science purposes that has never been seen before."

The prizes Burnett and company are waiting for are hexagonal wafers of pure silicon, gold, sapphire, diamond and other materials that have served as a celestial prison for their samples of solar wind particles. These wafers are now safely stowed in the return capsule. If the capsule were to descend all the way to the ground, some might fracture or break away from their mountings; hence, the midair retrieval by helicopter, with crew members including some who have performed helicopter stunt work for Hollywood.

"These guys fly in some of Hollywood's biggest movies," said Genesis Project Manager Don Sweetnam of JPL. "But this time, the Genesis capsule will be the star."

The capsule—carrying the agency's first sample return since the final Apollo lunar mission in 1972 and the first material collected beyond the

moon—will enter Earth's atmosphere at 9:55 a.m. Mountain Time. Two minutes and seven seconds after atmospheric entry, while still flying supersonically, the capsule will deploy a drogue parachute at 33 kilometers (108,000 feet) altitude. Six minutes after that, the main parachute, a parafoil, will deploy 6.1 kilometers (20,000 feet) up. Waiting below will be two helicopters, each with flight crews of three.

"The lead helicopter will deploy an 18 1/2-foot pole with what you could best describe as an oversized, Space-Age fishing hook on its end," said Roy Haggard, chief executive officer of Vertigo Inc. and director of flight operations for the lead helicopter. "When we make the approach we want the helicopter skids to be about 8 feet above the top of the parafoil. If for some reason the capture is not successful, the second helicopter is 1,000 feet behind us and setting up for its approach. We estimate we will have five opportunities to achieve capture."

The helicopter that does achieve capture will carry the sample canister to a clean room at the Michael Army Air Field at the U.S. Army Dugway Proving Ground, where scientists await their cosmic prize. The samples will then be moved to a special laboratory at Johnson Space Center, Houston, where they will be preserved and studied by scientists for many years to come.

"I understand much of the interest is in how we retrieve Genesis," added Burnett. "But to me the excitement really begins when scientists from around the world get hold of those samples for their research. That will be something."

More detailed background on the mission is available at <http://genesismission.jpl.nasa.gov>.

News Briefs



Brian Muirhead

Muirhead named Chief Engineer

Former Mars Pathfinder Project Manager BRIAN MUIRHEAD has been named to lead JPL's newly formed Office of Chief Engineer.

- The office's responsibilities include:
- Representing JPL to the NASA Chief Engineer and the Chief Engineers at the other NASA centers
 - Chairing the new JPL Engineering Board, which will consist of the directorate and division chief engineers
 - Advising the JPL Engineering and Science Director on engineering issues
 - Advising the JPL Director, Deputy Director and Associate Director for Flight Projects and Mission Success on project risk issues.

Directorates reorganized

JPL has reorganized the Mars Program Office, the Planetary Flight Projects Directorate and the Solar System Exploration Programs Directorate. The Planetary Flight Projects Directorate (Organization 400) has been renamed the Solar System Exploration Directorate and will have formulation, implementation and operations responsibility for Cassini and all competed solar system missions. CHRIS JONES will continue as the director. DR. JOHN MCNAMEE has been appointed deputy director as an additional duty and will assume this role full time once the transition of the Discovery/New Frontiers Program Office is complete.

The Solar System Exploration Programs Directorate (Organization 600) will be renamed the Mars Exploration Directorate and will have formulation, implementation and operations responsibility for all Mars missions.

Organization 150, the Mars Exploration Program Office, has been disbanded and its functions absorbed in the new Mars Exploration Directorate. DR. FIROUZ NADERI continues as director and DR. FUK LI continues as deputy director.

NASA training site debuts

The newly-launched NASA Engineering Training (NET) Web site at <http://net.larc.nasa.gov> provides engineers with information and links to the training and career-development resources necessary for success. The site also serves as a forum for news, discussions, lessons and strategies.

The site provides information (sponsored by NET through NASA Headquarters) about the engineering training that is available to the NASA engineering community, including a comprehensive list of all NET courses, course descriptions and class schedules.

Future features will include information on career growth opportunities, training workshops and conferences, discussion groups, a "course workshop" area and an online subscription engineering newsletter.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meets Wednesdays at 11 a.m. in Building 125-B16A.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place).

Codependents Anonymous—Meets at noon every Wednesday in Building 111-117.

Lambda (Gay, Lesbian, Bisexual and Transgender Networking Group)—Meets the first Friday and third Thursday of the month at noon in Building 111-117.

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

For more information on these groups, please contact the Employee Assistance Program at ext. 4-3680.

Monday, August 30

"Leadership & Communication With A Diverse Team"—Join Lucky Altman, executive director for the National Conference for Community and Justice, Los Angeles region, at noon in Building 180-101. Her talk will cover ensuring welcome environments for contributions from everyone, developing an inclusive work environment, what to do when a biased statement is made in a meeting and honoring differences.

Tuesday, August 31

Weight Watchers at Work—An orientation meeting will be held at 11:30 a.m. in Building 79-16 for those considering joining the on-Lab series or the online program. For more information, visit <http://eis.jpl.nasa.gov/hr/esr/wellness/wwatchers.htm>.

Wednesday, September 1

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at La Cañada

United Methodist Church, 104 Berkshire Place, La Cañada.

JPL Library Orientation—Come to Building 111-104 at 11:30 a.m. 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 reference desk, ext. 4-4200.

Thursday, September 2

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

Tuesday, September 7

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

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

Wednesday, September 8

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

JPL Library Orientation—Come to Building 111-104 at 11:30 a.m. 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 reference desk, ext. 4-4200.

JPL Toastmasters Club—Meeting at 5 p.m. in conference room 167. Call Dirk Runge at ext. 3-0465 for information.

Thursday, September 9

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

Friday, September 10

Caltech Folk Music Society—Singer/songwriter Michael Smith will appear at 8 p.m. in Beckman Institute Auditorium. Tickets are \$15 for adults and \$5 for children under 12. For more information, call (626) 395-4652 or visit <http://www.folkmusic.caltech.edu>.



Dutch Slager / JPL Photolab

Managers and officials join the engineering team on the Mesa for the dedication commemorating the installation of the first array-based DSN 6-meter breadboard antenna.

Array antenna dedicated

An Aug. 12 ceremony on the Mesa marked the installation of a new 6-meter-diameter antenna, one of two that will be used in the next year in conjunction with a 12-meter-diameter antenna, all located at the Oak Grove complex, to create a three-element breadboard communications array.

The Microwave Array Project for the Deep Space Network is developing an operational concept, plan and low-cost technologies to increase its overall signal reception capability by orders of magnitude, said Mark Gatti, the project's lead systems engineer and deputy manager of the Communications Ground Systems Section 333.

"The current concept is to construct three clusters, each of 400 low-cost 12-meter-diameter antennas," Gatti said. Each cluster will be located at three longitudes around the Earth, as are the three DSN facilities in Goldstone, Madrid and Canberra. "This system, operating at frequencies four times greater than currently used, will provide a total performance increase of 40 times that provided by the system of 70-meter diameter antennas," Gatti added.

The breadboard array—with two 6-meter antennas on the Mesa antenna range, a 12-meter antenna located above Building 245 on Mesa Road, and eventually one 6-meter antenna on the Caltech campus—will be used to develop both the technologies associated with arraying a large number of antennas for deep-space communications, as well as low-cost manufacturing methods required to construct this system in a cost-effective manner.

Activities associated with the breadboard will be planned for the next two years, Gatti said. "Expected to be completed by 2013, the array will provide the foundation for the future of the DSN, allowing greatly increased capacity for science missions through the following 30 years."

For the period of June through July 2004 the following JPL recipients celebrated 25 or more years of service and were invited to attend a luncheon and ceremony in their honor on Aug. 3.

45 years: L.J. Zottarelli.

40 years: Allan Eisenman, Richard Horttor, Samuel Petty, James Randolph.

35 years: Stewart Collins, Larry Dean, Manuel Franco, Krista Kelly, Robert Koukol, Robert Sniffin, Thomas Thorpe.

30 years: Richard Cowley, Dorothy Crawford, Arvid Croonquist, James Erickson, John Gieselman, James Graf, Deborah Johnson, Rigoberto Medina, Diane Newmark, R. Frank Tillman, Paul Weissman.

25 years: Gajanana Birur, N.T. Brady, Lonny Ching, Leslie Compton, Glenn Cunningham, David Durham, Daniel Eldred, Keith English, Carol Glazer, Hamid Habib-Agahi, Candice Hansen, Michael Jones, Catherine Lemaster, Terry Martin, John Miranda, Fred O'Callaghan, Mark Romejko, Robert Sible, Ilene Steen, James Steppe, Victor Vilnrotter.

Mars software honored by NASA

NASA has selected a data visualization and simulation software package used by Mars rovers and landers, and a software package that can be used in aerospace and industrial flow fluid applications, as the "best of the best" software developed by the agency this year.

The "Science Activity Planner," developed by a team of experts at JPL, combines cutting-edge visualization with sophisticated planning and simulation capabilities to provide an intuitive interface to Mars rovers and landers. It is a multi-mission, multi-purpose tool that has achieved three simultaneous successes in mission operations, public outreach and technology development.

The software comes in two versions. The first is used in mission operations and contains the official mission activity dictionary. The second version was released under the name "Maestro" to the public for education and outreach. Maestro includes additional training features that make it a more effective tool for public engagement.

Every day, mission scientists and engineers on the Mars Exploration Rover mission depend on the Science Activity Planner as their primary interface to the Spirit and Opportunity rovers. They use it to plan the next actions of the rovers and analyze the data arriving from Mars. The software has completed more than 360 Mars days of successful mission operations of the Spirit and Opportunity rovers without a single critical failure and will continue to serve this role until the end of the mission.

"We are thrilled to receive this award and honored to have been a part of the amazing team behind the Mars Exploration Rover mission," said Jeff Norris, the software team leader at JPL.

NASA also selected the TetrUSS 2004 software as an award winner. TetrUSS 2004 is a suite of computer programs used for fluid dynamics and aerodynamics analysis. Originally developed for NASA internal applications, TetrUSS 2004 has evolved into an efficient and versatile computer fluid dynamics tool used by engineers and scientists throughout the nation. The software is widely used in other government organizations, the aerospace industry, academia and non-aerospace industries such as automotive, biomedical and civil engineering.

NASA began the competition in 1994, designed to reward outstanding software at the agency, as measured by the science and technology significance of the software and its impact on NASA's mission; the extent of current and potential use; the software's usability; the quality factors considered in the software; intellectual property factors such as patents and copyrights; and innovation of the software.

Software eligible for this award must have NASA intellectual property interest, be of commercial grade and be available to appropriate commercial users or dedicated to a NASA mission.

For more information, visit <http://icb.nasa.gov/nasaswy.html>.

Service awards





Lab welcomes new HR director

BY MARK WHALEN

What brings you here? What attracted you to JPL?

I have seen JPL from the vantage point of being a member of the local community and for many years have heard of its reputation as a great employer. Like ARCO, JPL is known for its community and educational outreach, and for its employee-friendly culture. I am attracted to the challenge of working in one of the world's most prestigious scientific research and development centers.

Coming into the job, do you have any particular goals?

I come in with the belief we're at a good starting point. JPL is a great employer, it is a great friend of the community, and it attracts world-class talent. I hope to build on that legacy in creating an environment where everyone can contribute to their fullest.

A lot of companies say that people are their greatest assets. Here, I believe it is absolutely true. Through its people, JPL has proven it can create technology that doesn't currently exist and repeatedly conduct successful missions. Their talent will continue to create the future. But that talent is being competed for by private industry and other entities, and my goal is to have JPL continue to attract, develop and retain the best people.

We're competing for a limited resource with industry in general, especially in the hard sciences—math and computer science. I believe there is a portion of the population that would only work in a JPL-type organization. But there are other disciplines in which we are competing head-to-head with private industry and government. It will become increasingly more important for us to develop programs and processes to attract the best talent and provide meaningful development programs to ensure we allow individuals to be fully engaged and develop to their fullest potential.

I have a passion for diversity and inclusion. I believe if employees have a high level of satisfaction with their work environment and are fully engaged and committed to the organization's success, we will continue to attract top talent and reflect the diversity of our various recruiting sources.

Why was the new Human Resources Directorate created?

There is a desire on the part of senior management to make Human Resources a more visible part of our organization. We want to better position the Human Resources function and the development of our people in a more strategic way.

The Lab has emerged from an era of fewer, long-term projects to many projects in development at the same time. That creates greater complexity and requires a more strategic look at how we deploy our human capabilities. It affects the talent pool available to project managers, as well as individuals' own career development opportunities.

LAST MONTH, COZETTE HART JOINED JPL AS DIRECTOR FOR THE NEWLY FORMED HUMAN RESOURCES DIRECTORATE. SHE IS A MEMBER OF THE EXECUTIVE COUNCIL, REPORTING DIRECTLY TO THE LAB DIRECTOR AND DEPUTY DIRECTOR.

HART'S EXPERIENCE INCLUDES 15 YEARS WITH ATLANTIC RICHFIELD, WHERE SHE HELD A SERIES OF HUMAN RESOURCES MANAGERIAL POSITIONS OF INCREASING RESPONSIBILITY WITH ARCO CORPORATE AND SUBSIDIARY COMPANIES. ARCO WAS ACQUIRED BY BRITISH PETROLEUM IN 2000, AND WITH THAT MERGER SHE ULTIMATELY ASSUMED RESPONSIBILITY FOR LEADING THE HUMAN RESOURCES FUNCTION FOR BP'S U.S. CONVENIENCE RETAIL ORGANIZATION, ENCOMPASSING MORE THAN 19,000 EMPLOYEES ACROSS THE UNITED STATES.

PREVIOUSLY, SHE PROVIDED HUMAN RESOURCES CONSULTING SERVICES TO MORE THAN 200 HOSPITALS IN SOUTHERN CALIFORNIA FOR THE HOSPITAL COUNCIL OF SOUTHERN CALIFORNIA.

What are some of the biggest challenges in your organization?

Staffing is a critical area. We have about 1,600 transactions annually including hires, transfers and status changes. It's a continuous challenge for us to source the talent needed for current and future projects and we need to do that in the most efficient and effective ways.

The recently launched "JPL Jobs!" online search tool is a good example of trying to make that process more accessible and easier for our employees. It is also important for us to create and leverage existing relationships with universities to underpin our efforts in campus recruiting. We want to make sure we get access to the top students and ensure we have a coordinated approach in attracting them to JPL.

The Compensation area is near and dear to all of us—for both prospective and current employees. This includes the challenge of motivating and rewarding people in the best and most appropriate ways while remaining competitive with the market.

Succession planning is another key area. We need to ensure we are developing the capabilities to meet the needs of the future—in technical skills; project proposal, development and management; and in leadership competencies.

In your career, what's the most significant issue you have worked on or supported for the benefit of your employees?

I'm not sure I can name one significant issue. The way I approach Human Resources is to bring the components of the Employee Life Cycle (resourcing, performance management, learning and development, reward, career progression and succession planning) in cohesive support of the overall business strategy.

What are your first impressions of JPL?

First of all, I'm impressed with the open and collegial environment that exists here. While it is an explicit value, it is also apparent that it is very ingrained in the culture and is one of the contributing factors in making JPL a great place to work.

People have been very warm and multiple people have said, "Welcome to the JPL family."

I feel I'm coming here at a great time. People are excited about what's happening now, and about their future. I've met employees who have been here for many years and I'm impressed with the pride they have in contributing to the history of this place and that they continue to be excited about the contributions they are making to the science community and the world at large.

Agency dialogues continue



Durich Stager / JPL, Photolab

JPL Director Dr. Charles Elachi (center), who also serves as NASA's Director of Advanced Planning, joined moderator Johnny Stephenson (left), the One NASA Implementation Team Lead, and Kevin Petersen, director of Dryden Flight Research Center, at a NASA Transformation Dialogue broadcast from JPL on Aug. 20. They discussed competition vs. collaboration—dealing with mixed messages and when it makes sense for centers to compete and collaborate more. To view the archived webcast, visit http://insidenasa.nasa.gov/nasa_nas/ops/NASA_transformation/NASA_trans_webcast_arch.html.

Letters

My family and I would like to thank all of my co-workers and friends who extended their love and support in the recent passing of my beloved father-in-law. Your kind words, cards and flowers meant a lot to us during this difficult time. I would also like to thank JPL and ERC for the beautiful plants. Last January, I also lost my beloved father. I fear that I may have forgotten to thank my friends at JPL and ERC for their thoughts, cards, flowers, plants and comforting words. Please accept sincere appreciation from us.

Shu-Chen (Susan) Lee

Thank you, JPL, for the lovely plant sent to my home in memory of my mother. To my JPL friends and co-workers, thank you for the beautiful flowers, for your thoughtfulness, prayers, and for your words and cards of sympathy on the passing of my mother last month. With sincere appreciation,

Merideth Fiore

Retirees

The following JPL employees retired in August:

Saterios Dallas, 45 years, Section 310; Raymond Prizgintas, 42 years, Section 366; Frank Surber, 31 years, Section 311; Joanne Mintz, 30 years, Section 3193; Claudia Romain, 26 years, Section 3193; Robert Mcmillan, 25 years, Section 3493; Francis Schneider, 16 years; Inez Mikulski, 15 years, Section 512; Maximo Cortez, 14 years, Section 351; Marilyn Davis, 14 years, Section 420; Robert Heimlich, 13 years, Section 2524.

Classifieds

For Sale

AIR CONDITIONERS, for window, 18K BTU, ~\$150; 8K BTU, ~\$100; MICROWAVE, small, \$75, 249-2669.

BEDROOM FURNITURE, girls', antique white headboard, 5 pcs., twin 4-poster bed, computer desk w/hutch & nightstand, will sell separately or as a set, \$500 for set, 249-4053.

BICYCLE, road, Cannondale R400, 60 cm frame, RSX components, decent cond., drive train could use a little work, \$290/obo, 315/450-3309, Jason, or jaystock@umich.edu.

BICYCLE, Schwinn 5 spd tandem, red, good cond. (some rust), + saddlebags and pump, \$150, 248-8619.

CAMERA, Nikon digital, Cool Pix 5700, 35-280mm zoom-Nikkor lens, 5-area multi auto focus, Macro shooting to 1.2 in., matrix metering, magnesium alloy body, electronic viewfinder, vari-angle LCD, built-in spd. light, accessory shoe for external flash, movies w/audio, NiMH battery/charger, 256Mb compact flash card, exc. cond., \$450, 626/332-7305.

CLOTHES, infant: jacket, red/navy blue, zip-up w/hood (Old Navy), size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, buttons, size 3T, \$1/obo; zipper shoes, Spongebob motif, size 11M, exc. cond., \$5/obo; photos avail, 626/791-6101.

COMPUTER, Pentium II, 300 MHz, 128 MB RAM, 3 GB HD, Win 98, \$100/obo; Radius 17" monitor, \$75; Cambridge speakers, \$10; keyboard + mouse, \$5; all for \$175, 626/282-5815.

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

COMPUTER DESK, corner unit, exc. cond., shelves on both sides, light color, pressed wood, \$100, 848-2214, Karen or David.

COMPUTER MOTHERBOARD, ABit KV8-MAX3 for Amd Athlon 64 CPU (socket 754), not included, 281-7745 or 248-0638, Chris.

CURIO CABINET, Asian style, rosewood, 5 shelves, beveled glass doors and sides, mirrored back, lighted, 2-shelf storage cupboard on bottom, 78" H x 38" W x 14" D, exc. cond., photos available, \$200, 323/257-7928.

DIN. RM. SET, Spanish revival table & 8 high-back chairs, exc. cond., \$1,200, 626/794-3906.

DODGER TICKETS, up to 4 seats in Loge 164, row J, from my season ticket package, available for most remaining games, \$14 ea.

542-9828 or kimandgene@earthlink.net.
DODGER TICKETS, selected games from season ticket pkg., Loge level (orange), Aisle 132 (at 1st base), 2 tickets/gm. at face value of \$30/ticket, see www.dclunac.net/tickets, 626/296-1253 for details, avail. games.
ENCYCLOPEDIA SET, 1976 edition with updates, \$35/obo, 626/797-1310.

EXERCISE EQUIP.: one 5 ft. barbell, 2 dumbbells, all w/collars & sleeves; plate weights, 200 lbs., various sizes; combination bench press/squat rack, all for \$125, 248-7664.

FREEZER, upright, medium size, works great, \$50, 626/574-1495.

FURNITURE, ornately carved Spanish oak desk & 2 matching bookcases, \$650; Techline office furniture in white (6 pieces), \$400; several mirrors, Spanish hand-made rug, orange & pink, \$250; mission style oak server, \$350, 626/584-0860 or 626/794-3144, Donna.

KIDS POOL, Little Tykes, blue, hard plastic, outer dia. 5', water area 4' dia. & 1' D if filled to brim, small integral slide, drain plug, \$30, 626/303-1927.

LUMBER: white oak FAS, 4/4, \$3 bd. ft.; cherry \$5; also 1C and thickness to 16/4, 626/798-5110.

MISC: calculator, HP49G, w/manual, \$40; chess/checkers set, glass, 14" x 14" board, \$10; stereo amplifier, Kicker Impulse 352xi, w/two 8" subwoofer speakers, \$75, 626/807-7756.

MISC: Nokia 1260, \$40; Radio Shack plug-in intercom system, \$40; diamond ring, \$90; Suunto S6 wristop computer, \$250; Water Pure system, \$45; Memorex walkman, \$40; Sony am/fm tape player (small), \$40; canvas lounger, \$15; Ozark Trail portable queen frame and mattress, \$40; GE answering machine, \$35; fountain (table top), \$20, 897-1203.

MISC: pool table, 8', \$500; tablecloths, 2 slate blue oval, 18 matching napkins & rings, \$10; bunk bed, \$50; mailbox, oversized, green, \$20; wig, red, shoulder length, never used, \$20; generator, needs repair, \$10; electric frying pan, \$10; answering machine, \$5; basketball set, portable, needs net, \$200; fishing pole, saltwater, \$25, 626/357-8210.

MISC: loveseat, blue, \$100; computer table on wheels, \$20; floor lamp, 6', xenon, black, \$20; small chest of drawers, \$20; toaster ovens, \$6/ea.; bicycles (3), 10-speed, need work, \$50 each/obo, 626/282-5815.

MOUNTAIN BIKE, Trek, 13.5" frame w/26" tires (small frame w/full-size wheels), 18 gears w/grip shift, cyan/indigo color, gd cond., \$100, 952-8455.

PIANO by Hobart M. Cable, small, upright, exc. cond., buyer arranges pickup in Simi Valley, \$550/obo, down from \$750, 805/660-7446, Ben Bronwein.

REFRIGERATOR, Hotpoint, 16 cu. ft., gd. cond., runs well, \$150, 626/794-5484.

SECTIONAL, 2-piece, Bassett (1 pc. is a sleeper), floral print, photo & dimensions available, cushions need new covers, rest in vg cond., \$250/obo, 626/791-6101.

SHOES, Birkenstocks, size 39R, Granada white and Granada with ankle strap, white and black pairs, like new, \$30 ea, 243-8255.
SKI RACK, for Subaru Legacy wagon 2000 or later, with mounting hardware, locks, \$40, 626/797-6121, Steve.

TELEVISION, JVC, color, 27", w/remote, works great, \$50, 626/836-4960.

THERAPY MACHINE, HYS-398, digital, used a few times, Chinese/English user's manual, apply microcurrent for acupuncture, massage, manipulation, etc., \$200/obo, 626/840-0955, leave msg.

TROMBONES: Bach, exc. cond., like new, \$695/firm; Yamaha, gd. cond., \$495 firm; STROLLER, Aprica, teal green, was \$350, now \$95, 626/850-4378.

WASHER & DRYER, Maytag, extra-heavy duty capacity, \$50/ea, 626/437-2355.

WALKER by Invacare, dual-release w/3" fixed whls., model# 6291-3f, lightweight, height adjustments, ergonomic folding mechanisms, 300 lb. capacity, lifetime warranty, barely used, almost new cond., sell for \$50 (new \$130); Invacare commode also avail, 714/280-7368.

WASTEBASKET, white, plastic w/metal guide rail, about 1 x 2 x 3 ft. tall, installs inside kitchen cabinets to hide trash, brand new, in orig. box with screws for installation, \$80/obo, 626/840-0955, leave msg.

Vehicles / Accessories

'95 BUICK LeSabre, loaded, leather seats, 130K mi., runs great, \$2,400, 626/447-6423.

'97 CHEVROLET Tahoe, gd. cond., loaded, 4-wheel drive, 105,000 mi., \$9,000, 310/327-1080, Marji.

'00 FORD Explorer XLS, V6, auto, cruise, air, CD, 4 dr., 2WD, roof rack, running boards, 45K mi., exc. cond., \$12,000, 626/795-3966.

'98 FORD Explorer XLT, 4WD, 58K mi., rear a/c, 6-CD player, more features and picture at www.cars.com, exc. cond., \$8,500 KBB good cond., private party price, \$9,700, 548-1312, Ray, or melvanh@pacbell.net.

'96 FORD Explorer XLT, exc. cond., 69K mi., loaded, leather seats, 4WD, 6 cyl., auto, 6-CD player, see to appreciate, \$7,995, 244-5489.

'94 FORD Bronco XLT, 4 x 4, 5.8 L, V8 engine, blue/gray, loaded, exc. cond., 11K mi., \$7,500/obo, 626/357-3910.

'94 GEO Prizm, 1.6 L, 4-dr., 5 speed, 124K mi., gd. cond., \$2,000, 626/786-8136.

'92 HONDA Accord EX, 182K miles, 4 door, CD player, excellent condition outside/inside, \$2,800/obo, 626/305-0742, Elsa.

'81 HONDA Civic wagon, 4 door, automatic, gd. cond., great transportation, \$1,000, 626/791-0486, Dave.

'00 LEXUS ES300, automatic, leather powered seats, moonroof, CD changer, metallic two-tone black, power everything, exc. cond., 29K mi., \$19,500, 909/630-5176.

'93 MERCURY Sable GS, automatic wagon, 4 dr., V6, 3.8L, silver, second owner, very gd. cond., regular maint., 120K, \$1,800/obo (KBB \$2,100), 626/304-9249.

'87 NISSAN Sentra, 2 dr., auto trans, 84K mi., new CD player, a/c, pwr. steering/brakes, red, runs well, well-maint., \$1,200/obo, 323/254-8415.

RUNNING BOARDS for '04 Ford Escape, never used, \$100, 952-7940, Mickie.

SERVICE MANUAL for '91 Jeep, 3-book set, \$15, 626/448-4383.

'99 TOYOTA Camry XLE, loaded, V6, CD player, moonroof, power leather seats, auto, 50K mi., exc. cond., \$11,500, 909/599-3230.

'00 VW Jetta GLS, black leather seats, airbags, am/fm/cass/CD, box, pwr. window/locks/seats/mirrors, cruise control, sunroof, seat heater, auto, 6 cyl., 4 dr., 2WD, Maria@thoughtsquads.com.

Free

BRICKS, red, 1,000's, used, 310/541-3553 or 626/744-5576.

CLICKER for '90 Ford Escort, 548-1312, Ray.
DOG, to a gd. home, Apple, 1-1/2 yr. old German Shepard mix, all shots, neutered, owner is moving and can't take her, gd. w/kids and is just a darn gd. dog, please save her from a life of loneliness, photos avail, 504-6232.

FENCE BOARDS, grape-stake, cedar, several hundred, mostly 2 wide x 5 1/2" L, 626/794-0455.

KITTEN, 4-mo.-old male, orange and white, loves people and other cats, to gd. home, 653-7840, Cheryl.

KITTENS (2), cute, 4 mo. old, fixed and have shots, to good home, 443-1826, Janice.

Lost & Found

FOUND: NEC gray remote control, in 238-544 conf. rm. Ext. 4-2077.

FOUND: small Strada case, cloth and leather, street near Bldg. 158/278, 4-7396, Bill.

LOST: 32K MMC (Multi Media Card) in vicinity of Bldg. 125 on Aug 9, 625-9964.

Wanted

BOOKS, used/roman, paperback or hardback, or magazine, romance, science-fiction, mystery, etc. 248-0178, engineerbob4449@yahoo.com.
BOXES, cardboard, for moving, 626/574-1495.
GLIDER, gently used Dualtailer with or without ottoman, 626/799-1096.

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

PIANO LESSONS for 11-year-old girl, San Fernando Valley, once a week, 686-0095.

SOFTWARE, Microsoft Windows '98 Install Disk (full install w/serial), 653-9282, Steve.

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

STORAGE RENTAL, secure 10 x 10 or garage in Pasadena/Glendale/Tujunga/Sunland/Sylmar areas, 956-3223.

For Rent

ALTADENA "sabbatical house," 3 bd. + study, boundary Angeles Forest, 3 mi./JPL (trails to Lab behind house), view, hardwood floors, antiques, completely furn.: dinnerware, utensils, pots/pans, linens/towels, fine soaps, necessities included, just bring toothbrush & clothes, TV/DVD/VHS, Dish satellite, wireless DSL, garden, fruit trees, BBQ, parking, private, immaculate, avail. Oct. 626/798-3235, info/visit.

ALTADENA, 3 bd., 1.5 ba., character home to share, 2 mi. from JPL, just off Loma Alta, close to mtn. trails, beautiful hardwood floors throughout, fireplace, dining rm., mtn. view, 2-car garage, non-smoker, pets negotiable, month-to-month lease avail., \$700, util. incl. 626/818-5064, Dan.

LA CANADA, townhouse-style apt., 2 bd., 1 3/4 ba., large, quiet, central h/ac, gated, off-street parking, 10 min. from JPL, \$1,500, 952-7490, Frances.

NE PASADENA guest house; must see, very attractive; new carpet & freshly painted; cross streets Mountain/Allen, near 210 freeway, bus 1/2 block away; a/c, stove, ref. & dishwasher, lots of closet & cupboard space; secured parking, fenced yard, safe, quiet & clean; no pets; \$1,100, 626/791-8313.

PASADENA, easygoing, non-smoker house-mate wanted, small bd. in 4-bd. house, walking dist./JPL, 2 blocks, central air/heat, fireplace,

patio & backyard, laundry & kitchen privileges, no pets, off-st. parking: \$600 + \$300 deposit, util. incl. 626/807-0699, Myr.

PASADENA, spacious very private rm. + private ba. in condo, great location nr. Caltech, quiet, very clean, large closets, shared kitch./liv. rm., lg. balcony/nice view (green trees), gated security garage, laundry in building, quiet male preferred, \$530 + \$35 util, 626/796-9221.

PASADENA, SW, 1 bd., 1 1/2 ba., 3rd floor, 900 sq. ft., newly remodeled (beautiful kitchen with loads of storage), close to Gold Line, Paseo, walk to Lake Ave./Old Town shopping, mtn. vw., avail. 10/1, \$1,250, 626/577-2882.

PASADENA, luxurious tri-level townhouse, 301 Wallis St., cathedral ceilings, 2 skylights give spacious feeling; 2 bd., dressing rm with skylight; white marble entry, living rm. w/fireplace, formal dining rm., 1-1/2 ba., a/c, laundry area, storage, shelves, hookups, dishwasher, stove, garden window, priv. patio; 2-car enclosed garage; 3 fwys. close; safe, quiet; no pets; \$1,700, 626/791-8313.

SUNLAND, 2 + 2, very nice, extra lg., all new, 6-unit building, patio, 5 closets, kitchen hardwood cabinets with built-in appliances, quiet, dishwasher, \$1,275, 248-7610.

TEMPLE CITY house, 2 bd., 1 ba., Arcadia schools, large yard, \$1,325 + \$1,200 sec. 241-0586, 6-9 p.m.

TUJUNGA house, 15 min./JPL; 2 bd., 1 ba. 1 1/2-car gar., remodeled ba., oak cabinets throughout; stove, dishwasher, washer & dryer, soft water and gardener; pics at <http://users.adelphia.net/~krfields>; \$1,275, 877/312-4654, pager.

TUJUNGA, super clean, 3 bd. family home, high above Foothill, exc. neighborhood, adj. to La Crescenta, 5 min./JPL, priv. yd. equipped w/patio, deck w/spa, auto sprinklers, spacious family rm., new carpet, paint, stove, washer/dryer, attached 2-car garage, RV parking, gardener paid by owner, \$1,800 + sec. deposit, avail. 9/15, 249-8061.

Real Estate

LA CANADA home, by owner, 1 min. from JPL, 3 bd., 2 ba., LR, FR + 1 bd., 1 ba. for in-law or nanny, newly landscaped, backyard play-house, oak, gate to trail and JPL, sewers, 2,339 sq. ft., \$935,600, 790-5593.

TUJUNGA, fabulous view home w/guesthouse on 3/4 acre shaded hilltop lot, 2 bd., 1 ba., plus 1 bd., 1 ba., guesthouse, recently remodeled, new copper/electrical, central heat/air, 2-car garage, carport, 15 min. from JPL, super quiet & private, 952-7980, Dave.

Vacation Rentals

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

BROOKINGS, Oregon, 3 bd., 2 ba., 1,700 sq. ft. Moosehead Lodge residence, fully furn., sleeps 2 to 12 at the Winchuck River Estuary, walk the Winchuck or Pelican Bay beaches w/tidepools, surf & driftwood, fish the Pacific for salmon, albacore, bottom fish or crabs; salmon or steelhead up the wild rivers along Southern Oregon and Northern Calif. coast, enjoy the Redwoods and Siskiyou Nat'l Forest, 800/221-8175.

CAMBRIA house, ocean front, exceptional white water view, accom. up to 4 people, all amenities provided, 702/256-1359, areynolds2@cox.net.

DEL MAR timeshare, Wavecrest RCI Gold Crown, studio, sleeps 2, ocean view, Sept. 10-17, '04, see to appreciate, www.wavecrestresort.com, \$750/wk, 626/233-9612 or 626/794-7359, Camille.

FLORIDA condo on the surf of New Smyrna Beach, beautifully furn., 2 bd., 2 ba., full kitchen, half-hour to Cape Canaveral, 90 min. to Disney World, enjoy all comforts of home in a quiet, relaxing, overlooking beach + ocean, BBQ, pool, game rm., easy walk to stores and restaurants, 760/439-7821, Darlene or dfhaug@yahoo.com.

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/night/2, high season \$130/night/2, \$15/night/add'l person, 949/348-8047, jackandrady@cox.net.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitch. incl. microwave, D/V, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc't, 626/798-9222 or 626/794-0455 or valeriee@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.

RESORTS, 5-star Hyatt and Marriott, incl. Carmel, Tahoe, Sedona, Colorado Rockies, Florida & Puerto Rico; luxurious residential-style studios w/furn. kitchenette, starting at \$480 for 7 nts.; Palm Springs, Orlando, Puerto Vallarta specials, studio w/full kitchen \$399 for 7 nts., 1 & 2 bds. with full kitchens; partial weeks also avail. 626/794-9579 or fivevstarresorts@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.

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