

universe

Jet Propulsion Laboratory

I n s i d e

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Past water hints found at Gusev

By Guy Webster



The rock "Mazatzal" before Spirit drilled into it with its rock abrasion tool. Preliminary results suggest that fluid may have been present during Mazatzal's formation.

Clues from a wind-scalloped volcanic rock investigated by JPL's Spirit rover suggest repeated possible exposures to water inside Gusev Crater, scientists said on April 1.

Gusev is halfway around the planet from the Meridiani region where Spirit's twin, Opportunity, recently found evidence that water used to flow across the surface.

"This is not water that sloshed around on the surface like what appears to have happened at Meridiani," said Dr. Hap McSween, a rover science team member from the University of Tennessee. "We're talking about small amounts of water, perhaps underground."

The rock, called "Mazatzal" after mountains in Arizona, lies partially buried near the rim of the crater informally named "Bonneville" inside the much larger Gusev Crater. Its light-toned appearance grabbed scientists' attention. After Spirit's rock abrasion tool brushed two patches on the surface with wire bristles, a gray, darker layer could be seen under the tan topcoat. The rock abrasion tool ground into the surface with diamond cutting teeth on March 26. Then, after an examination of the newly exposed material, it ground deeper into the rock two days later. A lighter-gray interior lies under the darker layer, and a bright stripe cuts across both.

Dr. Jeff Johnson, a science team member from the U.S. Geological Survey's Astrogeology Team, Flagstaff, Ariz., said the stripe "seems to be a fracture that water

has flowed through, potentially with minerals precipitating from that fluid and lining the walls of the crack." He and other scientists stressed that the interpretations are preliminary.

Spirit's alpha particle X-ray spectrometer checked what chemical elements were close to the surface of untreated, brushed, once-drilled and twice-drilled patches. "Miracles, miracles, miracles. We have a lot of work to do," the instrument's lead scientist, Dr. Rudi Rieder of Germany Max Planck Institute, exclaimed about the results. For example, the ratio of bromine to chlorine seen inside the rock is unusually high and possibly a clue to alteration by water.

The final experiment on Mazatzal was to scrub the surface with the rock abrasion tool in a pattern of five circles arranged in a ring, with a sixth circle in the center. Besides creating a rock-art daisy, this task by the engineers of New York-based Honeybee Robotics, as well as JPL, produced a brushed patch big enough to fill the field of view of Spirit's miniature thermal emission spectrometer, said Dr. Steve Ruff of Arizona State University. The tan outer surface appears to have a strikingly different mineral composition than the dark gray coating exposed by the brushing, but more time is needed to complete the analysis, he said.

Opportunity set a one-day driving record on Mars March 27 by covering 160 feet toward "Bounce Rock," so named because airbag bounce marks show that the spacecraft hit it on landing day two months ago. "We're looking to break that record again very soon with longer and longer drives," said JPL's Chris Lewicki, flight director.

Bounce Rock is unlike any seen on Mars before, said Dr. Jim Bell, lead scientist for the rovers' panoramic cameras. "There are some shiny surfaces on this rock," he said, describing them as "almost mirrorlike."

Opportunity, approaching the 75-sol mark, has completed its observations at Bounce Rock and is being prepared for its trek toward "Endurance Crater."

Spirit woke up on sol 91, which ended at 6:38 p.m. PDT on April 5, as if it were any other Martian day, but this one was special. Finishing 90 sols of surface operations since landing day marked completion of the last of the official success criteria for Spirit's prime mission.

Aura shipped for launch preparations

NASA's Aura spacecraft, the latest in the Earth Observing System series, has arrived at Vandenberg Air Force Base to begin launch preparations.

Aura was transported from Northrop Grumman's Space Park manufacturing facility in Redondo Beach. The spacecraft will undergo final tests and integration with a Boeing Delta II rocket for a scheduled launch in June.

Aura's four state-of-the-art instruments, including two built and managed by JPL, will study the atmosphere's chemistry and dynamics. The spacecraft will provide data to help scientists better understand Earth's ozone, air quality and climate change. JPL's Tropospheric Emission Spectrometer is an infrared sensor designed to study Earth's troposphere—the lowest region of the atmosphere—and to look at ozone. JPL's Microwave Limb Sounder is an instrument intended to improve our understanding of ozone in Earth's stratosphere, vital in protecting us from solar ultraviolet radiation.

Aura fulfills part of NASA's commitment to study Earth as a global system and represents a key agency contribution to the U.S. Global Change Research Program. This mission will continue the global data collection underway by NASA's other Earth Observing System satellites: Terra, which monitors land; and Aqua, which observes Earth's water cycle.

Aura is part of NASA's Earth Science Enterprise, a long-term research effort to determine how human-induced and natural changes affect the global environment.

Genesis completes science phase

By DC Agle



Photo Courtesy of Donald Sevilla

Since October 2001 the Genesis spacecraft has exposed specially designed, collector arrays of sapphire, silicon, gold and diamond to the sun's solar wind.

That collection of pristine particles of the sun came to an end last week, when the Genesis team at JPL ordered the spacecraft's collectors deactivated and astowed. The close-out process was com-

pleted when Genesis closed and sealed the spacecraft's sample-return capsule.

"This is a momentous step," said Genesis Project Manager Don Sweetnam. "We have concluded the solar-wind collection phase of the mission. Now we are focusing on returning to Earth, this September, NASA's first samples from space since Apollo 17 back in December 1972," he said.

Genesis was launched in August 2001. Three months and about 1 million miles later, the spacecraft began to amass solar wind particles on hexagonal wafer-shaped collectors made of pure silicon, gold, sapphire and diamond.

"The material our collector arrays are made of may sound exotic, but what is really unique about Genesis is what we collected on them," said mission principal investigator Don Burnett. "With Genesis we have almost 27 months far beyond the moon's orbit collecting atoms from the sun. With data from this mission, 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."

To get Genesis' precious cargo into the sterilized-gloved hands of Burnett and solar scientists around the world is an exotic endeavor in itself.

Later this month, Genesis will execute the first in a series of

trajectory maneuvers that will place the spacecraft on a route toward Earth. On Sept. 8, the spacecraft will dispatch a sample-return capsule containing its solar booty. The capsule will re-enter Earth's atmosphere for a planned landing at the U.S. Air Force Utah Test and Training Range.

To preserve the delicate particles of the sun in their prisons of gold, sapphire and diamond, specially trained helicopter pilots will snag the return capsule from mid-air using giant hooks. The flight crews for the two helicopters assigned for the capture and return of Genesis are former military aviators, Hollywood stunt pilots and an active-duty Air Force test pilot.

The Genesis capsule team.

News Briefs

GPS software team gets Hall honors

The JPL-developed Precision Global Positioning System (GPS) Software System is one of four technologies newly inducted into the Space Technology Hall of Fame.

An April 1 ceremony at the National Space Symposium in Colorado Springs, Colo., honored team members DR. YOAZ BAR-SEVER, DR. WILLY BERTIGER, DR. MICHAEL HEFLIN, DR. KENNETH HURST, DR. STEPHEN LICHTEN, RONALD MUELLERSCHOEN, DR. FRANK WEBB, DR. SIEN-CHONG WU, DR. THOMAS YUNCK and DR. JAMES ZUMBERGE.

All the inductees from the team are from Section 335, except Hurst and Yunck, who are from 367.

RICHARD TRULY, a former NASA administrator and one of the first space shuttle astronauts, presented the inductees with their Space Technology Hall of Fame medals individually. In addition, JPL Deputy Director GENE TATTINI accepted a special Institutional Space Technology Hall of Fame medal for the Precision GPS Software System on behalf of JPL.

In 1985, JPL began developing software to determine satellite orbits with pinpoint accuracy. This work led to the development of a sophisticated system that incorporates special GPS algorithms and now uses the Internet to deliver information enabling real-time positioning accurate to a few inches anywhere in the world for terrestrial users and for space-borne users in low Earth orbit. The Federal Aviation Administration has adopted JPL's software in its GPS-based navigation system to improve air travel safety for millions of travelers.

The Space Foundation, in cooperation with NASA, established the Space Technology Hall of Fame in 1988 to honor innovators who have transformed space technology into commercial products, to increase public awareness of the benefits of space technology and to encourage further innovation.

"The 2004 Hall of Fame honorees are a shining example of how the exploration of space returns incredible and sometimes unexpected benefits for all of us on Earth," noted NASA Administrator SEAN O'KEEFE.

For more information on the award, visit <http://www.spacetechnologyhalloffame.org/index.cfm>.

Runners state 30th annual Microthon

A total of 47 runners competed in the JPL Running Club's 30th Annual Arroyo Seco Freako Microthon (Charles Voge Memorial Run) on April 1. This race has been run every year since 1975 on a course that runs alongside and across the wash south of JPL.

Runners begin
the April 1
Arroyo Seco
Freako Microthon.



Bob Brown / JPL Photolab

ERIC RIGNOT (Section 334F) was the fastest runner in this year's race, covering the 3.4 miles in 21:19. FEIMING MORGAN (Section 331N) won the women's division in 28:02.

Four of the five participants in the original 1975 Microthon were on hand

For the period of January through March 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 March 30.

45 years: William Harris, Rolf Hastrup.

40 years: Jerry Harter, Olivia Tyler.

35 years: Victor Chen, Pasquale Esposito, Gerald Hintz, Chris Jones, James R. Rose, Richard Wetzel.

30 years: Khosrow Bahrami, Nevin Bryant, George Carlisle, Bryan Huneycutt, Leon Keyser, Tomas Komarek, Steven Macenka, Peter Poon, Walter Proniewicz, Guillermo Rodriguez, Lyle Skjerve, Gary Spradlin, Miles Sue, Carroll Winn, Leslie Zoltan.

25 years: Noel Burden, James Chen, Steven Cole, Tonja Cooper, John T. Davis, Szabolcs de Gyurky, Peter Doms, Katherine Dumas, Aaron Fishman, Antonio Fonseca, Donald George, Joyce Grunwald, Rosemary Guerrero, Samad Hayati, Julie Ispirian, Dean Johnson, Robert A. Johnson, Chin-Po Kuo, Johnny Kwok, Greg Levanas, Kurt Liewer, Chi Lin, Guy Man, Charlotte Marsh, Jerry Millard, Andrew Morrison, Bill Nesmith, Juan Pacheco, Young Park, Kathie Reilly, Joseph Riedel, Naresh Rohatgi, Douglas Sanders, William Smythe, Theodore Sweetser III, Eric Tailor, Randall Taylor, Philip Turner, Steven Tyler, Paul Wagner, Robert Warzynski.

to celebrate the race's 30th running. That first race was a two-team challenge match, won by the Thirty-Niners (JOHN BECKMAN, LEN EFRON, and KEN ATKINS) over the 180 Planners (DICK DAVIES [running twice] and LOU FRIEDMAN).

Savings Bonds drive upcoming

A representative from National Bond and Trust Company will be on Lab April 12-15 from 9 a.m. to 2 p.m. to provide information to JPL employees interested in signing up for U.S. Savings Bonds through payroll deduction.

The schedule follows:

- Monday, April 12: 167 cafeteria
- Tuesday, April 13: 190 cafeteria
- Wednesday, April 14: 303 cafeteria
- Thursday, April 15: 601 lobby

The current interest rate on "I" bonds is 2.19%, with 2.61% offered on "EE" bonds. Interest is adjusted May 1 and Nov. 1.

There is no state tax on bonds' interest; federal tax on interest is deferred; and interest is tax-free if used for college tuition.

If you can't stop by or need more information, contact the JPL bond representative, JOE COREY, at (714) 931-5801 or joecorey@cox.net. For changes to existing bonds, call the National Bond and Trust Company at (800) 321-8024.

Blood drive next month

The next JPL/Red Cross blood drive will be held in von Kármán Auditorium on Tuesday, May 18, from 10 a.m. to 4 p.m. and Wednesday, May 19, from 7 a.m. to 1 p.m.

Sign up at the donor site at <http://www.givelife.org/index.cfm?hcl=JPL>. Register using work address and work phone only, which protects your personal information. Once you select your appointment, you will receive an automatic confirmation e-mail. Call the Red Cross at (213) 400-0140 if you need further assistance.

Advance signup sheets will also be available at Occupational Health Services, Building 310-202, prior to the blood drive. For last-minute signups or to change your appointment, call the Red Cross at (626) 960-6956, ext. 225.

JPL Occupational Health Services notes that during the two-day blood drive in February, the Red Cross collected 171 pints of blood, from which 513 lives will benefit.

The Red Cross congratulated JPL employees and affiliates for their contributions to the blood supply. Read their online article at http://www.socalredcross.org/coord/sponsor/coord_JPL.html.

MBA program offered at Caltech

The University of Redlands is offering an MBA program Mondays from 6 to 10 p.m. at Caltech.

The 24-month program consists of 41 semester credits. The four-semester MBA opens with an immersion in global, political, social and ethical issues of business. It also includes specialized study in such areas as global economy, finance and statistics. It concludes with an application of the general and specific concepts in both case study and applied study of real business problems.

For signup information, contact TONY LAWSON, assistant dean of admissions, at (818) 840-1180 or Tony_Lawson@redlands.edu.

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.

Tuesday, April 13

Advanced Cellular Solutions—Considering a new cell phone? Need a new plan? Stop by Café 303 from 11 a.m. to 2:30 p.m. when Caltech Wired hosts Dr. Wireless. All six wireless carriers will be represented (for personal use only). Visit www.caltechwired.caltech.edu for more information.

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

Wednesday, April 14

Change Request-Driven System Design Process—The Center for Space Mission Architecture and Design presents Hans-Peter Hoffmann, director and chief methodologist for Systems Design at I-Logix, at 10:30 a.m. in the 167 conference room. The chance for systems engineers to be involved in the design of a completely new system is rare. This seminar describes a change request-driven system design process aimed at early validation of customer requirements by means of executable models. The process is optimized for changes to an existing system coping with a legacy design.

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. 3-3690 for information.

Thursday-Friday, April 15-16

Von Kármán Lecture Series—"Artificial Intelligence for Autonomous Control in Space" will be presented by Dr. Ayanna Howard, senior member of the technical staff in JPL's Telerobotics Research and Applications Group, 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/apr04.cfm>. For more information, call Public Services at ext. 4-0112.



Saturday, April 17

The Abduction Project: Collision Theory—Set against the backdrop of 1950s American suburbia, extraterrestrial visitations and abductions meet the "ideal" nuclear family at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$20 for adults, \$10 for high school age and younger. For more information, call (626) 395-4652.

Sunday, April 18

Chamber Music—Edgar Meyer on double bass and Amy Dorfman on piano will appear at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25, \$21 and \$17. For more information, call (626) 395-4652.

"God Against the Gods"—Author Jonathan Kirsch examines the bright side of paganism, the dark side of monotheism and the roots of religious violence in the modern world at 2 p.m. in Caltech's Baxter Lecture Hall. The Skeptics Society sponsors. Donations: \$8 for nonmembers, \$5 for members; free for JPL/Caltech community. For more information, call (626) 794-3119.

Tuesday, April 20

"Everything You Have Always Wanted To Know About Immigration But Were Afraid To Ask"—Bernard Wolfsdorf, an attorney and certified specialist in immigration and nationality law, will speak from 2 to 4 p.m. in von Kármán Auditorium. The seminar, the first in a series presented by the Office of Legislative and International Affairs, will include an overview of the nuts and bolts of immigration and will answer questions on issues related to work authorization in the U.S., travel outside of the country, consulates and embassies abroad, maintaining legal status, and issues related to lawful permanent residency.

"Extending Our Reach: Onboard Science Autonomy for Advanced Exploration"—Dr. Kiri Wagstaff of the Machine Learning Systems Group will speak at noon in the 167 conference room. The talk will describe techniques that enable a spacecraft to analyze the images it collects and automatically rank them for transmission. These methods allow for broader coverage of the body being imaged, since the spacecraft can favor images containing novel information over those that are redundant or of poor quality. The assigned priority can also guide the level of compression, if any, to be used. Wagstaff will discuss the application of these methods to images taken from Earth orbit, from Mars orbit and on the surface by Mars rovers.



Wednesday, April 21

"The Disappearance of Play"—Tufts University professor of child development David Elkind, author of 13 books and more than 400 articles and book chapters, will speak at 7 p.m. in Caltech's Ramo Auditorium. Admission is free. The talk is presented by JPL, Caltech and the Child Educational Center in recognition of the National Association for the Education of Young Children's Week of the Young Child. Attendees are advised to arrive early due to limited seating.

Thursday, April 22

Caltech Architectural Tour—The Caltech Women's Club offers this free service, 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.

Clogging Class—This new class for beginners will be offered every other Thursday at noon in Building 300-217. For more information, call Shary DeVore at ext. 4-1024.

Saturday, April 24

Folk Music—Autoharp player/traditional singer/storyteller Bryan Bowers will appear at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$15 for adults, \$5 for children under 12. For more information, call (626) 395-4652 or visit <http://www.folkmusic.caltech.edu>.



Service awards



s p e a k i n g

O F

ETHICS

LANI DE BENEDICTIS IS THE MANAGER OF JPL'S ETHICS OFFICE. ON THE JOB SINCE LAST FALL, SHE LEADS A TEAM RESPONSIBLE FOR ADMINISTERING THE LABORATORY'S ETHICS PROGRAM, WHICH PROVIDES GUIDANCE TO EMPLOYEES ON PROPER BUSINESS CONDUCT AND PRACTICES. UNIVERSE SPOKE TO HER ABOUT HER BACKGROUND AND WHAT'S NEW IN THE ETHICS OFFICE.

By Mark Whalen

WHAT'S YOUR EXPERIENCE PRIOR TO COMING TO THE LAB?

Over the past 14 years, I've had various assignments in legal, ethics and the Ombuds industry. I spent most of those years with Rockwell and managed the Rockwell Ombudsman and Ethics Office. In 1998 Boeing began acquiring segments of Rockwell, McDonnell Douglas and Hughes. My last assignment with Boeing was to direct ethics and compliance programs within Boeing's Homeland Security, Launch Systems and Space and Intelligence sectors.

My most challenging work experience was to integrate all the different hotlines and integrate the different work cultures after the acquisitions and mergers. Each of the contractors had its own unique and mature Ethics program and culture. The real challenge was to ensure that core values were not compromised when business strategies, practices and tools changed. Those who followed the core value systems were the natural leaders, made sound decisions and were generally more successful.

WHAT ATTRACTED YOU TO JPL?

JPL has a very well-respected ethics program. I became familiar with the program through the Southern California Ethics Roundtable and the Ethics Officers' Association, for which the Lab is a sponsoring partner. Outside companies benchmark JPL and admire its reputation. Contractors simply like how JPL does business.

WHAT'S THE MOST IMPORTANT THING YOUR OFFICE DOES?

I hope that employees find our office to be a safe channel to ask questions and raise concerns. There is a great deal of satisfaction for the employee and for us knowing that we are proactive, and we welcome employees to contact us as part of their decision-making process. Or even when they recognize that they are in the middle of a dilemma!

We are subject matter experts on a variety of subjects—use of resources, conflict of interest, gifts and gratuities—but we find that employees rely on us being knowledgeable about the Laboratory and helping them locate the correct subject matter expert and resource.

WHO WORKS WITH YOU?

The Ethics staff also includes Doug Sanders, Martha Avina and Tom West. We work so closely together and rely on one another's expertise. JPL has a real staff of ethics veterans—all four of us are truly dedicated making ethics a part of business life and are committed to safeguarding JPL's reputation.

WHAT'S NEW ABOUT THE ETHICS PROGRAM?

Besides my coming on board, I'd note that the Ethics Office was just reassigned to General Tattini, and we are emphasizing a back-to-basics approach in terms of reaffirming our core values.

What's also new this year is we are working with Human Resources to have Ethics included for the first time in the Employee Contribution, Assessment and Planning (ECAP) process.

New training will begin in May. Our focus will be about values, credibility and integrity, and to share actual ethics cases with employees. Part of our responsibility is to communicate lessons learned. It's helpful for employees to see the real-world examples of what's happened in the past year.

For example, in recent weeks many JPL employees have received unsolicited mail from Microsoft, offering new software discs for free. This was a real test to our system. A lot of people recognized that they couldn't accept the offer and just forwarded this mail to us, unopened. We received more than 300 of them from employees.

It was great to see that people knew intuitively to not accept this offer. This is the right way for our employees to respond, since we don't want them to end up thinking they can solicit this type of thing.

WHAT ARE THE LAB'S CORE VALUES?

There are four: The openness of our people and processes; integrity of the individual and the institution; quality of our products and our people; and innovation in our processes and products.

FROM WHAT YOU'VE OBSERVED, WHY IS JPL'S ETHICS PROGRAM SUCCESSFUL?

It's because the program is values-based, rather than compliance-based.

"In a values-based environment, we link expected behaviors to our values. It's an individual commitment to excellence. I think most employees do this intuitively."

— Lani De Benedictis



Bob Brown / JPL, Photolab

WHAT'S THE DIFFERENCE?

Compliance is doing what the law expects you to do. Being ethical is taking that a step further and applying values—such as honesty, fairness and integrity—in all that you do. For example, we need to make sure that we operate without even a perception of conflict of interest. There should no question about how we operate, how we deal with people.

Employees demonstrate compliance through the proper use of resources, expected conduct and attending mandatory training. In a values-based environment, we link those expected behaviors to our values. It's an individual commitment to excellence. I think most employees do this intuitively.

In 1992, when JPL established its core values of openness, integrity, quality and innovation, it set forth standards by which we will operate and a roadmap for the future. Values like integrity and quality are timeless and set JPL apart.

WHAT TYPES OF ETHICS ISSUES COME UP MOST OFTEN?

Eighty percent of our time is spent responding to questions and offering direction and advice. The other 20 percent is reviewing or investigating a dilemma or misconduct. Proper use of resources and conflict of interest remain as the top concerns requiring investigation. Our investigations substantiate about half of the allegations. Our statistics indicate that employees are fairly accurate about what they report.

DO PEOPLE HAVE FEAR OF RETALIATION IF THEY ACCUSE A MANAGER OF WRONGDOING?

Unfortunately, employees do express that they fear retaliation—by co-workers and managers. When employees let us know they are concerned we ask the employee to help us with strategies on how to best address the issue. We always acknowledge their fears and attempt to address the issue openly. If retaliation is alleged or experienced, we will investigate and, if proven true, take immediate action.

WHAT'S THE FIRST THING EMPLOYEES SHOULD DO IF THEY BELIEVE THEY MAY HAVE BREACHED ETHICS POLICIES, OR IF A CO-WORKER HAS DONE SO?

Employees should start with their immediate supervisor. Supervisors usually want to resolve concerns on behalf of their employees. Supervisors are aware of their obligation to notify Ethics if a matter requires investigation. If the supervisor is not able to help resolve the situation, employees are welcome to call the Ethics Office at any time at ext. 4-6338. Our office also has a hotline at ext. 4-9999 if people want their conversations with us to be anonymous and confidential.

EARLIER, YOU MENTIONED OTHER "SUBJECT MATTER EXPERTS" ON LAB. BESIDES YOUR OFFICE, WHERE CAN JPL STAFF GO FOR GUIDANCE?

There are several other areas on Lab where staff can bring various work-related concerns, and where they will always be greeted with an open door. These include the Diversity Programs Office, 4-6400; Employee Assistance Program, 4-3680; Employee Relations, ext. 4-7506; Security, 3-3536; the Occupational Safety Office, 4-4711; Occupational Health Services, 4-3319; or Ombuds, 4-7045.

JPL encourages people to work together, seek solutions and to be open. It is important for employees to know that if they need help, they need not struggle alone.

Passings

NORMAN DE GROOT, 75, a retired telecommunications engineer, died on a motorcycle tour in Wanaka, South Island, New Zealand on March 17.

De Groot was employed at JPL from 1962 to 1993. He worked on Mariner Mars '69 and later represented the Lab in the Space Frequency Coordination Group. He was in the Telecommunications and Mission Operations Directorate, Section 410, at the time of his retirement.

De Groot leaves his wife, Nancy, two sons and three grandchildren.

The family requests donations in his memory to the Friends of the Fort Bragg Library, 499 E. Laurel, Fort Bragg, CA 95437.

ELIZABETH HOLMES, 30, a post-doctoral fellow on the Spitzer Space Telescope project, died March 22.

Holmes had worked on the project for about 2 1/2 years. She had been working on a Spitzer study on the theory of orbital dynamics, looking at hundreds of nearby stars.

Services were held in her home state of North Carolina.

GEORGIANA (GENA) KING, 77, a retired senior executive secretary, died March 28.

King, who worked at the Lab for 15 years, was the first woman president of the former Employees' Recreation Club.

She is survived by sons Steve, John, Tom, David and Gary, and daughter Nancy Winn. Services were held at Forest Lawn in Glendale.

Letters

Many thanks to my friends and colleagues at JPL whose generous support helped me through the difficult days since the passing of my dear mother, Ella. The cards and plant from JPL Hospitality have been a great comfort to my family and me. Your kindness will be long remembered.

Kay Ferrari

I would like to thank the MER Project, Office 510 and the rest of my JPL friends and colleagues for the flowers, cards and condolences you gave my family and me upon the death of my father. Your support during this difficult time has helped us to accept his passing and lift our spirits. Sincerely,

Mark Boyles

Thank you to my friends and coworkers for the wonderful love and support that you have shown me following the passing of my baby granddaughter. I am grateful to have been able to take time off to be with and console my daughter and son-in-law during this difficult period. Thank you to all who helped cover my responsibilities while I was away and thank you to JPL for the beautiful plant and card.

Ginger Kemp

I wish to thank the JPL community for the many expressions of condolence and sympathy on the recent passing of my mother. The cards, plant, e-mails, and kind words are deeply appreciated. Some of you knew that Mom was (in earlier days) an astronomer at the Lick and Mt. Wilson observatories. She always took a keen interest in my assignments at JPL, and I look forward to honoring her memory by carrying on her delight in learning and spirit of inquiry as I continue my work at the Laboratory.

Richard Beatty

Retirees

The following JPL employees retired in April:

Robert Polansky, 42 years, Section 920; Donald Palmieri, 41 years, Section 351; Tetsuo Ozawa, 33 years, Section 387; James Arnett, 30 years, Section 515; Steven Ogle, 26 years, Section 266; Michael Tickner, 16 years, Section 352; Rebecca Twitchell 13 years, long-term disability.

Classifieds

For Sale

AIR CONDITIONER, Sears ColdSpot, very large window unit, 28,000 BTU, very heavy, good working cond., \$50/obo. 661/299-2490.

ANGEL TICKETS, 2 seats, \$30 for the pair, various games from season tickets, lower view MVP, just right of home plate. 626/354-2337, Brian (not a JPL extension).

BABY ITEMS: crib, wood, made in Italy, includes mattress (height adjustable), excellent cond., photo available. \$150/obo; car seat, front-facing, up to 40 lbs, made by Century, good cond., \$25/obo. 626/791-6101.

BARBECUE, propane, lava rock, electronic ignition, on wheels; cooking area 29 x 15," 2 tanks, one half-full, one full. 845-9125, Sam.

BED, frame, Cometa queen, cherry wood, Italian design, paid \$1,300 new, sell for \$850; see at <http://www.modfurniture.com/italian.html>. 244-8822.

BIKE, BMX, very rugged construction; specialized model 415 FSX w/4130 chromoly frame; 20" wheels; Alex rims; 3-pc. crank set; gyro for barspins; exc. cond.; original price \$430, sacrifice for \$210. 790-4028, Daryl.

CAMERA, Canon, \$40; PHONE/ans. machine, Sony, \$20; SPEAKERS, Acoustic Research, \$20/pr.; CD PLAYER, Sony, w/ am/fm, \$20; TUNER/AMP, Onkyo, \$50; GOLF BAG, Calloway, \$20; PUTTER, Ping J-blade, \$20; DISC DRIVES: Zip external USB + floppy USB, \$20/ea.; WALKIE-TALKIES, Motorola, \$40/pr.; DESK LAMP, Ikea halogen, \$20; MATTRESSES, 'Perfect Sleeper' w/box-spring & frame, twin, pr., \$250/ea.; CLOCK, grandfather, \$400; COMPUTER TABLE, "Relax the Back," \$100. 213/810-8801.

CELL PHONE w/camera attachment, Sony Ericsson series, new, still in box, \$50. 897-2191.

COMPUTER DESK, mobile, cherry veneer, made by O'Sullivan, model 61925, excellent condition, like new; sell for best offer. 626/449-0997.

COMPUTER WORKSTATION, gray corner unit, extends 5 ft. at rt. angles from corner, with angled cutout (like JPL modulars); \$100. 626/577-6638, Suzanne.

DODGER TICKETS, selected games from season ticket package, loge level (orange), aisle 132, inside first base, 2 tickets per game face value, \$30 ea., see www.delunac.net/tickets. 626/296-1253.

DRUM SET w/double peddle base, \$250/obo. 626/447-4734.

DRYER, Kenmore 90 series electric, 2 yrs. old, great cond., \$200/obo. 661/816-4188.

DRYER, Maytag, gas, good condition; beige, extra large capacity, 3 temp cycles; \$100/obo. 648-4843.

DUFFEL BAG, Samsonite Outline 5, brand new, dark green, top-quality 1680D ballistic nylon, carry-on size (19" x 12" x 12"), padded handles/shoulder strap, large main packing area, exterior pockets, MSRP \$170, sacrifice at \$70/obo. 626/794-9579.

FURNITURE: 2-piece Bassett sectional (1 piece 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.

GUITAR, acoustic, Estaband signed, \$200 brand new, sell for \$100/obo. 249-4395 or rem@koroisland.com.

GYM EQUIPMENT, power rack w/low & high pulley system, incline, decline, bench press, includes 150 lb., you can buy more, \$400. 897-2191.

INCOME TAX GUIDE BOOK, J.K. Lasser's 2004, with forms, brand new, \$10; DIET TAPES, Jenny Craig, set of 14, \$25; COMPUTER POWER CONTROL CENTER, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20. 790-3899.

ORGAN, Yamaha 415 electronic console w/13 pedals, 3 keyboards, 144 rhythm patterns, rd. \$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.

ORNAMENTS, Star Trek by Hallmark (3), 1993-95; Enterprise, Romulan, and Klingon ships; with boxes, all 3 for \$100. 626/332-2682, Steve.

RECLINER, leather, wing back, good cond., \$50. 249-6786.

SCANNER, Radio Shack, model PRO 2030, programmable, 80 channel, new in box, \$50. 626/577-2882.

SCOOTER, 4 wheel, like new, exc. cond., rotating seat, comes apart for trunk, charger basket, 2 new batteries, charger, basket, etc., \$750/obo. 790-6060.

SOFA / DUAL-RECLINER/LOVESEAT, contemporary with pub-style back and deep stitched contours in soft textured abstract fabric, light color; COMPUTER DESK, dark brown, sturdy, make offer. 626/799-7593.

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

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

WASHER, Maytag, less than 1 year old, exc. cond.; white, extra-large capacity, 3 wash cycles, 4 load sizes, 4 temp wash/rinse combos; \$250/obo. 648-4843.

WASHER/DRYER, electric 220V, Maytag, older model, still in working condition, \$100 for both, firm, must be able to pick up from Laguna Beach. 626/646-1937.

VCR, JVC VCR+, \$25. 352-3588.

Vehicles / Accessories

'95 BMW 325is, sports package, computer, metallic gray/gray, 6-CD changer, tint, exc. cond., 106K mi., \$9,500. 310/374-0855, Alfonso.

'01 CHEVROLET Metro LSI, CD player, just smogged, \$4,300. 626/379-3503, Erik.

'93 CHEVROLET Suburban 2500 2X4 350 V8, red, excellent condition, well maintained,

low mileage; includes: a/c, power doors & windows, wood trim dash, custom front sheepskin covers, running boards, new tires with Weld wheels, Flowmaster exhaust. 626/359-7666.

CORONADO sailboat, 23 ft. with Nissan 5 hp, excellent condition; radio, sails, other equipment included, ready to sail to Catalina, perfect for new sailors; must see. \$2,600/obo. 626/584-1164, Muriel.

'01 FORD F150, Supercrew cab, 4WD, 5.4L EFI V8, power windows/doors/driver's seat, cloth interior, captains chairs, 6-disc CD changer, tow package, super clean inside and out, have all maintenance receipts, 34K mi., \$23,500. 626/852-0589 or 323/595-7220.

'98 FORD Explorer, XLT, V8, black, 71K mi., 4dr., VG cond., power everything, leather tan interior, newer multi-CD changer, \$8,500/obo. 352-9418, Lee.

'97 FORD F-150, S.B. reg. cab, exc. cond., \$6,000/obo. 310/480-6489.

'01 HONDA Prelude, 18K mi., platinum, manual 5-speed, power mirrors, CD, moonroof, meticulously maintained, exc. cond., \$16,000 firm. 626/975-8824.

'93 HONDA Civic hatchback, 94,000 miles, mechanically well-cared for, e.g., timing chain changed at 60,000 miles and front suspension ball joints recently replaced; body dinged and scratched; \$2,200. 845-9125, Sam.

'94 ISUZU Rodeo, 1 owner, 117K miles, 2WD, V6, green, AT, a/c, power windows/door locks, remote with alarm, www.colorado4wheel.com, \$4,400. 235-4015.

'94 JAGUAR XJ6, exc. cond., burgundy w/tan leather interior, 95K mi., premium wheels/sound, am/fm/cassette/multi-CD player, full power window/seats, new brakes & tires, \$6,500/obo. 310/451-5919.

'98 JEEP Grand Cherokee Special Edition, 5.2L, V8, 4WD, 75K mi., power everything, cruise control, cassette, 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., \$10,400/obo. 352-6646, Ben, or verdugo_verde@comcast.net.

'93 JEEP Grand Cherokee Laredo, 4x4 V8 automatic, 145K mi., loaded, forest green w/gray interior, many new parts 10,000 miles ago, all maint. done + records and receipts, great cond., <http://www.ecf.caltech.edu/~jawolf> for more info., \$6,000/obo. 626/796-6658, Garrett or gkatzens@hotmail.com.

'92 PONTIAC Sunbird SE coupe, 3.1L V6, 5-speed manual, black w/black interior, a/c, ABS, factory CD player, cruise, power locks/windows, alloy wheels, new battery and alternator, 119K mi., \$1,100/obo. 626/222-1034, Jason, or foxswimmer@juno.com.

'00 TOYOTA Tundra Limited, 56K miles, snug top shell w/carpet kit, tow package, all power, 6-CD in dash, new tires, \$17,500. 909/596-9007.

'97 TOYOTA Tercel, exc. cond., CD player. 626/379-3503.

TRUCK SHELL, skill-craft, currently on a 1986 Toyota long bed, red, \$150. 626/798-0329.

'99 VOLKSWAGEN Passat, loaded, sunroof, CD, power all, alloy wheels, heated leather seats, cruise control, tiptronic auto trans, 2nd owner, 72K mi., pics: www.begrific.com/4sale/passa/, \$14,500/obo. 323/578-8995 or be@begrific.com.

'73 VOLKSWAGEN Karmen Ghia, needs to be restored, non-operational for 4 yrs., extra parts included, \$2,200/obo. 661/264-4347, Kathy.

'84 VOLVO DL, silver, 4 dr., 4-speed manual with OD, a/c, power steering/locks, cruise control, am/fm/stereo/cassette, 4-wheel disc brakes, 120K mi., vg cond., \$875. 626/794-8870. btfsplk@earthlink.net.

Free

BED, twin, with box springs and frame. 626/614 8370.

CAT, Calico, mostly white house cat, spayed and de-clawed, friendly, loves milk in a saucer, looking for a good home. 249-6786.

SLEEPER SOFA, green/white striped canvas, needs slipcover, you haul. 790-5538.

Wanted

HOME to PURCHASE, private party, La Canada school area, minimum 3 bd. 790-6060.

HOUSE to rent in Montrose/La Crescenta area; must have at least 2 bd. 541-9091, Susan.

HOUSING, mature couple relocating to JPL starting in June, prefer 2-3 bedroom, safe and quiet, close to JPL, have 2 cats, 1 dog. 235-4015.

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

MULAN, by Disney, DVD format. 626/646-1937.

RV to rent for 1 week, 7/24-7/31/04 trip to Leo Carrillo State Beach near Malibu, desire new, large, with all amenities, will be properly insured. 909/823-4711.

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

VANPOOL RIDERS, from Victor Valley to JPL. 4-1424, Scott.

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10 p.m. at Eagle Rock High School, \$4/nt. 956-1744, Barbara.

For Rent

ALTADENA bungalow/duplex in quiet neighborhood close to JPL, very private, 1 bd., 1 ba., a/c, stove/refrig., hardwood floors, beautiful yard, available mid-June, \$950. 626/797-2990, Dave.

ALTADENA room, quiet neighbor'd, nr. Woodbury & NY, 3.3 mi. to JPL, beautiful hardwd. floors, fireplace, washer/dryer, kitchen privileges, util. incl., high-spd. internet at add'l cost, \$525. 626/345-0625.

ALTADENA house, 1 mile from JPL, 2 bd.,

beautiful hardwood floors, wood-burning fireplace, French doors, remodeled kitchen & bathrm., dishwasher, a/c, washer/dryer, gard-ener included, detached 2-car garage, gated back yard w/patio, \$1,400. 626/791-7081.

LA CRESCENTA, Upper Briggs Terrace, spectacular views, quiet, isolated, 2 bd., 1.5 ba., + large artist view loft over large garage, 1/3 acre on rim of 300-acre canyon, a/c, new kitchen, hot tub, 15 min. to JPL, 2325 Maurice Ave, deer/crittlers often seen, \$2,500 + 1 mo. sec., 1-year lease, will consider small pet. 310/322-8513, Jim.

PASADENA, Caltech's Health Educator seeking non-smoking, cat-friendly roommate to share 2 bd., 2 ba. condo 3 blocks from campus; unfurnished bedroom/priv. ba; amenities include cent. air/heat, fireplace, large balcony, lots of closet space, laundry and parking; terrific location, available May 1; 6-mo. lease; 1-mo. security deposit; \$800 + 1/2 gas & electric. 626/833-2961, Jane.

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

PASADENA / S. PAS. border, roommate to share 2 bd., 1 ba., front and back yards, hardwood floors, furnished or not, fireplace, all appliances, no pets, 2 cats already, 7-10 min. drive to JPL, temporary stay preferred, \$750 + 1/2 bills. 626/676-3911.

VAN NUYS, 1-bd. condo in gated tropical complex w/pool and Jacuzzi, 2-car covered parking, built-in stove + washer and dryer in unit, central air & heat, gas fireplace, lg. balcony, spacious and clean, close to 405 fwy at Roscoe, \$895. 601-0297, Melody, evenings.

Real Estate

ALPINE FOREST, 3.2 acre view lot, just 25 minutes from Tehachapi, property sits among pine and oak trees at 6,300 ft. elevation; 4 seasons are part of the enjoyment; buildable for a vacation retreat or secluded home site; property association is responsible for road maintenance and security (gated w/guard); closest neighbor is 3/4 mile; \$40,000. 249-6071.

ARIZONA, 43 acres w/2 room house, near Williams, wildlife abounds, 2.5 mile access, house over looks 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 years. rem@koroisland.com.

ESCONDIDO, golfers' paradise timeshare, Lawrence Welk Villa, fixed week #23 with high RC / trading value; spacious 1,600 sq. ft., 2 bd., 2 tow full ba. with all amenities; cathedral vaulted ceiling and outside veranda overlook a beautiful 18-hole golf course; Wild Animal Park/zoo/Sea World are close by; \$17,000. 249-6071.

NATIONAL FOREST, 68 acre: home: 2 lg. bd., 1 ba., lg. den, fireplace, kitchen, 2 refrig., pantry, washer/dryer, tools, electric, propane 288 gal., barn, workshop, tractor & attachments, \$289,900. 790-5586 or 542-2411, Chris Thomas.

SIERRA MADRE home, 2-story built in 1989, stunning views of city lights & mtns., backs to open space, 3 bd., 2 1/2 ba., 2,403 sq. ft.; updated throughout w/newer roof, flooring, lighting, appliances, paint; huge master suite, fireplace, patio; oversized 2-car gar.; slide-show at www.timcragoe.com under properties/new listings; \$699,000. 626/229-2210.

Vacation Rentals

BALBOA ISLAND, cute upstairs apt., fully furnished, 2 bd., 1 ba., deck, parking, laundry, steps to bay, sleeps 5; avail. for weekly rental June-Sept., \$1,000-\$1,500/week. 626/429-3677 or betryrs@earthlink.net.

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

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

FLORIDA, New Smyrna Beach, fully furn. condo, 2 bd., 2 ba., full kitchen, half-hour to Cape Canaveral; quiet, relaxing, overlooking beach; BBQ/pool/game rm., great ocean view, easy walk to stores and restaurants; sleeps 6; weekly or monthly. 909/981-7492, Darlene, or dhauge@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 rate \$130/night/2, \$15/night/add'l person. 949/348-8047 or jackandrandy@cox.net.

HAWAII, Oahu, Marriott's Ko Olina Beach Club, 5-star resort, 15 min. from Waikiki, 7 nights, Aug. 28-Sep. 4, 2-bd. luxury suite, 2 ba., sleeps 8, dining room, fully equipped kitchen, oven, microwave, dishwasher, refrigerator, service for 8, built-in laundry facility, view, TV/VCR in every room, \$1,100/7 nights, Marriott price \$332/night. 790-7916.

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 valeriec@caltech.edu.

OCEANSIDE condo, fully furn. 2 bd., 2 ba., fireplace, 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 dhauge@yahoo.com.

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

RESORTS, 5-star; incl. Carmel, Tahoe, Sedona, Colorado Rockies & Florida, luxurious residential-style studios w/furnished kitchenette, starting at \$511 for 7 nts; larger units w/1-3 bd., living rm., full kitchen. 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.

JPL'S ONLINE NEWS SOURCE

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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

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Meteorite-like rock found on Mars

By Guy Webster



This false-color composite of "Bounce Rock" shows the rock after the Spirit rover drilled into it with its rock abrasion tool. The drilling of the 0.3-inch hole generated a bright powder.

JPL's Opportunity rover has examined an odd volcanic rock on the plains of Mars' Meridiani Planum region with a composition unlike anything seen on Mars before, but scientists have found similarities to meteorites that fell to Earth.

"We think we have a rock similar to something found on Earth," said Dr. Benton Clark of Lockheed Martin Space Systems, Denver, science-team member for the Opportunity and Spirit rovers. The similarity seen in data from Opportunity's alpha particle X-ray spectrometer "gives us a way of understanding 'Bounce Rock' better," he said. Bounce Rock is the name given to the odd, football-sized rock because Opportunity struck it while bouncing to a stop inside protective airbags on landing day.

The resemblance helps resolve a paradox about the meteorites, too. Bubbles of gas trapped in them match the recipe of martian atmosphere so closely that scientists have been confident for years that these rocks originated from Mars. But examination of rocks on Mars with orbiters and surface missions had never found anything like them, until now.

"There is a striking similarity in spectra," said Christian Schroeder, a rover science-team collaborator from the University of Mainz, Germany, which supplied both Mars rovers' Moessbauer spectrometer instruments for identifying iron-bearing minerals.

Mars Exploration Rover scientists described two such meteorites in particular during a JPL news conference. One rock, named Shergotty, was found in India in 1865 and it gave its name to a class of meteorites called shergottites. A shergottite named EETA79001 was found in Antarctica in 1979 and has an elemental composition even closer to Bounce Rock's. Those two and nearly 30 other meteorites found on Earth are believed to have been ejected from Mars by the impacts of large asteroids or comets hitting Mars.

Opportunity's miniature thermal emission spectrometer indicates that the main ingredient in Bounce Rock is a volcanic mineral called pyroxene, said science-team collaborator Deanne Rogers of Arizona State University. The Moessbauer spectrometer also identified pyroxene in the rock. The high proportion of pyroxene makes it unlike not only any other rock studied by Opportunity or Spirit, but also unlike the volcanic deposits mapped extensively around Mars by a similar spectrometer on the JPL-managed Mars Global Surveyor orbiter, Rogers said.

Thermal infrared imaging by another orbiter, Mars Odyssey, suggests a possible origin for Bounce Rock. An impact crater about 16 miles wide lies about 31 miles southwest of Opportunity. The images show that some rocks thrown outward by the impact that formed that crater flew as far as the distance to the rover. "Some of us think Bounce Rock could have been ejected from this crater," Rogers said.

Opportunity is driving eastward, toward a crater dubbed "Endurance" that might offer access to thicker exposures of bedrock than the rover has been able to examine so far. With new software to improve mobility performance, the rover may reach Endurance within two weeks, said JPL's Jan Chodas, flight software manager for both Mars Exploration Rovers.

Mission controllers at JPL successfully sent new versions of flight software to both rovers. Spirit switched to the new version successfully on April 12, and Opportunity did the next day.

A parting look at the small crater in which Opportunity landed is part of a full 360-degree color panorama released at the news conference. The view combines about 600 individual frames from the rover's panoramic camera, said science-team collaborator Jason Soderblom of Cornell University. It is called the Lion King panorama because it was taken from a high-ground viewpoint at the edge of the crater, like the high-ground viewpoint used by animal characters in the Lion King story.

Invisible gas giants exposed by Spitzer

By Whitney Clavin

Hidden behind a curtain of dusty darkness lurks one of the most violent pockets of star birth in our galaxy. Called DR21, this stellar nursery is so draped in cosmic dust that it appears invisible to the human eye.

By seeing in the infrared, the JPL-managed Spitzer Space Telescope has pulled this veil aside, revealing a fireworks-like display of massive stars, the biggest of which is estimated to be 100,000 times as bright as our own Sun.

"We've never seen anything like this before," said Dr. William Reach, an investigator for the latest observations and an astronomer at the Spitzer Science Center at Caltech. "The massive stars are ripping the cloud of gas and dust around them to shreds."

Located about 10,000 light-years away in the Cygnus constellation of our Milky Way galaxy, DR21 is a turbulent nest of giant newborn stars. The region is buried in so much space dust that no visible light escapes it. Previous images taken with radio and near-infrared bands of light reveal a powerful jet emanating from a huge, nebulous cloud. But these views are just the tip of the iceberg.

Spitzer's highly sensitive infrared detectors were able to see past the obscuring dust to the stars behind. The new false-color image spans a vast expanse of space, with DR21 at the top center. Within DR21, a dense knot of massive stars can be seen surrounded by a wispy cloud of gas and dust. Red filaments containing organic compounds called polycyclic aromatic hydrocarbons stretch horizontally and vertically across this cloud. A green jet of gas shoots downward past the bulge of stars and represents fast-moving, hot gas being ejected from the region's biggest star.

Below DR21 are distinct pockets of star formation, never captured in full detail before.

The new view testifies to the ability of massive newborn stars to destroy the cloud that blankets them. Astronomers plan to use these observations to determine precisely how such an energetic event occurs.

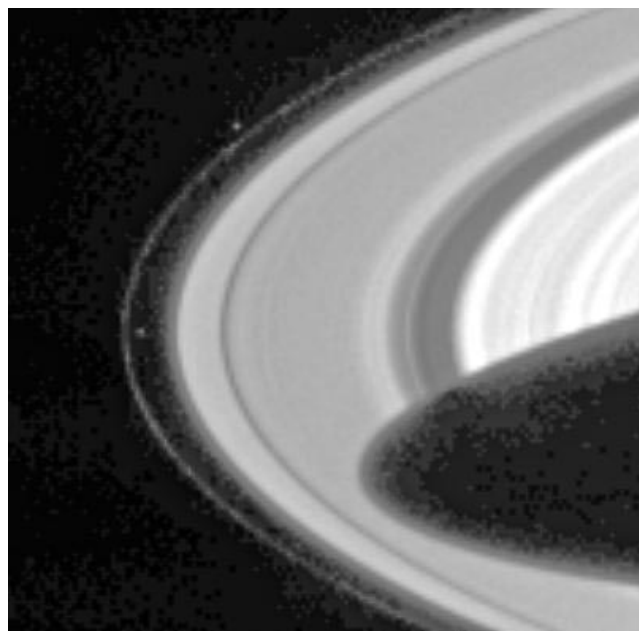
The new image is available online at <http://photojournal.jpl.nasa.gov>.

Spitzer, which was launched in August 2003, is managed by JPL for NASA's Office of Space Science.

Cassini finds moons in the rings

Cassini has sighted Prometheus and Pandora, Saturn's two F-ring-shepherding moons whose unpredictable orbits both fascinate scientists and wreak havoc on the F ring.

Prometheus (63 miles across) is visible left of center in the image, inside the F ring. Pandora (52 miles across) appears above center, outside the ring. The dark shadow cast by the planet stretches more than halfway across the A ring, the outermost main ring. The mottled pattern appearing in the dark regions of the image is "noise" in the signal recorded by the camera system, which has subsequently been magnified by the image processing.



News Briefs

MER honored by foundation

The Earth and Space Foundation has presented its first Exploration Award to the JPL Mars Exploration Rover (MER) team for its outstanding work on the surface of the Red Planet this year.

Foundation co-founder DOUGLAS MESSIER presented the award to MER Flight Director CHRIS LEWICKI and team member JULIE TOWNSEND, on behalf of the team, during the April 12 Los Angeles celebration of Yuri's Night: The Global Space Party, held at Los Angeles International Airport.

"The MER team has done extraordinary work on the surface of Mars during these past three months," Messier said. "I can't think of a better recipient for this award than this outstanding group."



Earth and Space Foundation co-founder Douglas Messier, left, presents award to MER Flight Director Chris Lewicki.

The Earth and Space Foundation was established in 1994 as a non-profit organization in the United States and the United Kingdom. The foundation has supported more than 40 expeditions in two categories: the use of space technologies to help study and preserve the Earth's fragile biosphere; and the study of life in our planet's most extreme environments.

Yuri's Night is held each year on April 12 to mark the first human spaceflight by Yuri Gagarin in 1961 and the first shuttle mission 20 years later. This year, 75 parties were held on seven continents.

"We're very pleased to be doing this presentation at Yuri's Night," Messier said. "The purpose of this celebration is to get the world's youth excited about space exploration. Spirit and Opportunity certainly achieved that goal."

Four receive Ed Stone Award

Four JPL employees have received the 2004 Dr. Edward Stone Award for Outstanding Research Publication.

The annual awards recognize and encourage publication of significant research results in science and technology by JPL employees throughout their professional careers.

The recipients are:

STEVEN CHESLEY, senior engineer, Organization 3120. Publication: "Direct Detection of the Yarkovsky Effect via Radar Ranging to Near-Earth Asteroid 6489 Golevka."

PETER DAY, senior engineer, Organization 3869. Publication: "A Broadband Superconducting Detector Suitable for Use in Large Arrays."

IAN JOUGHIN, senior engineer, Organization 334. Publication: "Changes in West Antarctic Ice Stream Velocities: Observation and Analysis."

CHRISTOPHER WEBSTER, senior research scientist, Organization 324. Publication: "Water Isotope Ratios D/H, 180/160, 170/160 In and Out of Clouds Map Dehydration Pathways."

Each winner received a certificate of recognition and a Level A Bonus Award. In return, each recipient is asked to give a public lecture to the JPL community related to the work for which he is being recognized. The lectures will be spread through the year.

The award was established in 2000 in honor of Stone, who served as JPL's Director from 1991-2001.

Lab hosts Quality Assurance event

JPL's Procurement Quality Assurance Group last month hosted the semi-annual Quality Leadership Forum Conference, held in Cocoa Beach, Fla.

More than 150 Quality professionals from NASA and the aerospace industry attended. Procurement Quality Assur-

ance Group Supervisor BUCK CRENSHAW hosted the event, which addressed issues such as leadership, metrics, tools, process control and lessons learned.

Also in attendance was Quality Assurance Section Manager CARL DE SILVEIRA. TOM RAMSEY, JPL's quality assurance manager for the Mars Exploration Rovers, spoke on the role of quality assurance in MER's success.

JPL's supplier outreach coordinator KIEN NGUYEN spoke on the Supplier Outreach Process Control program, a JPL-administered NASA Code Q-sponsored initiative to reach out to suppliers and sub-tier suppliers of Earth science, space science, and biological and physical research programs.

OLGA CERITELLI, JPL's procurement quality assurance supplier interface lead, presented on the Supplier Rating System currently in development. This system will include components of the Department of Defense's Naval Sea Logistical Center's Product Data Reporting Evaluation Program.

For information on this or upcoming Quality Leadership Forum conferences, call Crenshaw (ext. 4-7225) or Ceritelli (3-6085) or join the online workgroup at <http://qualityleadership-pbma-kms.intranets.com>.

In conjunction with the Quality Leadership Conference, Ramsey participated in a panel discussion on the fundamentals of quality contributing to program success/interaction of quality in the entire life cycle at the Conference on Quality in the Space and Defense Industries, held in Cape Canaveral, Fla., March 22 and 23.

Procurement Quality Assurance also hosted "Strengthening Ties with Your Supplier Base," a workshop in which panelists from JPL, ATK Thiokol and Adacel Inc. shared ways in which their respective companies manage, recognize and work with their supplier base.

For CQSDI Conference information, visit www.asdnet.org/cqsd.

Revlon Run/Walk for Women May 8

The Director's Advisory Council for Women notes JPL's participation in the 11th annual Revlon Run/Walk for Women on Saturday, May 8. The event raises vital funds for research into the cause and cure of women's cancers as well as funds to provide support for patients surviving these diseases. To date, the Run/Walk has raised \$28 million.

This is the fourth straight year JPL will participate. To join the team, register at <https://www.revlonrunwalk.com/la/secure/findteam.cfm>. JPL's team number is 588. This year's goal is to have 75 participants raise \$7,500.

If you are unable to attend, you can still join the fight by sponsoring registered team members on the website.

If you have any questions or comments, contact NANCY NEILAN at ext. 4-1809 or by e-mail.

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>.

Survey rates NASA a top workplace

The Partnership for Public Service and the American University Institute for the Study of Public Policy Implementation has released the second set of rankings of the "Best Places to Work in the Federal Government." Young people, women and minorities selected NASA as the best place to work in the federal government.

The rankings were compiled from an employee satisfaction survey administered to more than 100,000 federal employees by the U.S. Office of Personnel Management.

To view the rankings, visit <http://www.bestplacetowork.org>.

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, April 23

"The Flow of Energy Through the Earth's Climate System"—Dr. Kevin Trenberth, who leads the Climate Analysis Section at the National Center for Atmospheric Research, will speak at 11:30 a.m. in von Kármán Auditorium. The talk is sponsored by the Office of the Chief Scientist and the Earth and Space Sciences Division.



Saturday, April 24

Caltech Jazz Bands—The Caltech Jazz Festival, featuring "Jazz Classics for Big Band," will be presented from 2 to 6 p.m. at Gates Library Patio, near Dabney Lounge. Free admission. For more information, call (626) 395-4652.

Folk Music—Autoharp player/traditional singer/storyteller Bryan Bowers will appear at 8 p.m. in Caltech's Beckman Institute Auditorium. Tickets are \$15 for adults, \$5 for children under 12. For more information, call (626) 395-4652 or check the Folk Music Society website at <http://www.folkmusic.caltech.edu>.

Sunday, April 25

Chamber Music—The Coleman Chamber Ensemble Competition Winners Concert will be presented at 3:30 p.m. in Caltech's Ramo Auditorium. Tickets are \$15 for adults, \$10 for high school age and under. For more information, call (626) 395-4652.

Wednesday, April 28

"Challenges and Excitement of Space Exploration"—JPL Director Dr. Charles Elachi will deliver this free lecture at 8 p.m. in Caltech's Beckman Auditorium. For more information, call (626) 395-4652.

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Debbi Llata at ext. 3-3690 for information.

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

Thursday, April 29

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

JPL Stories—Tom Farr of the Earth and Space Sciences Division will present "Feet on the Ground, Eyes in the Sky: A Field Geologist's Adventures in Remote Sensing" at 4 p.m. in the Library, Building 111-104. If you have questions about the story series or wish to participate, call Teresa Bailey at ext. 4-9233.

Friday, April 30; Sat., May 1

Capitol Steps—This troupe of former Congressional staffers will perform song parodies poking fun at politicians and other newsmakers at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28, and \$24; high school age and under, \$10. For more information, call (626) 395-4652.

Sunday, May 2

California String Quartet—This free concert will be offered at 2:30 p.m. in Caltech's Ramo Auditorium. For more information, call (626) 395-4652.

Tuesday, May 4

Caltech Management Association—A program to honor JPL's Mars Exploration Rover team will take place in Beckman Auditorium at noon. MER team members will take part in a panel discussion about their project experiences as well as respond to audience questions. The entire JPL and Caltech Campus community is invited. A box lunch will be provided to everyone who attends as they leave the event.

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

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

Thursday, May 6

Clogging Class—Meets 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.

Division 35 salutes MER



Division 35 Manager Phil Garrison, left, and Mars Exploration Program Manager Dr. Firouz Naderi chat at April 9 celebration of the division honoring its members who contributed to the success of the mission. About 350 MER team members from Division 35 received certificates of recognition.

Dutch Sliger / JPL Photolab

ALLIANCE PARTNERS JPL WITH MUSEUMS AND
OTHER LEARNING CENTERS NATIONWIDE

By Susan Brauhelm-Kalogerakos



JPL's Informal Education Office and the Mars Public Engagement Office are partnering with museums, science centers, planetaria and other non-profit informal science education organizations across the country in an effort bring Mars to Earth. The Mars Museum Visualization Alliance is a collaboration between JPL and more than 100 institutions to share the adventure of exploration and make Mars a real place.

JPL provides the alliance partners with assured access to the real-time and press-released images, timely information, people and an "in" to NASA. The alliance members use the images and information in their live programming, webcasts, exhibits, presentations, classes and educational activities.

The idea for such an alliance was spawned a few months after Mars Pathfinder's July 4, 1997, landing when Anita Sohus, JPL's informal education lead, was visiting a curator at the National Air and Space Museum in Washington, D.C., the world's most visited museum. "He observed that on the day of Pathfinder's landing, he had a huge auditorium full of excited people—and nothing to show them," Sohus said. "What a lost opportunity."

"I learned that museums, science centers and planetaria have unique facilities, knowledgeable and enthusiastic staff, and strong ties within their local communities, including the school systems and civic leaders," she added.

Sohus took this information and went to work with Michelle Viotti, Mars public engagement manager, and Eric De Jong, principal investigator for the Solar System Visualization Project, to create the Mars Museum Visualization Alliance.

A key to the success of the program has been the near-real-time release of images. "We created the alliance to assure that these institutions would have access to the visuals and information they could present to their audiences in a timely way," Sohus said. "They get the images at the same time as the science teams." This service has never been provided in past outreach campaigns.

The alliance members receive e-mail notifications about the latest NASA TV schedule, breaking news, opportunities and contacts, and participate in regular teleconferences that allow them to ask questions, share information and interview Mars Exploration Rover team members. Member institutions can also advertise their events on the public NASA Mars Web page. More than 100 events have been advertised in this manner.

JPL provides the institutions with reality TV, up-to-the-minute images, reliable information and resources, and as a result, through these venues, tens of thousands of people nationwide are exploring Mars right along with us. Solar System Ambassador Michelle Nichols at Chicago's Adler Planetarium noted, "We've got the 3-D images playing in one of our galleries and it's just been wonderful. People walk out with these stunned looks on their faces like, 'Oh my God, I've been to Mars.'"

"Planetarians, especially, consider themselves 'NASA evangelists,'" Sohus added. "So we have a huge cadre of knowledgeable, dedicated and talented spokespeople in nearly all areas of the country, telling our story and making it relevant for their own audiences."

The images and information received via the alliance have enhanced the museums' ability to teach using current science and technology events. "The magic, for me, is putting the live stuff into our daily programming," said Jon Elvert, director of the Irene W. Pennington Planetarium in Baton Rouge, Louisiana, and president of the International Planetarium Society. "Then the planetarium truly becomes a learning center."

Added Dave Hurst, astronomy professor at Glendale Community College, "We're learning geology through an actual case study rather than linearly through a textbook."

"Each facility is able to do what they do best," Sohus noted. "They are ecstatic to get the images in near-real time to use in their daily programming and classes. They share resources and knowledge, and love the connectivity with NASA, JPL and each other."

"Their cache in their communities has risen due to the NASA/JPL connection, and as a result they are getting higher attendance and lots of local press—and so are we."

Rob Semper, executive associate director at the Exploratorium science museum in San Francisco, agrees. "JPL has done an amazing thing with this museum alliance. It has provided just the right inside track to let the museums do what they do best," he said.

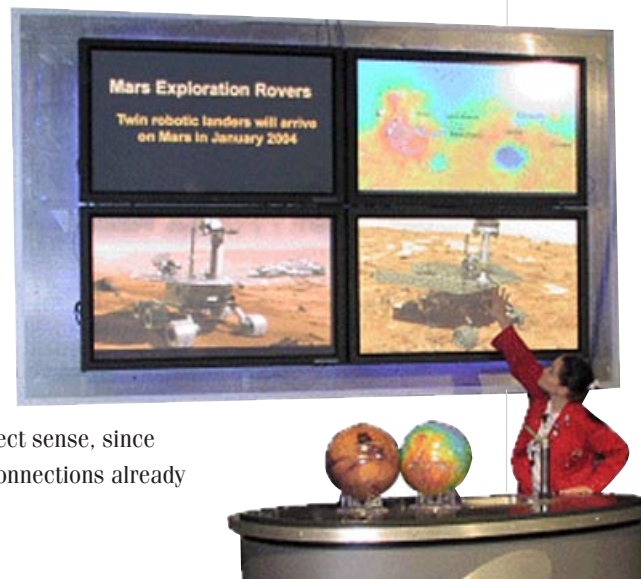
The MER landings were big hits with museum crowds. Many facilities reported their auditoriums were filled to capacity and some had to turn people away. "We were getting a heavy snowstorm the night Spirit landed and had to make a judgment call as to how late to stay open. We decided to stay open very late," said Jim Todd, planetarium director at the Oregon Museum of Science and Industry in Portland. "We turned away about 200 to 300 people, and had to open our auditorium and the planetarium. We had so many people standing in the halls cheering; it was great."

The network will extend beyond the MER missions, including all of the upcoming Mars missions. In addition, De Jong noted that the Cassini mission has already signed up to use the alliance. "We will use the same process to send images of Saturn to the museums that we used on MER," he said.

"Other missions are definitely interested in taking advantage of this network," Sohus said, "and it makes perfect sense, since the infrastructure and connections already have been made."

"Museums, science centers and planetaria have unique facilities, knowledgeable and enthusiastic staff, and strong ties within their local communities, including the school systems and civic leaders."

*— Anita Sohus
JPL informal education lead*



Sharing the vision

MER thermal systems engineer

Shonte Wright shows an astronaut suit to Washington Middle School students.



Dutch Slager / JPL Photolab

NASA officials joined Mars Exploration Rover team members in visits to Southern California NASA Explorer Schools this month.

Associate Administrator Dr. Victor Lebacqz joined MER thermal systems engineer Shonte Wright at Washington Middle School in Pasadena on April 14. The next day, Assistant Administrator David Saleeba and JPL senior robotics engineer Dr. Eddie Tunstel stopped by Ruth O. Harris Middle School in Bloomington (near Fontana); Saleeba also visited 153rd Street Elementary School in Gardena, accompanied by MER science manager Dr. John Callas.

The NASA officials and the MER team members talked with students about our destiny as explorers, NASA's steppingstone approach to exploring Earth, the moon, Mars and beyond, how space impacts our lives, and how people and machines rely on each other in space.

For information about NASA's Explorer Schools Program, visit <http://explorerschools.nasa.gov>.

Passings

DAVID QUINN, 75, a retired project resource administrator in Section 250, died April 3.

Quinn worked at the Lab from 1971 to 2003. He is survived by his wife, Jean; sons David Jr., Peter and Gary; and three grandchildren.

Services were held April 13 at All Saints Church in Pasadena.

DEET STOFFERS, 80, retired from Security after a 32-year career at the Lab, died April 8.

Stoffers retired in 1991, working for 25 years as a receptionist at JPL visitor control.

She is survived by her husband, Fred, son Steve, daughter Kay, three grandchildren and four great grandchildren.

Memorial services were held April 17.

Letters

I would like to thank my friends, co-workers, Section 512 and the ST-7 team for your support during this very difficult time. Your thoughtfulness and expressions of condolence for me and my family is greatly appreciated in the recent passing of my loving father. Sincerely,

Donna Markley

On behalf the Armstrong family I would like to thank all my friends and colleagues in Section 381 and Raytheon, and the rest of JPL including JPL Hospitality for the condolences, cards, flowers and plants that we received upon the death of my father. My father, a former airline pilot who was naturally a technically savvy person, was very enthusiastic about the work we do here at JPL and always inquiring about our latest projects and endeavors. Many thanks for your support, which was greatly appreciated.

Ed Armstrong

On behalf of my family and myself I would like to thank my friends, co-workers and JPL for their kind words, flowers and the beautiful plant following the unexpected death of my father-in-law.

Cynthia Benavides-Baldwin

I would like to thank Section 368 and the rest of my JPL friends and co-workers for the expression of sympathy and support you gave me and my family upon the death of my father. Your kind thoughts, plant and the card are greatly appreciated.

Boris Shenker

Classifieds

For Sale

ANGEL TICKETS, 2 seats, \$30 for the pair, various games from season tickets, lower view MVP, just right of home plate. 626/354-2337, Brian (not a JPL extension).

ANGEL TICKETS, pairs from 20-gm. pack, avail. for most games, \$9-\$11 ea. 626/844-9286.

BABY ITEMS: crib, wood, made in Italy, includes mattress (height adjustable), exc. cond., photo available, \$150/obo; car seat, front-facing, up to 40 lbs, made by Century, good cond., \$25/obo. 626/791-6101.

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

BEDROOM SET, Ikea, queen, black, headboard has shelves, nightstands w/drawers, muck70@hotmail.com for pictures, \$75/obo. 760/948-6839.

BLINDS, vertical, for sliding patio door, white, great cond., \$20. 323/342-9363.

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

BUNK BED, oak, twin on top, double on

bottom, 2 lg. drawers, exc. cond., bought for \$1,200, sell \$500. 909/599-9853.

CD CHANGERS, 100, Aiwa; 200 Sony; 400 Sony. 790-7129, Bill.

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

DESK, from Plummers, teak veneer, side built-in bookshelf, 2 drawers, vg cond., 47" L, 28.5" H, 36" D, \$50. 626/644-1296.

DESK, teak, lg. 69" x 39," contemporary, solid, attractive, 3 locking drawers, pick up on Green St., \$50, cash only. 957-3030 or 298-2044.

DUFFEL BAG, Samsonite, Outline 5, brand new, dark green, top-quality 1680D ballistic nylon, carry-on size (19" x 12" x 12"), padded handles & shoulder strap, lg. main packing area with exterior pockets, MSRP \$170, sacrifice at \$70/obo. 626/794-9579.

DODGER TICKETS, selected games from season ticket pkg., loge level (orange), aisle 132, inside 1st base, 2 tickets/game at face value \$30 ea., see www.delunac.net/tickets. 626/296-1253.

DODGER TICKETS, field level, games include Cubs, Angels and Giants. 365-3350.

EXERCISE EQUIPMENT, Alpine climber (like stair climber), \$50. 626/289-2795.

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

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; desk, library, mission, 34" x 24", dark oak, \$375; mirror, framed, tall, wood, \$25; server, mission, oak, 38 W x 20 D x 37 H, \$300; 2-lamps, ceramic, \$30. 626/584-0860, day; 626/794-3144, eve., Donna.

FURNITURE: sofa and loveseat, matching, multi-colored, only 4 months old, like new, moved in with roommates and no longer need, \$500/obo. 626/399-3037.

FURNITURE: sofa, dual-recliner & loveseat, contemporary with pub-style back and deep stitched contours in soft textured abstract fabric, light color; computer desk, dark brown, sturdy, make offer. 626/799-7593.

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

LAWN MOWER, Murphy 5 HP 20" gas w/3-in-1 capability to mulch, bag and side discharge, adjustable height, good working cond., \$95/obo. 909/576-5788.

LOVESEAT, exc. cond., 5' L, beautiful soft green/blue/pink floral design upholstery, \$75. 626/644-1296.

MICROWAVE, Panasonic, white, 1000W, \$40; SCANNER, UMAX 1220P for Windows, \$15; STEREO SYSTEM, Sony LBT-62000, 3-disc CD changer, \$75; BED FRAME, queen size, \$5. 323/342-9363.

MISC: turkey roaster, 15 x 11 x 7 1/2", self basting, vg cond., \$8; cooking kettle, covered, like new, \$7; bun warmer, electric, vg cond., \$7; beverage pitcher, glass, 2 1/2 qt., gold rimmed, etched body, beautiful, \$7; vegetable dish, covered, porcelain w/ handles, rose pattern, \$9. 626/793-1895, Albert.

MISC: man's formal tuxedo dinner jacket, 40 long, burgundy color, for weddings, cruises, etc., like new, \$25/obo; bed pillows, new, \$5/ea.; sleeping bag, attractive, inside like new, \$10; tennis shoes, Wilson, sz. 12, like new, \$9. 626/793-1895, Albert.

MOVING SALE: ottoman bed, twin size with brown fabric slipcover, hardly used, very good condition, always covered with slipcover, \$150/obo. 909/896-9685.

RECLINER, brown leather, swivels, rocks, fully reclines, made in USA by Franklin Corp., very comfortable but rarely used, \$300. 653-8204.

SCUBA gear, full set, most is Scuba Pro with DUI dry suit included, www.guiwits.com/scuba for details, \$2,800/obo. steve@guiwits.com.

SCULPTURES from Disney movies, "Classic Collection," porcelain, hand painted, boxed, cert. of authenticity, from 4" to 10" H, some 9" long; Beauty & Beast, Snow White w/7 dwarves & hearth (individual), Cruella deVil (hugh), Icabod Crane, Headless Horseman, Pinocchio & characters, beautiful; \$50-\$400. 626/963-2278, Glendora, Karen Hartman.

SOFA HIDE-A-BED, queen size, exc. cond., subdued floral pattern, \$980 new, sell for \$485. 626/794-7498.

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

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

TOY COTTAGE, Little Tykes, telephone, stove/sink for cooking, 4 shutters/windows, a door, plastic tea sets, pots, dishes, mint condition, always kept indoors, will deliver in Pasadena area, original price \$300, sell for \$175; BIRD CAGES, assorted; DOG HOUSE, med. size, \$30. 249-6248.

WASHER, Sears Kenmore, \$50. 626/445-4497.

Vehicles / Accessories

'97 CHEVROLET Suburban LS, V8, 123K mi., driver & passenger airbags, pwr. everything, no accidents, flawless cond., vake3377@yahoo.com for pics, \$14,000/obo. 846-0053.

'93 CHEVROLET Suburban 2500 2x4 350 V8, red, exc. cond., well maintained, low mileage; incl.: a/c, pwr doors/windows, wood trim dash, custom front sheepskin covers, running boards, new tires with Weld wheels, Flow-master exhaust. 626/359-7666.

'00 DODGE Durango 4x4 SLT, 43K, 4.7L V8, auto, overdrive, 7-passenger, red w/tan leather interior; loaded: cruise, tilt, front/rear air, am/fm/CD/cass., dual airbags, privacy glass, luggage rack, running boards, alloy wheels, ABS, tow pkg., pwr. seat/steering/windows/locks/mirrors, like new inside/out, transferable 8/80 warranty, can send digitals, \$17,500/obo. 661/945-9984.

'97 DODGE Grand Caravan, sport package, V6, 71K, white, tan int., factory tint, overhead console, rear air, power locks/doors, security syst., very sharp, e-mail avbattis@yahoo.com for pics, \$7,800/obo. 909/702-2326.

'01 FORD F250, super duty, crew cab, V10, 30K mi., 60K warranty, very clean, only used as extra vehicle to tow a boat, must sell, \$23,000/obo. 399-1667.

'65 GLASPAR boat, 16 ft. with trailer, 75 HP Evinrude outboard engine, very nice exterior, interior OK, canopy and extra features, great for first time boat buyer, \$1,450. 323/266-8671, Duane.

'98 HONDA Accord LX sedan, 58K mi., silver, manual 5-spd., a/c, pwr. windows/doors/locks, new tires, \$8,500. 626/403-7163, Katie.

'97 HONDA Valkyrie motorcycle, showroom cond., many extra chrome parts, garage kept, 26K mi., windshield, leather bags, studded seats, purple/white, \$7,900. 957-2852.

'93 INFINITI G20, loaded, sunroof, new clutch, 117K, just broken in for this car, great mpg, very nice, e-mail avbattis@yahoo.com for pics, \$3,999/obo. 909/702-2326.

'94 ISUZU Trooper LS, 4D, V6, 4WD, 3.2 L, DOHC, automatic, locking hubs, antilock brakes, cruise control, alarm, am/fm stereo, 12-CD player, white, exc. shape, tinted windows, new a/c, new transm'n, pwr. steering/windows/locks, tilt wheel, rear window defroster, rear window wiper, exterior spare tire carrier, \$6,495/obo. 957-3296.

'00 JEEP Grand Cherokee, only 44,800 mi., 4-dr., a/c, CD, power door, exc. cond., \$13,150/obo. 731-0470.

'01 LEXUS RX 300, 2WD SUV, 38K mi., power moonroof, CD changer, leather, exc. cond., \$26,900. 818/395-9631, 562/695-5197.

'96 LEXUS SC 300, loaded, leather, power seats, sunroof, 48K miles, rear spoiler, metallic gold color, 12-CD changer, etc., \$12,500. 909/599-3230.

'86 MERCEDES-BENZ 560 SEL, dk. blue ext., gray leather seats, 4-dr. sedan, 153K mi., pwr. windows/seats, seat heaters, sunroof, cruise contr., great stereo w/CD, new tires, registration just pd., looks great, \$3,800/obo. 323/442-6533, Candy W or myella76@hotmail.com.

'93 MERCURY Villager GS, 7-seat, power steering/windows/doors/locks, a/c, am/fm stereo, good cond., \$3,500/obo. 249-9093. SERVICE RAMPS, automotive; 16" W x 16" L, 21" lift, rear fold-down legs with bridge, very heavy duty, near new, \$850. 909/596-2848.

'00 TOYOTA Tundra Ltd., 56K mi., ABS, full power, snug top, carpet kit, tow pkg., 6-CD in dash, new tires, \$16,900. 909/596-9007.

'99 TOYOTA Avalon XL, automatic V6, 52K miles, 4-dr. sedan, silver w/tan cloth interior, pwr. steering/seats/doors/window, airbag, ABS, cruise control, am/fm/CD/cass./radio, a/c, alarm, gd. cond., \$10,800/obo. 248-4003.

'94 TOYOTA Camry, 4-door, 92,500 mi., 4 cyl., champagne ext./beige int., auto, a/c, cruise control, vg condition, \$2,950/obo. 790-5965.

'99 VW Passat, loaded w/sunroof, CD, power all, alloy wheels, heated leather seats, cruise control, tripomatic auto trans, 2nd owner, 72K mi., pics: www.begrafic.com/4sale/passat, \$14,500/obo. 323/578-8995, be@begrafic.com.

'97 VW Passat GLX, V6, sedan, auto, white, sunroof, leather, a/c, 4-wheel disk brakes with ABS, premium sound, 6-CD changer, LoJack and alarm, 62K miles, runs great, \$7,650/obo. 626/794-4592, Dan Barber.

Free

DRYER, needs starting switch from Sears parts store for \$70. 626/445-4497.

FENCE MATERIAL, 4 ft., chain link, tension bars, metal pipes in assorted sizes, can be used to construct fence. 249-6248.

Lost & Found

FOUND: several pieces of jewelry at the Woodbury Complex, Building 601 over the past month or so. 4-5640, Jennifer.

Wanted

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

VANPOOL RIDERS, from Victor Valley to JPL. 4-1424, Scott.

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10 p.m. at Eagle Rock High School, \$4/nt. 956-1744, Barbara.

For Rent

ALTADENA furn. rm, 3 mi. from JPL, nice neighborhood, incl. linen, laundry, parking, kitchen, patio; \$500 + sec. dep. 626/798-4821.

LA CANADA, very small rm, separate from house, furn., walking dist. to JPL from horse trail, futon, refrig., microwave, heat, a/c, cable, priv. entrance, security gate, weekly or monthly OK, all util. pd. \$175/wk. 790-1893, leave msg. LA CRESCENTA, 3+2, 2 car, exc. remodeled English style, laundry rm., dining room, nice yards, plum and tangerine trees, fireplace, bricks, slate, charisma, Glendale schools, \$1,995. 248-7610.

PASADENA detached bungalow, 2 bd., 1 ba., all new interiors, hardwood floors, laundry hookups, dishwasher, microwave and oven, granite countertops, private backyd., parking for 1 car, \$1,500/1-yr. lease. 213/952-9052, Allan.

PASADENA home for lease, 2 bd., 2 ba., hardwood floors in living + dining rms., beautiful fireplace w/hardwood mantle, remodeled kitchen, laundry rm., convenient loc. on peaceful tree-lined st., nr PCC/Caltech, Rose Parade route/Metro Gold Line, new paint and carpet, gardener, 76 N. San Marino Ave., \$1,695. 790-3336.

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.

SAN MARINO home for lease, 3 bd., 1.5 ba, walk to Carver Elementary & San Marino High; refrigerator, range, microwave (brand new), newly painted, cent. a/c & heat, alarm system, covered patio, 2-car attached gar.; 1580 Bellwood Rd., \$3,200 (incl. gardener, trash and water bills), 714/553-8585, Richard Tan.

S. PASADENA condo, 2 bd., 2 ba.; end unit; unfurn.; carpets, refrigerator (if needed), stove, dishwasher, balcony, central heat/air, laundry facility, controlled access, gated parking (1 space); walk to downtown S. Pas, near Old Town Pasadena; adjacent to Garfield Park (tennis courts); near 110, 210, 134 & 710 fr-wys; water incl.; cats allowed w/deposit, \$1,650 w/negotiable deposit. 626/441-0231.

Vacation Rentals

BALBOA ISLAND, cute upstairs apt., fully furnished, 2 bd., 1 ba., deck, parking, laundry, steps to bay, sleeps 5; avail. weekly June-Sept. for \$1,000-\$1,500/week. 626/429-3677 or bettyrs@earthlink.net.

BIG BEAR LAKEFRONT luxury townhome, 2 decks, tennis, indoor pool/spa, nr. skiing, beautiful master bd. suite, slps. 6. 949/786-6548. ENCINITAS beach cottage, 2 bd., 1 ba., steps to beach access w/lifeguard, on quiet Neptune Ave., moments from dining spots & downtown, Old Encinitas; awesome tropical front yard w/bi-level decks for BBQ and entertaining; surfing, rollerblading, bike riding along Neptune Ave., avail. June-Sept. 2004 from Saturday to Saturday, \$1,850/week. 760/942-4470.

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

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

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, Maui luxury condo, 2 bd., 2 ba., sleeps 6, fabulous view, 2 pools, tennis court, BBQ, 3 min. walk to beach, Saturday to Saturday only. \$475. 562/597-2977, Sue.

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

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

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

OCEANSIDE condo, beachfront, lovely 2 bd., 2 ba., single-level, deluxe, fireplace, white water ocean views, end unit, luxurious gated complex on sand w/gm. rms/fitness rm/pools/BBQ's/Jacuzzi, 10 min. walk to pier/harbor, slps. 6, JPL disc'n't. see www.beachvisitors.com. 760/433-4459.

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

RESORTS, 5-star; incl. Carmel, Tahoe, Sedona, Colorado Rockies and Florida, luxurious residential-style studios w/furn. kitchenette, starting at \$511 for 7 nts; larger units w/1-3 bd., living rm., full kitch. 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.

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