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Satellite heads cloudward

Smooth April 28
launch for CloudSat

By Mark Whalen



After yet another graveyard shift at Vandenberg Air Force Base, Deborah Vane, the CloudSat deputy principal investigator, saw the irony. Following delays that were caused by launch vehicle issues, technical glitches and a labor strike, it was now, of all things, the weather that was holding up the spacecraft liftoff.

But finally, JPL's CloudSat did get off the ground, along with launch partner Calipso, on Friday, April 28 at 3:02 a.m. Pacific time atop a Boeing Delta II rocket.

Vane and other team members were stationed about five miles from the launch pad. "We had numerous nights when the view was spectacular, but on the morning of the launch, the fog rolled in. So all we were able to see was a little flash. But I heard from people in Simi Valley, Pasadena and Redondo Beach who got a spectacular view of the launch.

"It was really gratifying to finally get off the ground," she said. "It was a great relief; the team was at their physical limits."

"We're very excited about the beginning of the CloudSat mission, both because of its potential for some immediate benefit in terms of weather forecasting, as well as the long-term benefits of understanding climate change and the availability of water in the future," said Dr. Diane Evans, JPL's Earth science and technology director. "The team has waited a long time for the launch and they are very excited to get to work on the radar data."

CloudSat and Calipso will reveal the inner secrets of clouds and aerosols, tiny particles suspended in the air. The two satellites will eventually circle approximately 705 kilometers (438 miles) above Earth in a sun-synchronous polar orbit, which means they will always cross the equator at the same local time. Their technologies will enable scientists to study how clouds and aerosols form, evolve and interact.

Since launch, "all has gone very well, extremely smoothly" Vane said, adding that by month's end CloudSat would join the "A-train" constellation, which also includes NASA's Aqua and Aura satellites and a French satellite known as Parasol. The satellite data will be more useful when combined, providing insights into the global distribution and evolution of clouds to improve weather forecasting and climate prediction.

"It takes a while to overtake the A-train, then insert the spacecraft in its appropriate place," Vane said. Next week the team will test the radar, which will be turned on and set up to receive only.

"We're going to take our time, proceed cautiously. The radar will be turned on by mid to late May and then we will begin to receive the science data."

Vane praised the efforts of the launch team at Vandenberg as well as the operations team in Albuquerque, N.M., for their perseverance and not getting frustrated with the delays.

"Getting up and ready for 3 a.m. launches is very demanding," she said. "Graveyard is a tough shift to work. Most of us also had other tasks to attend to, such as meetings, interviews and guest operations, so it was almost like working 24-hour shifts."

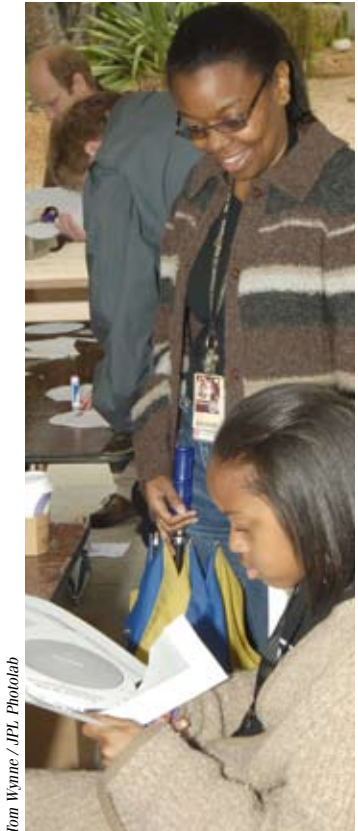
"They really maintained an esprit de corps through the whole thing. This was a small team that had to perform many roles, and they have executed them with extreme dedication."

Calipso is a collaboration between NASA and the French space agency. For more information about CloudSat and Calipso, visit www.nasa.gov/cloudsat and www.nasa.gov/calipso.

Kids have their day



Hundreds of children stopped by the Lab on April 27 for "Take Our Children to Work" day. Among the activities they enjoyed were a rolling rover (above) and spacecraft building (above right). At right, Leslie Callum watches daughter Khrislynn work on a "Star Finder," while a group joins Richard Shope for an "Icy Worlds" interactive presentation (below).



Tom Wynne / JPL Photolab

News Briefs

Donnellan honored by science center

DR. ANDREA DONNELLAN, interferometric synthetic aperture radar (InSAR) science lead at JPL, has been named Woman of the Year by the Muses, a fundraising group for the California Science Center in Los Angeles' Exposition Park. Donnellan, a geophysicist, joined JPL in 1993. Prior to her current position, she served as deputy manager of the Science Division. Her specialty, through both interferometric synthetic aperture radar and global positioning system technology, has been the study of earthquakes, plate tectonics and the corresponding movements of Earth's crust. Donnellan is also principal investigator of NASA's QuakeSim project, which integrates data and computer simulations to improve understanding of earthquake faults and how they interact.



JPL Director Dr. Charles Elachi introduced Dr. Andrea Donnellan at the Woman of the Year luncheon honoring her.



Dr. Michael Werner

She has conducted field studies in California in the region of the Northridge earthquake, the Ventura basin and on the San Andreas Fault. She has also completed fieldwork in Antarctica, Bolivia, Mongolia and Alaska, among other sites. Her work also includes involvement in the establishment of the Southern California Integrated GPS Network, an array of 250 GPS receivers used for earthquake hazard assessment and mitigation. The Muses funds scholarships for a science camp, science fair and science workshop for inner-city children.

Werner to give Royal lecture

DR. MICHAEL WERNER, project scientist for the Spitzer Space Telescope, has been invited by the United Kingdom's Royal Astronomical Society to deliver a lecture to its membership. Werner will give a talk as the 2006 George Darwin Lecturer on May 12. Numerous famous astronomers have been Darwin lecturers in the past. The honor, first given in 1927, is named for GEORGE DARWIN, an astronomer and son of 19th century scientist CHARLES DARWIN. A written version of Werner's talk is planned for publication in the society's journal Astronomy & Geophysics.

The Royal Astronomical Society is the United Kingdom's leading professional body for astronomy and astrophysics, geophysics, solar and solar-terrestrial physics and planetary sciences.

Spitzer image shows galaxies in mask

A pair of dancing galaxies appears dressed for a cosmic masquerade in a new image from JPL's Spitzer Space Telescope. The infrared picture shows what looks like two icy blue eyes staring through an elaborate, swirling red mask. These "eyes" are actually the cores of two merging galaxies, called NGC 2207 and IC 2163, which recently met and began to twirl around each other. The "mask" is made up of the galaxies' twisted spiral arms. Dotted along the arms, like strings of decorative pearls, are dusty clusters of newborn stars. This is the first time that clusters of this type, called "beads on a string" by astronomers, have been seen in NGC 2207 and IC 2163. The image can be viewed at <http://www.spitzer.caltech.edu/spitzer>.

Rocket radar 40th reunion May 12

The JPL Radar program was initiated 40 years ago with the May 9, 1966 launch of an L-band radar on an Aerobee rocket. To commemorate the event, all JPL active and retired personnel who have been involved in the NASA/JPL Radar Development Program over the years are invited to a reunion on Friday, May 12, in von Kármán Auditorium from noon to 2 p.m. To ensure proper accommodation of all attendees, all who are interested in attending the celebration are asked to RSVP to VALERIE SEARLS at (818) 345-9447 or valerie.searls@jpl.nasa.gov with your contact information.

Surveyor I to celebrate 40th

On June 2, 1966, Surveyor I flawlessly performed the United States' first soft landing on the moon. The Surveyor Program, managed by JPL with Hughes as spacecraft contractor, was the pathfinder for the Apollo human missions to the lunar surface that began in 1969. An informal gathering of people who worked on Surveyor I will be held in Pasadena from 4 to 9 p.m. Friday, June 2, on the 40th anniversary of that historic landing. Complimentary hors d'oeuvres will be served. A full, no-host bar will be available. For information, contact any of the following: BILL O'NEIL (woneil4488@earthlink.net); BILL LEFLANG (wglef@aol.com) or JOHN SCHLUE (dotirene@msn.com). If e-mail is not convenient, leave a message at (626) 664-2027. Please let any of your Surveyor colleagues know about this event, which will be a great opportunity to visit with old friends and share Surveyor "war stories."

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meets Wednesdays at 11:30 a.m. 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.

Lambda (Gay, Lesbian, Bisexual and Transgender Networking Group)—Meets the first Friday and third Thursday of the month at noon in Building 111-117. For more information, call Randy Herrera, 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). For more information on any of the support groups, call the Employee Assistance Program at ext. 4-3680.

Friday-Sunday, May 5-7

Political Satire—Capitol Steps will perform in Caltech's Beckman Auditorium at 8 p.m. Friday and Saturday and at 3:30 p.m. Sunday. Tickets are \$35, \$31 and \$27; high school age and younger, \$10. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Sunday, May 7

Spring Potluck—Presented by the Caltech Women's Club, Wednesdays in the Park and Preschool Playgroups and Babysitting Co-op, from 4 to 7 p.m. at Tournament Park. Meet other families from the Caltech/JPL community. Plates, cups, drinks and utensils are provided; just bring a dish to share. Entertainment and crafts will be offered. For more information, contact Caroline Haider Sutton at mcsutton10@hotmail.com or Nancy Hewett at Nancyhewett@earthlink.net.

Tuesday, May 9

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

"Programming the Universe: A Quantum Computer Scientist Takes On the Cosmos"—Seth Lloyd will discuss his latest book in this Voices of Vision talk at 8 p.m. in Caltech's Beckman Auditorium. Free admission. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Tues.-Wed., May 9-10

Investment Advice—TIAA/CREF will offer one-on-one counseling in T1720. For an appointment, visit www.tiaa-cref.org or call (626) 432-6363, ext. 2614.

Wednesday, May 10

Caltech Women's Club "Wednesday in the Park"—Meets in Tournament Park for playtime for the children and socializing for adults. Rain location is Brown Gym. Group also meets May 17. For more information, e-mail smiller@caltech.edu. JPL Amateur Radio Club—Meeting at noon in Building 238-543. JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by 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, ext. 3-0465, or visit www.jplcaltechtoastmasters.com.

Thursday, May 11

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

Thu.-Fri., May 11-12

Von Kármán Lecture Series—Dr. Ashley Stroupe of the Mars Exploration Rovers Engineering Team (pictured) and Brett Kennedy, a staff engineer in the JPL Robotic Hardware Group, will present "Planetary Robotics: To Mars and Beyond" at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Thursday's lecture will be webcast at www.jpl.nasa.gov/events/lectures/may06.cfm. For more information, call Public Services at ext. 4-0112.



Saturday, May 13

Weird Nature: Puzzling Partners—This high-definition film, to be presented at 2 p.m. in Caltech's Beckman Auditorium, will highlight humans' puzzling partnerships with other animals. Barbara Kraatz Fortini, of Caltech's Biology Department, will introduce the film and lead a post-screening discussion. Tickets are \$5. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Tuesday, May 16

Investment Advice—Fidelity will offer one-on-one counseling in T1720. For an appointment, call (800) 642-7131.

Wednesday, May 17

"Can One Make A Mouse Model of Mental Illness, and Why Try?"—Caltech biological sciences professor Dr. Paul Patterson will discuss the relationship between maternal infection and fetal brain development at 8 p.m. in Beckman Auditorium. Free admission. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by 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.

"Planning Ahead for Retirement"—This workshop, to be held from 10 to 11:30 a.m. in conference room T1720-137, is a general overview that covers the product features and benefit options available with TIAA/CREF products used to fund both basic and supplemental retirement plans. This is appropriate for employees just starting to plan their retirement investment strategy and for those closer to retirement.

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 selection of investment options and the completion of their enrollment forms.

70-meter antenna's 40th is celebrated



Photo courtesy of Shirley Wolff

JPL Deputy Director Gene Tattini addresses the recent gathering at the Deep Space Network complex at Goldstone celebrating the 40th anniversary of DSS-14, the 70-meter antenna shown in the background. Other speakers were Bill Weber, JPL's Interplanetary Network director; Barry Geldzahler, program executive for deep-space mission systems, NASA Headquarters; and Doug Mudgway, an author and former JPL engineer. Approximately 90 people attended the ceremony, including past Interplanetary Network leaders and retired JPL engineers who had worked on the original antenna. For more information about the Deep Space Network, visit <http://deepspace.jpl.nasa.gov/dsn>.

Explore New Worlds

May 20—21

JPL Open House

MEMBERS OF THE PUBLIC ARE invited to “Explore New Worlds” at JPL’s annual open house, on Saturday and Sunday, May 20 and 21, from 9 a.m. to 5 p.m.

Displays will feature the Laboratory’s myriad journies to the solar system and beyond, including how missions and their technologies are developed. Visitors can also catch “Spirit of Exploration,” a multimedia show celebrating JPL’s most recent accomplishments; see the Spacecraft Fabrication Facility, to learn about how mechanical, developmental and flight hardware is made for JPL projects, and the Spacecraft Assembly Facility, with JPL’s largest clean room; find out about JPL’s employment opportunities and student programs; and learn about the activities of the JPL Education Office.

Fun times await younger visitors as well, including hands-on activities for preschool-age children, provided by the Child Educational Center; “Fly in Outer Space” at the von Kármán TV studio; and more.

At right are some highlights of what’s coming up:

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

Solar System

“Frozen in Time—The Voyages of Deep Impact and Stardust.”

“Ring World,” a multimedia show about the Cassini–Huygens mission.

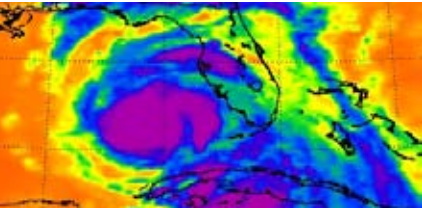
Deep Space Operations, the “hub” of all communications with spacecraft exploring our solar system.

Solar system exploration: the Sun, the planets and comets.

Voyager interstellar mission: Learn about recent surprises from this 28-year journey of discovery.

Sample returns, small bodies missions and more: Deep Impact comet encounter, Stardust comet sample return flight spare, Genesis solar wind particles, aerogel, New Horizons, Dawn, Juno, M3.

Earth

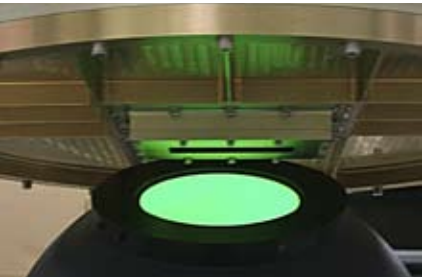


Dynamic Earth: see the changes on Earth viewed from space, featuring stunning imagery and satellite models.

Technology

Cutting-edge technologies, new methods: lasers, thermal electric propulsion, machine learning, autonomous intelligence computer systems, robotics, mission safety.

Launch services: learn about JPL partnerships with Kennedy Space Center and launch vehicle contractors to provide a vital service to proposals, studies and flight projects.



Mobility and robotic systems: rover prototypes and new capabilities, including “Athlete,” designed to drive or walk across lunar terrain.

Microdevices Laboratory: See yourself in infrared light; learn about the small size scales at which we operate and why; view cleanroom processing areas and tooling for space.

Universe



Night Sky Network Telescope Station

Universe Plaza: exploring new worlds, from discovering new planets to investigating stars, black holes and distant galaxies.

Robo-Dome: see a pair of 700-pound robots glide in a high-tech arena under artificial stars.

Mars



Mars Reconnaissance Orbiter: the newest spacecraft at Mars. It can radio data to Earth at up to 10 times the rate of any previous mission.

Mars Exploration: Friendly martians will roll rovers over small earthlings and teleport the latest images and discoveries from Mars to you.

Two more join exclusive JPL Fellows roster

From left: JPL Deputy Director Gene Tattini, Richard Zurek, Ted Kopf, JPL Director Dr. Charles Elachi.



A scientist and an engineer have joined a select circle honored as among the Laboratory’s most distinguished technical staff.

Rich Zurek and Ted Kopf have been named JPL Fellows, two of only five engineers, scientists and technologists to be accorded the honor. They were recognized at a recent meeting of the Laboratory’s Executive Council.

Zurek, who currently serves as project scientist for Mars Reconnaissance Orbiter, is an atmospheric scientist who has been active on numerous Mars missions. According to his nomination, Zurek is “accepted and trusted by the Mars science community as a project scientist who pushes for the science community.”

Kopf, a principal engineer now working on a challenging task in the terminal descent phase for the Phoenix Mars Scout, “has made exceptional technical contributions to

every major planetary flight project since 1964.” Recent assignments have included key technical roles on Cassini and the Mars Exploration Rovers.

Kopf and Zurek join engineers Gentry Lee and Duncan MacPherson, who were named JPL Fellows in 2003, and Joe Savino, who was made a fellow in 2005.

The fellow designation is the top rung of JPL’s technical career ladder, explained Lee, who along with the other fellows serves on a Fellows Promotion Advisory Board that evaluates new nominees each year.

“This is designed to recognize those who have made extraordinary technical contributions to the success of JPL over an extended period of time,” Lee explained. “Technical brilliance in and of itself it not enough—you might be a Nobel Prize winner, but what is important here is what you have done for the Lab.”

As the roster of fellows grows, Lee said it is anticipated that it will reach a maximum size of 10 to 12. The nomination process for next year’s selections will begin this summer; nominations may be made by division managers and equivalents or above.

In addition to the existing fellows, the promotion advisory board includes Tom Gavin, JPL’s associate director for flight projects and mission success; Firouz Naderi, the associate director for programs, project formulation and strategy; and the Laboratory’s chief scientist, chief technologist and chief engineer—Tom Prince, Paul Dimotakis and Brian Muirhead, respectively. They forward recommendations to JPL Director Charles Elachi and Deputy Director Gene Tattini, who make the final selections.

Kopf is credited with making contributions to JPL in diverse technical areas ranging from conceptual design, design analysis, detailed circuit design and hardware design, test and integration to flight and test software. Missions to which he has made key contributions have included Mariner missions to Mars, Venus and Mercury, Voyager, Galileo, Cassini and the Mars Exploration Rovers.

In addition to Mars Reconnaissance Orbiter, Zurek served as project scientist for Mars Climate Orbiter and Mars Polar Lander. He has held leadership positions on several instrument science teams and has participated in many key NASA science committees and studies. His personal research focuses on the impact of dust in Mars’ atmosphere, including the origin and year-to-year variability of planet-wide dust storms.

Passings

WILLIAM PETIT, 88, retired from Section 100, died March 4. Petit joined JPL in 1960 and retired in 1982. He is survived by his wife, Charlotte, daughters Barb and Sarah, son Bruce, sister Ruth and grandchildren Will, Mary, Erin and Preston. Donations in Petit's memory may be made to the National Multiple Sclerosis Society, Hampton Roads Chapter, 405 S. Parliament Dr., Suite 105, Virginia Beach, VA 23462.

DR. EBERHARDT RECHTIN, 80, former JPL assistant laboratory director for Tracking and Data Acquisition and a key player in the development of the Deep Space Network, died April 14. Rechtin earned both bachelor's (1946) and doctoral (1950) degrees in electrical engineering from Caltech. He joined JPL in 1948 and served as chief architect and director of the Deep Space Network from when the Laboratory joined NASA in 1958 until he retired to become the director of the Department of Defense's Advanced Research Projects Agency in 1967. In 1973, Rechtin joined the Hewlett-Packard Company as its chief engineer. Four years later, he became chief executive officer of the Aerospace Corp., a federally funded research and development center sponsored by the United States Air Force that supports long-term planning and the immediate needs of the nation's military and reconnaissance space programs. Rechtin is survived by his wife, Deedee; daughters Andrea Rechtin, Nina Meierding, Julie Rechtin and Erica Bauermeister; son Mark; four grandchildren; and sister Joan Lincoln.

RICHARD CANNOVA, 78, retired from Section 510, died April 19. Cannova joined JPL in 1960 and retired in 1986. He is survived by his sister, Lucille Johnson, and several nieces and nephews. Services were held in Rockford, Ill.

Letters

I would like to thank all of our JPL friends for their cards, letters, thoughts, fond memories, help and prayers after my husband Dick died. All have been a great source of strength and comfort during this most difficult time.

Aileen Zanteson

Dear colleagues: please accept my sincere thanks for the kind words, out-standing NIS party, and great gifts on my retirement from JPL. I will always remember the great experiences while working at JPL. I was blessed to be part of a great team of professionals as they enabled the exploration of the universe. What a ride, and just imagine what the future will bring. With best regards,

Jerry Humphrey

It was sad to read of Eb Rechtin's death. An era at JPL is fading—Bill Pickering, Eb Rechtin, Bob Stevens, Walt Victor—the JPL pioneers. Those who came after can only echo Newton, "If I have seen farther than others, it is because I have stood on the shoulders of giants." These pioneers had visions and "made them so." I was privileged to share this time with them. I was born to be an engineer and I was born to work at JPL. I built my first radio at the age of 10 and never stopped. I received my BSEE in 1961 at the age of 31. I was to continue for a master's but one day my boss asked, "... thought about working at JPL?" I replied, "What's that?" He told me, I applied and was accepted. On such small events do our lives depend. Nothing else could have been more satisfying than my 29-some years at JPL and the formative years with Rechtin et al. were the best. By the time I was 65, the free-wheeling pioneer organization had become a stifling (to me) bureaucracy and I retired. But I have never regretted the time that I spent there. As one friend of mine put it, "The most fun you can have with your clothes on." Goodbye Eb!

Although we have not seen each other for decades, I will miss you.

Sam Brunstein

Classifieds

For Sale

BBQ, Weber Genesis Silver B model, propane, 3-burner, portable, top quality, near new, death forces sale, \$250. 626/798-2925.

CEILING FIXTURE, brass, candelabra type with 6 lights, \$10. 919-2408.

CEMETERY PLOTS (6) in the older section of Valhalla Cemetery, North Hollywood, \$950 each. 766-5354.

COMPUTER, iMac, 350 MHz PowerPC G3, 128 MB SDRAM, 6 GB Ultra ATA drive, 24x CD-ROM drive, 56K modem, Ethernet, 15" color display, hard drive may need to be replaced, \$100; TREADMILL, EZWalkII manual, excellent condition, like new, \$75. 626/292-1751.

COMPUTER SYSTEM: Apple G3, 500 MB RAM, 2 SCSI HDs 18 GB, loaded with software (incl: Photoshop, Illustrator, Pagemaker, Dimensions, etc.), Epson 1500 printer, scanner, CD burner, extra Zip drives, 15" monitor, table, \$500/obo. 661/259-6390.

DINING TABLE, solid oak, corner-sectional unit with bench, \$250. 661/644-5714. Sandy.

DODGER TICKETS: selected games from season ticket package, Loge level, Section 134 (at first base), 2 tickets per game at face value of \$35/ticket, see www.delunac.net/tickets. 626/296-1253.

DODGER TICKETS (2), from season ticket package, preferred Loge box, aisle 150 row C, \$30/ticket. thinkblue06@hotmail.com.

DODGER TICKETS: up to 6 together, various dates, section TD 7, row N, on or close to the aisle, \$4/ticket, about 30 games remaining. 626/644-0793.

DODGER TICKETS: 2 per game, front row, Section 32 RS, \$13/ticket, face value, various dates incl. 4/19, 5/3, 5/10, 5/24, etc., about 10 games remaining. 626/644-0793.

DRESSES, Jessica McClintock: gorgeous white Cinderella-style wedding gown, corset top connects to ball gown skirt, beautiful lace detail, originally \$900, sell for \$350; stunning strapless prom dress, white, fitted bodice with poofy skirt, not to be missed, originally \$220, sell for \$100, matching jewelry also available. 957-8614, Mina, after 5 p.m.

EXERCISE BALL, Thera-Band, 65 cm, green, for body height 5'7"-6'1"; for exercise, gym, balance, fitness, yoga, pilates, resistance and stability; brand new, \$25. 714/369-9095.

FOOTBALL HELMETS, pro, authentic, not replicas; new in box; available: Atlanta Falcons, Miami Dolphins, Tampa Bay Buccan-eers, SF 49ers, Houston Oilers, LA Rams, NY Jets, Denver Broncos, Seattle Seahawks; helmets are new but have prior logos and/or colors; \$225 each. 909/717-4383, Tim.

FURNITURE, Ikea: red "lokka" table (new \$69, sell \$30); 2 "Nick" chairs/cushions (new \$9/each, sell \$5); navy Pier 1 Papasan chair (new \$99, sell \$40). 626/590-0924.

FURNITURE: 2 chairs, Scandinavian style (premium quality, not Ikea), lightweight hardwood frames, canvas support for seat & back, leather cushions for seat, back & adjustable head-rest, 6 yrs old; small decorative table, wood pedestal w/stone (granite?) top, stands 19" high, top is an 18" diam. circle; make offers; located in San Clemente. 949/366-1064.

GOLF CLUBS, 2 sets:Yamaha men's, exc. cond., full set irons, graphite shafts, woods #1, 3, 5, oversize heads, original ping putter, fabric bag, \$300; Apollo women's, exc. cond., full set irons, graphite shafts, 2 oversize Saldilla woods, ping putter, fabric bag, \$250; played the world over, including St. Andrews, each set got a hole in one; deserve a good home. 626/405-2323, ragdoll9@pacbell.net.

GRADUATION CAP AND GOWN, La Cañada High School, \$5. 626/794-0081, Bonnie.

HAM RADIO EQUIPMENT: Icom IC-751A, HF transceiver with manual (\$1,289 new in '87), \$600; Yaesu FT-DX, 101B HF transceiver, \$250; Yaesu FT DX 100, SSB transceiver, \$200; Yaesu YO-100, monitor scope, \$150; Drake Twins - R-4B, receiver, \$200 and T-4X, transmitter, \$150; Dentrone MT-3000A, antenna tuner, \$150; miscellaneous test equipment, \$5-\$25. 951-5952, Dave, after 5 p.m.

JACUZZI / SPA, full size, whirlpool jets, heater and draining system, seats 6 adults, works great, original cost \$7,800 (housed in lattice gazebo, which is deteriorating), need space in garden for another project, buyer to pick up, need a truck and manpower, \$400/obo. 626/284-9664, Maggie Porter.

JEWELRY: woman's 0.20 carat solitaire diamond ring set in 14K gold w/8 round diamonds inlays in band w/0.11 carat weight; are of good quality with a clarity of I1-21 and color being H-I; never been worn, still in box; would be an ideal grad gift or promise ring; seller has written appraisal from Robbin's Bros (world's biggest engagement ring store) for \$770, but will sell for \$450. 626/483-5538, Ana.

JEWELRY, titanium: 8.5" man's & 24K YG bracelet (hand polished & finished w/5 inlays of 24k IPG 3 mic gold plating), \$60; woman's ring band (10 mm wide, high polish/finish), size 6.75, \$35. kar10026@hotmail.com.

KIDS' ITEMS: new Stride Rite sz. 8 1/2 hiking boots (for girl), \$15; new Buster Brown size 9 M white covered sandals (for a little girl), \$10; Little Tykes girl's toy box, excellent cond., \$25; little girl's vanity and chair, vg condition, \$10; child's shopping cart (Little Tykes, good cond., \$7; lots of wooden puzzles, toys, clothes for a little girl, excellent cond. 249-6248.

LAWN MOWER, Craftsman gas-powered, 3.8 hp, 20" cutting diameter. 626/791-7645.

MISC.: skis, about 72" and 66," also poles, ski bag, boots, boot bags and car-top carrier; Nordic Track exercise machine, about 20 yrs. old; Sony 20" TV, 6 yrs. old; Panasonic 20" TV with built-in VCR and FM radio, 6 yrs. old; grain mill; crock pot, make offers; located in San Clemente. 949/366-1064.

MISC.: lady's set of golf clubs, with bag, \$30; Queen Anne bench, off white/cream, \$60; walnut wood entertainment center with shelves and cabinet, \$90; woman's white dressy jacket, \$50. 957-8614, Mina, after 5 p.m.

MISC.: camera, digital SLR, Canon EOS 20D 8.2 MP with EF-S 18-55mm f/3.5-5.6 lens, new in box, \$1,120; shredder, Fellowes P-45C, new, \$35; monitor, NEC 17" w/ VGA and BNC inputs

and anti-glare glass panel, gd. cond., \$30. 626/390-1932.

MISC.: refrig., Frigidaire, 20.8 cu. ft., white, freezer on top, 7 yrs. old, runs gd., \$150; coffee table (52.5" x 24") and end table (28" x 28"), oak, herringbone pattern, good condition, \$75; vintage stereo speakers, Infinity RSh, 3 way, 10" woofer (replaced), floor-standing or bookshelf, \$100 for pair. 951-5952, Dave.

MISC.: home gym, \$50; crimp hair iron, \$5; women's "cowboy" boots, gray, sz. 7 1/2, gd. cond., \$50; fishing reels (freshwater), \$10/ea.; electrolysis machine, \$20; camping chairs (4), camouflage, \$10 ea.; twin mattress, fair cond., \$10. 626/357-8210.

MOBILE PHONE (T-mobile), brand new Motorola V360; features: VGA camera with 4x zoom, video capture and playback, Bluetooth hands-free headset, charger, manual, cables, 5 MB of internal memory plus up to 512 MB removable memory card; \$150. 714/369-9095.

MOVING SALE: nice green couch & love seat (\$275), expensive sofa queen sleeper w/custom fabric/pillows & thick mattress (\$250), green swivel upholstered chair (\$50), mission oak coffee & end tables (\$75), kitchen fluorescent 4-tube light, \$15 (19 x 25 in.), electric cement mixer (\$150) and weightlifting bench (\$10). 749-4975, Carl.

PRINTER, Compaq Ink Jet 600 color, box opened, never used, serial and USB compatible, cable not included, \$30. 626/437-6345.

TROPICAL PLANTS, plumerias, variety of colors and sizes; shell ginger. 626/444-6156.

TWO-WAY RADIOS, Motorola T5950; brand new, sealed package, great for outdoor activities, up to 5-mile range; 2 radios, rechargeable batteries, dual pocket charger, earbuds with push-to-talk buttons, swivel belt clips, user manual, 22 channels, \$88 negotiable; RCA 13" color TV, \$20. 626/794-9579.

WASHER, Maytag W-6 top loader, excellent condition, with manuals, \$120. 919-2408.

Vehicles / Accessories

BIKE TRAILER, Trek, 2-child runner-stroller combo, \$400 new (still like new), sell \$200/obo. 661/259-6390.

'02 BMW 325i 4-dr. sedan, 2.5 inline-6, 5-sp. manual, power locks/mirrors/windows, CD, iPod adapter, keyless entry & alarm, white on sand leatherette, exc. condition, only 28K miles, free maintenance until 49K miles, \$20K. 626/449-0997.

'98 CADILLAC DeVille d'Elegance, emerald green with natural shale interior and new matching canvas carriage top, fully optioned with 45,000 well-maintained miles, \$11,000. 626/795-6538.

CANOE, 17' Grumman, aluminum, comes with 2 oars, 2 life preservers and PVC storage stand, buyer is responsible for pickup in South Pasadena, \$500. southpasadena@mac.com, 626/390-5996.

'02 CHRYSLER PT Cruiser Ltd., cranberry ext. w/gray leather & suede int., moonroof, new brakes, rotors, tires & battery; automatic, a/c, heated seats, am/fm/CD/cassette; ABS, frt. & side airbags; 51K, 7-year, 85K transferable warranty; Kelley Blue Book is \$9,800 for good condition, sell \$8,900/obo. 661/993-9239 or saracenstan@aol.com.

'95 DODGE Stealth R/T, black, leather, moonroof, CD changer, 67K miles, one owner, very clean, details at http://mysite.verizon.net/res6kh2w/stealth, \$5,900/obo. 805/386-3829 or jack@digins.com.

'00 FLEETWOOD Wilderness 22-foot travel trailer, fully equipped, sleeps 6, \$9,000/obo. 661/424-0835 or 818/415-0341.

'95 MERCEDES BENZ S420, black with tan interior, 93K mi., loaded (with CD changer), excellent condition, includes 4 new tires and original car cover, \$11K/obo. 626/577-7687, Debbie or 626/622-6575.

'03 TOYOTA Highlander Ltd., only 31K mi., top of the line, leather, all auto/power, a/c, multi-disk CD, front & side airbags, sliding sunroof, towing package, black with tan interior, excellent condition, like a new car, \$22,500 (Blue Book price), 626/296-3441.

'96 WINNEBAGO Adventurer 32' Class A motorhome, Ford 460, 35K miles, services recent and up to date; 6 Kw generator, ducted dual a/c, driver door, hydraulic leveler, queen bed, oak interior, 2 TVs and much more; NADA valuation \$25K (low) to \$30K (avg.); make offer, must sell. 805/584-6766.

Lost & Found

Lost: gold cross pen, engraved, close to Building 82 or approaching Building 198. Ext. 3-2532, Veronica.

Free

CAT, mature healthy gray, with pink nose, short hair, age unknown, litter-box trained, loves humans, hate cats, follows like a dog; indoor/outdoor, prefers single-cat home. 626/840-0955, mlei@igo.caltech.edu.

Wanted

APARTMENT for young JPL engineer: Los Feliz, Silver Lake, Echo Park, Highland Park, Eagle Rock, Atwater, Tujunga or near 2 fwy, beginning June or July. 323/668-9756 or rockettothemoon@yahoo.com.

COMPUTER, Mac/Apple laptop, not worse than Power Mac G-3 with built-in memory, 64 MB and Mac OS 8.1; should be USB connectable; must not be expensive. 310/829-2976, Alex.

COMPUTER, w/all necessary peripherals at low price or just take off your hands, doesn't need to be super fast, just working. 626/793-7900.

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

VANPOOL RIDERS: full & part-time fr. Inland Empire & Glendora Walmart; save gas & stress. Shelley Norman, ext. 4-7672 or ride-share ofc., 4-7433 for route/schedule/fare info.

Real Estate

DEL MAR timeshare condo, 2 bd., 2 ba., living room, fully equipped kitchen, pool, Jacuzzi, BBQ area, game room, walk to beach; high

season, 1 week; \$4,000. 626/507-8083, David or 626/215-3323, Kitty.

GLENDALE Chevy Chase Canyon home, 3 bd., 3 ba., family room with loft, 2,550 sq. ft., vaulted ceilings, stunning fireplace in living room, central air, kitchen w/island, hardwood floors throughout entire home, attached 2-car gar., three floors w/remarkable mountain view, move-in condition, 10-min. drive to JPL, \$799K. (Prudential Realty) 476-3071, Alina.

MONROVIA, beautiful home, 3 bd., 2 ba., large living room with separate family room, 2-car garage with auto door, fireplace, hardwood floors, central air/heat, plantation shutters, pool, auto sprinklers, landscaped, etc., on a very quiet, no-through-traffic street, \$695,000, by owner. 626/272-9380.

For Rent

ALTADENA, 1,300 sq. ft. furnished (negotiable) house (washer/dryer incl.), 2 bd. w/built-in closets & office & sunroom, 2 new ba., living room, dining area, 2-car garage, 3 mi. from JPL, central air/heat, backyard with covered BBQ area, available July 2006, \$2,250 (water incl.), + sec deposit. marjorie.schmeltz@free.fr or 626/497-8801.

ALTADENA, comprehensively furn. extended-stay sabbatical house: 3 bd., study, boundary Angeles Nat'l Forest, 3 mi. from JPL, trail access, view, fireplace, oak floors, antiques; furniture, beds, dinnerware, utensils, pots/pans, all linens & towels, fine soaps, necessities included, just bring toothbrush & clothes; TV/DVD/VHS, Dish satellite, wireless DSL; garden, fruit trees, covered patio, garage; private; available June. 626/798-3235.

ALTADENA, walk to JPL, bus stop & hiking/biking trails; quiet backyard cottage with private yard; 1 bd. with built-in closets, full bath, kitchen, pantry and living area, 500+ sq. ft.; private deck w/gorgeous views of the San Gabriel Mtns., central air/heat, very cute; non-smoking please; on-site parking/laundry negotiable for right tenant; \$1,000. 626/794-7930.

ARCADIA apt., 2 bd. + 2 ba. or 1 bd. + 1 ba., garage, a/c, stove, new paint/carpet/flooring, clean, convenient location, walking dist. to shops + food court, nr. JPL/Caltech, SA mall and 10/210 fwys., no pets, \$1,099/\$1,299. 626/576-7333.

GLENDALE triplex, front house, 2 + 2 + ofc, patio, 2-car garage, wash/dryer in unit, no pets, \$1,795. 952-5215.

PASADENA, 1-bd. guest house, priv. entrance w/attached garage (half of 2-car garage); Colorado & Rosemead, close to 210; furnished or unfurn.; includes refrigerator, microwave and a/c, no stove; no smokers, no pets; 6-mo. lease; \$800 includes utilities. 626/744-9145.

POMONA, 3 bd., 2 ba., 2-story townhome, all amenities, pool, 2-car garage, \$1,700. 626/376-5463.

SUNLAND apt., 2+1, 3 closets, newly remodeled, quiet 4-unit building, built-in oven/cooktop, parking, air, laundry, dining area, bar, kitchen hardwood cabinets, consider pets, lg. bath, \$985. 248-7610.

SUNLAND apt., XL 1+1, walk-in closet, newly remodeled, quiet 6-unit building, built-in oven & cooktop, parking, air, laundry, dining area, bar, kitchen hardwood cabinets, consider pets, \$840. 248-7610.

TUJUNGA: share this incredibly cool mtn.-top house with me; 1 bd. in 2-bd. house; all utilities included; washer/dryer, half of 2-car garage, extra storage, wood shop; fully furnished kitchen & living room; beautiful view; digital cable and wireless (extra); very quiet/peaceful; pets considered; more info and pictures avail.; I'm 31, single male; \$875. verdugoverde@comcast.net, 359-0285, Ben.

Vacation Rentals

BALBOA ISLAND duplex, weekly May–August; fully furnished 2 bd., 1 ba., upstairs w/private covered patio, and 3 bd., 2 ba., downstairs w/patio & BBQ; newly renovated downstairs, washer/dryer, parking, located steps from bay and canal, a short walk to main street shops and restaurants; rent one or both; upstairs \$800-\$1,200/wk.; downstairs \$1,700-\$2,100/wk. bettyrs@earthlink.net or 626/351-9641.

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

FIVE-STAR RESORTS, local + worldwide, incl. Westin, Marriott & Sheraton; luxurious residential-style studios w/furn. kitchenette, starting at \$85/nt., taxes incl.; 1 bd. w/fully furn. Kitchen & living room, starting at \$130/nt., taxes included; 2 & 3 bedrooms also avail. 626/794-9579 or e-mail fivestarresorts@earthlink.net with desired dates and locations.

FLORIDA condo, beautifully furn. 2 bd., 2 ba., 2nd floor, on the surf of New Smyrna Beach, half-hour to Cape Canaveral, 90 min. to Disney World; enjoy all the comforts of home, quiet, relaxing, overlooks beach, BBQ/pool/ game room, easy walk to stores and restaurants. 760/439-7821, Darlene, dfhauge@yahoo.com.

GRAND TETON / YELLOWSTONE Nat'l Parks, visit in style, 2 bd. + loft townhome, totally outfitted, stunning Teton view, sleeps 6, cable, microwave, etc., borders Grand Teton, connie-matt@bcglobal.net.

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., \$145/nite/2, \$20/nite/add'l person. 949/348-8047, jackandrandy@cox.net.

MAMMOTH, Meadow Ridge, 2 bd., 2 ba., + loft; sleeps 8, great family unit & location, walking dist. to Eagle Lodge; fully equipped kitchen: microwave, new dishwasher, new oven; cable TVs, VCR, DVD, CD/cass. stereo, free wireless internet access; close to pool, Jacz., spa; JPL discount. 240-8763 or anahid@KazEng.com.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microwv., D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt., no pets. 626/798-9222, 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 rm., sleeps 4. 949/786-6548.

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

JPL'S ONLINE NEWS SOURCE

http://dailyplanet

E-mail us at universe@jpl.nasa.gov

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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.

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JPL to map the moon on India mission

The Moon Mineralogy Mapper team, from left. Front row: Carlé Pieters (holding globe) and Bonnie Buratti; second row: Rachel Klima, Stefanie Tompkins, Larry Taylor, Jessica Sunshine, Joe Boardman, Roger Clark, Jim Head; third row: Noab Petro, Matt Slaid, Tom Glavich, Alok Chatterjee, Mary White, Robert Green; fourth row: Steven McClard, Cass Runyon, Glenn Sellar, Jack Mustard.

A JPL state-of-the-art imaging spectrometer that will provide the first high-resolution spectral map of the entire lunar surface successfully completed its critical design review this week.

The Moon Mineralogy Mapper, also known as “M3,” is one of two instruments that NASA is contributing to India’s first mission to the moon, scheduled to launch in late 2007 or early 2008. By mapping the mineral composition of the lunar surface, the mission will both provide clues to the early development of the solar system and guide future astronauts to stores of precious resources.

Chandrayaan-1 is India’s first deep-space mission as well as its first lunar mission. “The entire M3 team feels honored to be able to participate,” said Project Manager Tom Glavich of JPL.

The instrument is well on its way to being delivered to the Chandrayaan-1 spacecraft integration in Bangalore, India, next March, Glavich said.

A two-year mission, the mapper will characterize and map the lunar surface composition in the context of its geologic evolution by evaluating primary crustal components and their distribution across the highlands; characterizing the diversity and extent of different types of basaltic volcanism; identifying and assessing deposits containing volatiles, including water; mapping fresh craters to assess abundance of small impacts in the recent past; and identifying and evaluating concentrations of unusual/unexpected minerals.

The instrument will accomplish its goals by acquiring spectroscopic measurements of the lunar materials in the visible and near-infrared

regions of the electromagnetic spectrum, while simultaneously mapping the distribution of these

materials across the surface at high spatial resolution. This data will provide a much-needed long-term baseline for future exploration activities.

The mission’s observations will address several important scientific issues, including early evolution of the solar system; fundamental processes acting on planets that shape their character; assessment of potential impact hazards to Earth; and assessment of space resources.

From its vantage point in orbit around the moon, the spacecraft will measure the sunlight reflected by all of the rocks and soil over which it passes. It will be sensitive to wavelengths from 430 to 3,000 nanometers, which covers visible light and the near-infrared region (including short-wave infrared). This range is dominated by solar reflection, rather than by heat radiated by the ground lunar surface.

The mapper was selected in 2005 as a NASA Discovery Program instrument of opportunity. The principal investigator is Carlé Pieters of Brown University.

Chandrayaan-1 is a truly international mission, with payloads from Europe as well as the United States. Besides the Moon Mineralogy Mapper, Chandrayaan-1 will include a second NASA instrument, a miniature synthetic aperture radar developed by the Applied Physics Laboratory at Johns Hopkins University that will look for ice deposits in the moon’s polar regions.

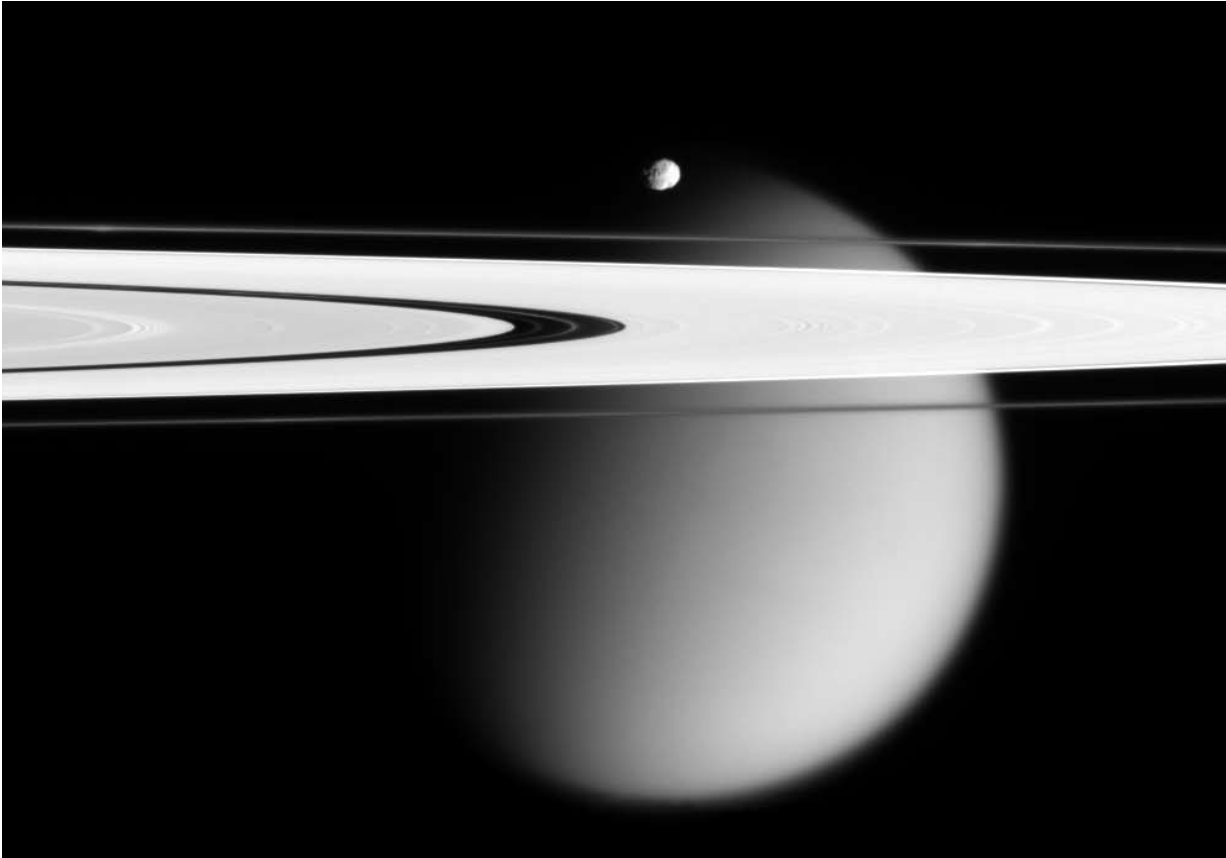
Data from the two instruments will contribute to NASA’s increased understanding of the lunar environment as it implements the Vision for Space Exploration, which calls for robotic and human exploration of the moon’s surface.

On May 9, NASA Administrator Mike Griffin and his counterpart, Indian Space Research Organization Chairman G. Madhavan Nair, signed two Memoranda of Understanding in Bangalore, India, for cooperation on India’s Chandrayaan-1 mission.

“It is my hope and belief that as we extend the reach of human civilization throughout the solar system, the United States and India will be partners on many more technically challenging and scientifically rewarding projects,” Griffin said.

Glavich said the next milestone for the mapper team is to send the mission’s engineering model electronics to India for spacecraft integration in July.

For more information on the mission, visit <http://moonmineralogymapper.jpl.nasa.gov>.



Cassini reveals stunning Saturn vista

The Cassini spacecraft provided this stunning vista showing small, battered Epimetheus and smog-enshrouded Titan, with Saturn’s A and F rings stretching across the scene. The image was taken in visible light with Cassini’s narrow-angle camera on April 28,

The prominent dark region visible in the A ring is the Encke Gap, in which the moon Pan and several narrow ringlets reside. Moon-driven features that mark the A ring are easily seen to the left and right of the Encke Gap. The Encke Gap is 325 kilometers (200 miles) wide. Pan is 26 kilometers (16 miles) across.

In an optical illusion, the narrow F ring, outside the A ring, appears to fade across the disk of Titan. A couple of bright clumps can be seen in the F ring.

Epimetheus is 116 kilometers (72 miles) across and giant Titan is 5,150 kilometers (3,200 miles) across.

The image, which captures the illuminated side of the rings, was taken at a distance of approximately 667,000 kilometers (415,000 miles) from Epimetheus and 1.8 million kilometers (1.1 million miles) from Titan.

For more information about the Cassini-Huygens mission, visit <http://saturn.jpl.nasa.gov/home/index.cfm>.

News Briefs



Dr. Daniel McCleese

McCleese named chief scientist

DR. DANIEL MCCLEESE has been named the Laboratory's new chief scientist, effective June 19.

A 30-year JPL employee, McCleese brings extensive experience in the strategic planning of NASA robotic missions, line and program management, as well as considerable experience in the development and execution of scientific instruments.

Currently, McCleese serves as the principal investigator for the Mars Climate Sounder, an instrument on the Mars Reconnaissance Orbiter. He has also served as the Mars Exploration Program chief scientist since 1996. Previously, he managed the Earth and Space Sciences Division and the Planetary Atmospheres Section, and chaired the Mars Expeditions Strategy Group, a NASA advisory panel.

McCleese was a Fulbright Scholar at Oxford University in England, where he received his doctorate in Atmospheric Physics.

McCleese replaces Dr. Tom Prince, who will resume his research and teaching activities as a joint campus/JPL appointment in June.

JPL team wins NASA Center Best

The JPL-led Coupled Layer Architecture for Robotic Autonomy (CLARAty) Team has been awarded the 2006 One NASA JPL Center Best Award for its efforts to foster NASA-wide collaboration. Only the second winner of the award, which is given at all centers and Headquarters, the team was honored for creating and applying a software framework for rapidly integrating innovations in robotics into NASA's flight missions.



From left: Doug Terrier,
One NASA team lead;

Johnny Stephenson, acting
director of the Organizational

Readiness Division of the
Office of Program Analysis
and Evaluation; Issa A.D.

Nernas, CLARAty team lead
and supervisor, Robotic

Software Systems; James Cutts,
chief technologist, Solar System

Exploration Directorate;
Richard Volpe, manager,

Mobility and Robotic
Systems Section.

The team will be recognized at the 2006 JPL NASA Honor Awards Ceremony on June 7.

The One NASA Center Best Award recognizes individuals and teams for significant accomplishments in promoting NASA strategic goals utilizing a One NASA approach, which includes exhibiting One NASA behaviors of making decisions for the common good, collaborating to leverage existing capabilities, and standardization that demonstrates efficiency. Information about the 11 Center Best recipients and their outstanding achievements is available on the One NASA website (<http://onenasa.nasa.gov>).

GERALD SANDERS of Johnson Space Center was selected as the agency "Best of the Best" award recipient. He was recognized for his key role in establishing a coordinated agency program in space resource utilization, more commonly known as in-situ resource utilization, supporting NASA's strategic goal to establish a lunar return program that has the maximum possible utility for later missions to Mars and beyond.

Sanders' award features a map of the United States highlighting all 10 NASA centers, signed by each center director and the NASA deputy administrator.

Willis earns French honor

DR. PASCAL WILLIS of Section 335 has been awarded the prestigious French Academy of Science's Prix Antoine d'Abbadie, an award given for outstanding achievements in geophysics or astronomy.

Willis was recognized for his work in the fields of satellite positioning global positioning, Doppler Orbitography and Radio-positioning Integrated by Satellite (a French navigation system) and Global Navigation Satellite System (a Russian navigation system)

and their applications to high-precision orbit determination, geocenter variation measurements and crustal deformation.

Willis, also a principal investigator on a solid Earth and natural hazard NASA Research Announcement, will end his five-year tenure at JPL in September when he returns to France.

Tibet storms provide pathway

Researchers from JPL, the Georgia Institute of Technology and the University of Edinburgh, Scotland, have found that thunderstorms over Tibet provide a main pathway for water vapor and chemicals to travel from the lower atmosphere, where human activity directly affects atmospheric composition, into the stratosphere, where the protective ozone layer resides.

The researchers performed their analysis using data from the JPL-managed Microwave Limb Sounder instrument on NASA's Aura spacecraft, combined with data from NASA's Aqua and Tropical Rainfall Measuring Missions.

The team found that even though more thunderstorms occurred over India, the storms over Tibet transported nearly three times more water vapor into the lower stratosphere than the more frequent thunderstorms that occur over India.

"This study shows that thunderstorms over Tibet are mainly responsible for the large amount of water vapor entering the stratosphere," said DR. RONG FU, associate professor in Georgia Tech's School of Earth and Atmospheric Sciences, who led the study. "Because Tibet is at a much higher elevation than India, the storms over Tibet are strong and penetrate very high, and send water vapor right into the stratosphere."

The study also found that the same pathway is responsible for transporting carbon monoxide, an indicator of air pollution, into the upper atmosphere.

The findings are published in the Proceedings of the National Academy of Sciences. For more information, visit <http://mls.jpl.nasa.gov>.

Santa Monica third in Science Bowl

Santa Monica High School, a JPL-sponsored team, took third place in the National Science Bowl tournament during the final weekend in April in Washington, D.C. Santa Monica had advanced to the final round after winning a regional competition in March, which JPL co-hosted.

State College Area High School from State College, Pa., won the competition, which is sponsored by the Department of Energy. North Hollywood High School placed second, with Albany High School in Albany, Calif., placing behind Santa Monica in fourth.

In all, more than 12,000 students from 1,800 schools across the country participated in the 65 regionals. The top 16 teams received \$1,000 for their schools' science departments.

For more information about the competition, visit <http://www.doe.gov/news/3572.htm>.

Evacuation drills coming up

During the summer months ahead, JPL employees and contractors can expect to be involved in building emergency evacuation drills, which are required to be conducted on an annual basis.

In order for these drills to be successful, all personnel should know important emergency evacuation information, such as who their building and floor wardens and division/section safety coordinators are, their building's exit ways, evacuation route signs in their building and rally or assembly areas outside of their building. With this knowledge, the evacuation drills should be routine and orderly.

The drills will be coordinated with wardens and safety coordinators to minimize impacts to critical operations. Information regarding these building evacuation drills and what your part is will be prepared for distribution to you over the next several weeks before the drills begin. Should you have any urgent questions, please contact ERIC FULLER at ext. 4-1091 or GREGG ELLERS at 4-2356.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meets Wednesdays at 11:30 a.m.

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.

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

For more information on any of the support groups, call the Employee Assistance Program at ext. 4-3680.

Sunday, May 21

Chamber Music—Baritone James Weaver and accompanist Joanne Kong will perform a free concert at 3:30 p.m. in Caltech's Dabney Lounge. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Wednesday, May 24

"Europa: Mystery of the Ice Moon"—Presented by the Science Division, this Discovery Science Channel film highlights JPL employees Pan Conrad, Lonnie Lane, Wayne Zimmerman, Claudia Alexander and Bob Pappalardo. Producer Dan Birman will introduce the 45-minute, high-definition film, and lead a question-and-answer session at its conclusion. Seating is limited to the first 175 attendees. Held at 11:30 a.m. in von Kármán Auditorium. For more information, e-mail Michele.Judd@jpl.nasa.gov or call ext. 4-4994.

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by 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, ext. 3-0465, or visit www.jplcaltechtostmasters.com.

Thursday, May 25

Caltech Architectural Tour—Hosted by the Caltech Women's Club, from 11 a.m. to 12:30 p.m. Free and open to the public. Meet at the Athenaeum front hall, 551 S. Hill Ave. For reservations, call Susan Lee, (626) 395-6327.

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

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

Wednesday, May 31

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by 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, June 1

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

Friday, June 2

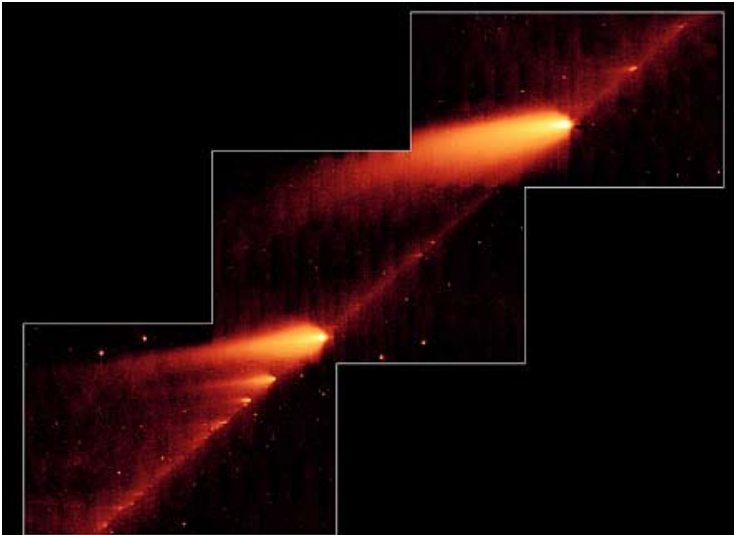
"The Challenge of Landing Humans on Mars"—Mars Exploration Directorate chief engineer Rob Manning will speak at noon in von Kármán Auditorium.



Tuesday, June 6

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

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



Spitzer shows comet breakup

The JPL-managed Spitzer Space Telescope has snapped a picture of the bits and pieces making up Comet 73P/Schwassman-Wachmann 3, which is continuing to break apart on its periodic journey around the sun. The new infrared view shows several chunks of the comet riding along its own dusty trail of crumbs.

"Spitzer has revealed a trail of meteor-sized debris filling the comet's orbit," said Dr. William Reach of Caltech's Spitzer Science Center. Reach and his team recently observed the comet using Spitzer. The picture can be viewed at <http://www.spitzer.caltech.edu/Media/releases/ssc2006-13/ssc2006-13a.shtml>.

The comet consists of a collection of fragments that file along like ducks in a row around the sun every 5.4 years. This year, the bunch passed by Earth beginning on May 12 before swinging by the sun on June 6. The fragments won't get too close to Earth, about 7.3 million miles, or 30 times the distance between Earth and the moon, but they should be visible through binoculars in the countryside night skies.

Comet 73P/Schwassman-Wachmann 3 should be dimly visible through binoculars on a clear night between the Cygnus and Pegasus constellations through May 28. For more information about viewing the comet or the meteors, visit http://science.nasa.gov/headlines/y2006/24mar_73p.htm.

Griffin

visits Lab, sees stable future

NASA Administrator Mike Griffin told an all-hands meeting of JPL personnel on May 18 that he foresees a stable future for the laboratory, but no new major role at least in the near term in NASA's plan to send humans to the moon and beyond.



Tom Wymore / JPL Photolab

By Frank O'Donnell
and Mark Whalen

"... I did feel that I could maintain a commitment to a 5,000-person laboratory. I'm committed to a stable, viable, healthy JPL at that level."

"Humans are going to need a lot of robotic assistance," said the administrator.

"I would anticipate there could be a lot of involvement in that at JPL ..."

Given the prospect of a flat NASA budget for the years ahead, Griffin told the Tuesday gathering in von Kármán Auditorium that his biggest challenge has been to find a way to fund missions under the Vision for Space Exploration while maintaining stable workforces at each of the agency's 10 field centers.

He said that the cut in JPL's workforce last fall from 5,400 employees and contractors to about 5,000 was driven by the fact that the previous level was based on expectations of growth in NASA's science programs that couldn't be maintained given the budget cap and his charter to remake NASA's human program. "I felt I had no choice but to nip that in the bud," he said. "I did feel that I could maintain a commitment to a 5,000-person laboratory. I'm committed to a stable, viable, healthy JPL at that level."

Griffin said his biggest immediate challenge has been to find work for NASA's traditional research/aeronautics centers. "I don't have that problem right now at JPL," he said, adding that the lab's current workload appears to be sufficient to keep the workforce stable.

In the future he expects JPL to continue to attract new business by competing for missions, but, "If I think JPL is in danger of falling below having the right amount of work to cover the JPL staff, then I will do as I have done at other places – I will find you a mission. If you can win enough to keep up the level you're at, you don't need me to do anything."

However, he discouraged JPLers from going after major new work that would drive the lab's workforce beyond the current level. "If you kill more than you can eat, I'll probably ask you to send some of that somewhere else."

"A gain in people at one center is a loss in people at another center, or it is a removal of dollars from industry into the federal civil service," said Griffin. "That's not acceptable. And it's not acceptable to be moving people and moving significant numbers of jobs from one center to another."

In response to a question, Griffin also said he hopes Congress will not restore cuts he made in the proposed fiscal year 2007 budget for scientific research and analysis. "I hope Congress won't restore it, because it will come at the expense of a mission," he said. "The budget I put forward is the best budget I can do given all the constraints I have. If you push on the bean bag somewhere, it will pop out somewhere else. There will be other unhappy people, they will just be in other zip codes."

Griffin cited the importance of placing humans and cargo in low-Earth orbit "an essential first step" in the next stage of exploration. "It's got to be done right," he said.

He also said that he sees potential opportunities for JPL for robotic work under the Vision for Space Exploration after he gets over the immediate hump of retiring the shuttle, completing the space station and developing new crewed vehicles. "In part it'll depend on how clever and how innovative your proposals are in response to mission opportunities."

"Humans are going to need a lot of robotic assistance," said the administrator. "I would anticipate there could be a lot of involve-

ment in that at JPL, but I don't want to turn you into a manned spacecraft center."

Griffin thinks the shuttle will complete the 16 scheduled international space station assembly missions as well as a Hubble repair mission.

"If we can get back to our average rate of 4.5 shuttle flights a year, we can finish the station with no problem. But we've got to get over the hump of this next flight (July 1) and have it be successful. That is crucial."

He said the initial return-to-flight missions need to launch in daylight to guarantee good camera viewing of possible foam buildup and other issues. However, he said, in order to complete the international space station it will be essential for some of the upcoming missions to launch at night.

Looking to the next decade, Griffin foresees a human presence on the moon in 2018. "What we do after that depends in part on what people want to do." Possibilities, he said, include developing the capability to have a research station there that would initially permanently staffed, very much like Antarctica.

Griffin foresees a potential human presence on Mars as early as the early to mid 2020s. "To me, the key is getting back into space in a reliable, robust, dependable way with enough lift capacity," he said. "It doesn't matter what Mars mission strategy you use, we already know we're going to need a space-station equivalent mass and will need a million pounds of hardware to go through low-Earth orbit."

Among his other observations in response to questions from JPLers:

— Asking about space collaborations with China, Griffin noted that he will be visiting that country next fall, but "can't predict the outcome. The space station partnership is well forged and long established, and so that's not on the table. Whether there ever could be a visiting vehicle at the space station from the Chinese, I couldn't say right now."

— Griffin believes there are many opportunities for young people interested in joining NASA. He noted that when he and JPL Director Dr. Charles Elachi were at the beginning of their careers 35 years ago, the Vietnam war and NASA's Apollo lunar program were winding down, and "in aerospace you had to scramble hard for any opening at all." By contrast, 25 percent of NASA's current workforce is eligible to retire in the next five years, "which will create openings at the younger end of the pipeline."

— The administrator said he shared concerns raised by a JPLer in the audience that the government's foreign export rules, called International Traffic in Arms Regulations or ITAR, aren't accomplishing their objectives. Intended to prevent the proliferation of technologies that could be used against the United States, the current implementation of ITAR is unintentionally "creating competitors" overseas. "It is preventing us from accessing the best and brightest in the world," said Griffin. "In my capacity as a government official, I am doing what I can do within the purview of my office to try to make" that case.



Kengo Kawano

Passings

KENGO KAWANO, 75, a retired electrical engineer in Section 810, died April 14.

Kawano joined the Lab in 1957 and retired in 1993, with his final JPL assignment in the Technology Applications Program Office.

He is survived by partner Jo Jean Kos, brother Paul, niece Carmel, and nephews Blake and Garrett.

JOHN "JACK" STEARNS JR., 80, a retired engineer, died April 16.

Stearns worked at JPL from 1954-88, much of it in the Advanced Concepts and Propulsion Research Section, where he made significant contributions to, among other things, electrical spacecraft propulsion. He is survived by his wife, Marjorie; daughters Barbara and Robin; sons Gregory and Roger; and many grandchildren and great grandchildren.

JOHN CHESTER, 78, retired from Section 6211, died April 27.

Chester worked at JPL from 1979 to 1994. He is survived by his wife, Jacqueline; children Cynthia, Thaddeus, Jon Marie and Sandra; and grandchildren Ryan, Maegan, Allison, Jennifer, Sam, Ricky and David.

Services were held at Riverside National Cemetery.

DENNIS LE CROISSETTE, 81, who oversaw development of the scientific instruments of the Surveyor spacecraft, the first U.S. effort to make a soft landing on the moon, died May 1.

Le Croisette joined JPL in 1962. On June 2, 1966, Surveyor 1, launched about three days earlier from Cape Kennedy, became the first U.S. spacecraft to land safely on the moon. Parts of two instruments for which Le Croisette was responsible, the television camera and the surface sampler on Surveyor 3, were returned to Earth by Apollo astronauts in November 1969.

He retired from JPL in 1984 and later became an author and humorist, and also excelled in medical research. Le Croisette served as a consultant for the National Institutes of Health and was also appointed a clinical professor of radiology at USC medical school.

Le Croisette is survived by his wife, Jill, and sister Eileen Younghusband. No services were scheduled. Donations are suggested to the American Cancer Society or San Diego Hospice.

Letters

I would like to thank my co-workers and friends for their support during my father's illness and recent passing. I feel extremely lucky to have had a father who lived to be 98 years old. He was truly an amazing man. I also feel extremely lucky to have such a kind and caring family here at JPL. Thank you all for your cards, flowers and kind words.

Robert Path

To my friends and the JPL community: Heartfelt thanks for the comforting words and gifts on the loss of my mother. Special thanks go out to Section 2726 and 2746, especially to Michael Nieto and Andrea Stein.

William Pateracki and family

Retirees

The following JPL employees retired in May:

Robert Ryan, Section 314, 50 years; Gerald Humphrey, 41 years, Section 373; Giulo Varsi, 34 years, Section 1300; Ronald Gillette, 32 years, Section 911; Philip Turner, Section 312, 27 years; Saundra Menotti, 24 years, Section 274; Myrna Joy Hindsill, 17 years; Tommy Dearmond, 15 years, Section 373D.

Classifieds

For Sale

BEDROOM SET, solid pine, incl. headboard, footboard and rails, 9-drawer dresser with mirror and 3-drawer night table, exc. condition, \$450/obo. 626/791-5498, Joe.

BICYCLE: boys 20" GT Dyno, excellent condition, \$65. 626/798-1839.

BIKE, 18 speed, 20" Magna Mt, excellent condition, blue/yellow and black, adjustable seat, handlebars and front wheel shocks, \$100. 626/710-2410, Braden Cox.

CANOE, 17' Grumman, aluminum, comes w/2 oars, 2 life preservers & PVC storage stand, buyer responsible for pickup in South Pas., \$500. southpasadena@mac.com, 626/390-5996.

COMFORTER COVER (duvet), brand new in original packaging, king size, 100% cotton sateen, 230 thread count, smoky blue, \$35. 626/398-0921, Shari.

COMPUTER: SGI Iris Indigo model CMNB003B, upgraded from R4000 to R4400 CPU and Elan graphics (old CPU, GFX included); 128 MB RAM, 3xSCSI Disks, ext. SCSI CD-ROM, QIC tape; 20" monitor (HL7965KW-SG), kbd, mouse, Irix 5.2, 6.1.,2.,3 and 6.5 media; other misc. CDs: \$100/obo. 661/250-1729, John.

COMPUTER: Apple MacBook Pro w/ Intel Core Duo: 2.0 GHz processor, 15.4" wide screen, 1 GB RAM (single sodimm), 100 GB HD, sealed in its box, retails \$2,500 + tax, best offer. 213/447-0725, Yian.

COMPUTER CHAIRS (2), adjustable height, good condition, perfect for any room, \$75/ea. 626/284-9424.

DODGER TICKETS (2), select games from season ticket package, preferred Loge Box, Aisle 50 Row C, \$22/ticket (face value), think-blue06@hotmail.com.

DRESSES, Jessica McClintock: gorgeous white Cinderella-style wedding gown, corset top connects to ball gown skirt, beautiful lace detail, orig. \$900, sell for \$350; stunning strapless prom dress, white, fitted bodice with poofy skirt, not to be missed, originally \$220, sell for \$100, matching jewelry also avail. 957-8614, Mina, after 5 p.m.

ELECTRONIC KEYBOARD, Casio model WK-3700, 76 touch-sensitive full-sized keys, over 500 different sounds including piano and draw-bar organ; DSP, auto-accompaniment, MIDI in/out; includes built-in stereo speakers, adjustable stand: \$125/obo. 626/577-5685, shumate@caltech.edu.

ENTERTAINMENT CENTER, beautiful solid maple, excellent condition, 63" L x 46" W x 22" D, fits a TV up to 30" L x 38" W x 20" D, pictures available, purchased brand new 1 year ago for over \$1,800, sell for \$900/obo, sherieannabelle@yahoo.com or 626/744-0643.

KIMONOS, exquisite vintage furisode and uchikake (for wedding), many hand-painted and embroidered, prices from \$125 to \$400. 249-2925.

MATTRESS + BOX SPRINGS (Calif. King), totally refurbish'd by factory, manufact'r is Diamond mattress, see to believe, still has 15-yr. warranty, you need to buy mattress frame, retail \$1,400, sell for \$450. 661/254-4464, Marian.

MISC.: lady's set of golf clubs, with bag, \$30; Queen Anne bench, off white/cream, \$60; walnut wood entertainment center with shelves and cabinet, \$90; woman's white dressy jacket, \$50. 957-8614, Mina, after 5 p.m.

MISC.: diamond ring, David Yurman "X" sterling silver w/pave diamonds, sz. 6, pd. \$900, sell for \$700/obo; ring, pearl & diamond 14K white gold, size 6, \$120; handbag, new in box, Dooney & Bourke, black w/brown, all-weather Leather 2 collection mini skinny case, 4" H, 6" L, .75" W, pd. \$65, sell for \$45. 653-9037.

MISC.: coffeemaker, Cuisinart, 2 to go, new, \$25; Barton's Creek Snuggles doll, 13.25" tall, new in box, \$25; picture, Paradise Waterfall, 46" x 29", moving water & bird sounds (volume control), creates illusion of moving water, pd. \$250, sell for \$100. 653-9037.

MISC.: home gym, \$50; crimp hair iron, \$5; women's "cowboy" boots, gray, sz. 7 1/2, gd. cond., \$50; fishing reels (freshwater), \$10/ea.; electrolysis machine, \$20; camping chairs (4), camouflage, \$10 ea.; twin mattress, fair cond., \$10. 626/357-8210.

MISC.: Brookstone elec. foot massager, multi-speed, \$30; pantsuit, new (tags still on), Jones of New York, sz. 12, \$50; sheet music cabinet, circa 1890-1910, wooden, 41 x 16-1/2 x 40," has shelves, needs refinishing, gorgeous piece, "doo-dads" on the door, \$75; 20+ Alfred Hitchcock short-story paperback books, \$10. 626/398-4960.

MONITOR, flat square CRT, 19" Iiyama, Vision Master 1451, SF dot pitch 0.22 mm, max. res. 1600 x 1200m, \$65; PRINTER: HP DeskJet 832C, color/B/W w/cartridges, \$45; both in excellent condition; upgrading equipment, must sell. 626/357-6155.

MOVING SALE: full bed (53" x 75"), \$50; bed-rm. furniture set (2 chests of drawers, 2 night tables, desk, chair), \$160; love seat, blue, \$80; microwave cart, \$20; parquet end table, \$20; spice jar lamp, \$15; computer stand, \$15; small dresser, \$20; cable spool table, \$10; GE toaster oven, \$6; blender, \$5; electric coffee pot, \$5. 726-8114, evenings & weekends.

MOVING SALE: electric juicer, \$5; ironing boards (2), \$4/ea.; electric broom, \$10; carpet sweeper, \$5; electric hedge trimmer, \$5; lawn edger, \$4; lawn spreader, \$5; flatware service for 8 (missing a few pieces), \$6; 10-spd. bicycles (2) in various stages of disrepair, \$20 each; bricks and boards for bookcases, make offer. 726-8114, evenings & weekends.

ORGAN, Hammond S1 Chord, built in about the 1950s, may need some work, pictures avail., \$100. JLesh@keyway.net. 626/355-4475.

PICTURES (4), coordinating, beautiful: Apollo, Venus, Mercvrvs, Mars; truly unique, quality, beautifully framed; cream background w/gold frame; primarily red & blue; must see, pictures avail.: \$30 each/obo. sherieannabelle@yahoo.com or 626/744-0643.

PITCHING MACHINE, Zooka 720, pitches "real" baseballs up to 50 mph, includes self-contained machine w/wall charger, 18" and 43" tripods, has about 100 pitches through it, will pitch 500 balls between recharge, great for little league, \$250/obo. 760/244-3009, Dan.

PRINTER CARTRIDGES (4), black inkjet compatible Epson T044120 (T0441), standard capacity (C64/C66/C84/C86/CX4600/CX6400 & CX6600), \$25. 362-2003.

SOFA / CHAIR: lovely camelback style sofa in a deep burgundy tone, 95", vg condition and ready for any room, \$350; matching oversize chair, \$200. 626/284-9424.

TELEVISIONS: flat screen Toshiba, 27", with built-in DVD and VHS players, approx. 1 1/2 years old, \$200; battery-operated Casio 2",

color, works very well, \$50. 626/793-7937, Jerry Brown.

TREADMILL, NordicTrack EXP 1000 XI, 3 programs plus custom programmable, hardly used, can e-mail photo, \$450 (new on sale was \$800). ciceroal@verizon.net or 626/963-7197.

TROPICAL PLANTS, plumerias, variety of colors and sizes; shell gingers. 626/444-6156.

TWO-WAY RADIOS, Motorola T5950; brand new, sealed package; great for outdoor activities, up to 5-mile range; 2 radios, rechargeable batteries, dual pocket charger, earbuds with push-to-talk buttons, swivel belt clips, user manual, 22 channels, \$88 negotiable; TV, RCA 13" color, \$20. 626/794-9579.

WALL UNIT, TV-entertainment-display; beautiful, cherry wood, with base for TV and hutch; 6" H, 7" W, 18" D; has 2 large glass doors for display in hutch, 4 wood doors in base for storage; holds 36" + TV size; shelves above TV section set for electronics; slight blemishes, but vg condition; see http://losangeles.craigslist.org/fur/156610445.html; orig. price \$880 from Plummers Pasadena, sell for \$490. 952-2529.

Vehicles / Accessories

'00 BMW X5, V8 (4.4), loaded, auto, 6 CD changer, everything power, moonroof, over-size wheels, leather power seats, 42K miles, excellent condition, \$25,999. 909/599-3230.

'98 FORD Crown Victoria, 185,000 miles, well maintained, top end rebuilt, runs great, Champagne color, loaded, \$3,000/obo. 805/674-7055, Jim Bean.

'88 FORD Ranger, 6-cylinder automatic longbed, red, 170,000 miles, runs well, great weekend hauler or commuter, \$1,750/obo. 626/398-4106, Scott.

'02 INFINITI QX4, V6, 3.5 L, 4 wheel drive, beautiful 2-tone color, low (52,100) mileage, still under full factory warranty, roof rack, running boards, 6-CD changer, alloy wheels, memory seats, sunroof, a/c, alloy wheels, cruise control, leather seats, pwr. seats/door locks/ mirrors/windows/steering & so much more, great condition, \$19,990/obo. 626/793-3408.

'02 JAGUAR, beautiful blue, loaded, like new; immac. cond.; V6 2.5 Liter, automatic, AWD, 26,500 miles, dual front and side airbags, alloy wheels, keyless entry, side curtains, moonroof, alarm, leather interior, and more; clean title, Carfax warranty; \$18,250. 957-6230.

'05 LEXUS ES 330, 14K miles, top of the line, leather, all auto/power, multi-disk CD, sliding sunroof, pearl-beige with tan interior, exc. cond., \$30,300 (Blue Book price). 241-8208.

'04 LINCOLN Signature Towncar, very smooth ride, loaded, 29K miles, \$24,000. JLesh@keyway.net, 626/355-4475.

'00 OLDSMOBILE Alero, 2-dr. coupe, 4 cyl., new automatic transmission, new brakes, newer tires, clean interior, bucket seats, pewter/ silver, dual front airbags, power steering, traction control, daytime running lamps w/automatic headlights, trip odometer, a/c, 121K, good condition, \$5,300. 489-4677, Stacey.

'01 SAAB 9-3, 4-dr. hatchback, manual transmission, turbo, leather uphol., heated front seats, moonroof, ABS, traction control, front & side airbags, tops in crash tests; extra mats, car cover, and Thule ski rack included; 1 owner, no accidents, few scratches, otherwise good cond., \$6,000. 952-7624, Debra Grubb.

'96 WINNEBAGO Adventurer 32' Class A motorhome, Ford 460, 35K miles, services recent and up to date; 6 kW generator, ducted dual a/c, driver door, hydraulic leveler, queen bed, oak interior, 2 TVs and much more; NADA valuation \$25K (low) to \$30K (avg.); make offer, must sell. 805/584-6766.

Free

LAWN MOWER, Craftsman gas-powered, 3.8 hp, 20" cutting diameter, you pick up. 626/791-7645.

HUTCHES for bunnies, 2 large, must pick up in San Gabriel. 626/345-0681.

Lost & Found

FOUND: Two different earrings in Building 601, possibly lost during a training class. Ext. 4-9550, Barbara.

LOST: book "Electric Power Substations Engineering," edited by John McDonald, CRC Press; personal copy; inside is a note written and signed by John McDonald to me. Ext. 4-9699, Harold Kirkham.

Wanted

PIANO (working), free, for a summer camp (non-profit org.) in the Sequoias, we will pick up. 626/398-4960.

ROOM TO RENT in Pasadena area for graduate student, quiet, non-smoker seeking same, in good neighborhood, start early June for about 3 months, kitchen privileges a must, laundry a plus. 619/817-9685.

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

Real Estate

ALTADENA Country Club area, 3 ba., 2 ba., 1,932 sq. ft. with spacious, sun-filled rooms; family rm., den, living rm., dining rm., kitchen w/breakfast bar & gas cooktop; lg. secluded backyard w/gas BBQ island and sink, and new pergola; fresh exterior paint & recent interior paint throughout; see www.2065holliston.com.

DEL MAR timeshare condo, 2 bd., 2 ba., living room, fully equipped kitchen, pool, Jacuzzi, BBQ area, game room, walk to beach; high season, 1 week: \$4,000. 626/507-8083, David or 626/215-3323, Kitty.

ENSENADA, Baja Calif., beautiful 3-bd. 2-ba. house, 2 blocks from beach and close to shopping centers, 10 min. from Costco & Home Depot, no garage but long driveway enough for 3 cars, \$70,000 (American)/obo. 626/372-9646, Colleen or 626/796-4966, Raquel.

MERRITT ISLAND, Fla., close to KSC; great family home, 2,700 sq. ft., 4 bd. + 3 ba., (includes mother in law suite w/hcp, access bath), L.R. FR w/plc, newer kitchen, lg. screened pool & attached porch; oversized 2-car gar., lg. lot, nr. schools & shopping; pictures avail. on request; \$439,900. 321/453-5127.

UPLAND, 4 bd., 2.5 ba., living rm. w/fireplace, formal dining rm., lg. kitchen w/table nook, laundry rm., central air/heat, center courtyard, mtn. view, attached 2-car garage; new front door, new windows & sliding doors, lg. lot w/ RV parking, firepit in back patio & much more. 909/946-3443, Paul or 909/946-3859, Carol.

For Rent

ALTADENA, 1,300 sq. ft. furn. (negotiable) house, washer/dryer incl., 2 bd. w/built-in closets + office + sunroom, 2 new ba., living rm., dining area, 2-car gar., 3 mi./JPL; cent. air/ heat, backyard w/covered BBQ area; available July: \$2,250 (water incl) + \$2,400 sec deposit. marjorie.schmeltz@free.fr or 626/497-8801.

ALTADENA: "Dillinger House" is comprehensively furn. for extended stays: 3 bd., study, boundary Angeles Nat'l Forest, 3 mi./JPL, trail access, view, fireplace, oak floors, antiques, furniture, beds, dinnerware, utensils, pots/ pans, all linens & towels, fine soaps, necessities incl.; just bring toothbrush & clothes: TV/DVD/VHS, Dish satellite, wire-less DSL; garden, fruit trees, garage; private, secluded neighbor'h'd, avail. June. 626/798-3235.

ARCADIA apt., 2 bd. + 2 ba., or 1 bd. + 1 ba., garage, a/c, stove, new paint/carpet/flooring, clean, convenient location, walking dist. to shops + food court, nr. JPL/Caltech, SA mall and 10/ 210 fwy's., quiet residential neighborhood, no pets, \$1,099/\$1,299. 626/576-7333.

EATON CANYON hillside, cozy 1-bd. apt. attached to flag-lot house, separate entrance on lower level; big yard, oak trees, great mtn. view; fridge, stove, dishwasher, utilities, parking, laundry; no pets, no smoking; owner seeks long-term tenancy, "green living" commitment; female preferred; avail. June 1; \$850. 626/396-3910, Kelley Brock, Sotheby's Realty.

GLENDALÉ triplex, front house, 2 + 2 + ofc., patio, 2-car garage, wash/dryer in unit, no pets, \$1,795. 952-5215.

LA CRESCENTA, lg., furnished bedroom in lg., private home; private bath, study/den with TV, kitchen privileges or cooked meals; must be employed, non-smoker, OK w/ animals, neat, clean, quiet; female preferred; 2 mo. deposit required for mo.-to-month at \$800. 541-9100.

PASADENA, 3 bd. 2 ba. house in Upper Hastings Ranch, 1,850 sq. ft., 7,500 sq. ft. lot; spacious living rm. w/fireplace, family rm. w/ dining area, cent. energy-efficient a/c, fresh paint in/out; 15 min. to JPL, 10 min./Caltech; avail. now for summer, furnished or unfurn.; \$2,600, includes water/trash pickup/gardening service + sec. deposit. 626/351-8608.

PASADENA, room w/priv. entrance in beautiful home, beautiful garden setting, above golf course, priv. bedrm., private remodeled bathroom, kitchenett, ideal for a very quiet & neat person, no pets, mo.-to-month lease, \$750. 626/798-4056.

PASADENA, charming 1920s-era unit near Lake Ave. shopping district & Caltech; 1,500 sq. ft., 2 bd., 2 ba., L.R. DR (with fireplace), bonus rm. & enclosed front and back decks; covered parking for 2 cars; W/D on premises; avail. June 15; \$1,800 including gardener, water and trash. 818/249-3602, 626/710-8091.

TUJUNGA: share this incredibly cool mtn.-top house with me; 1 bd. in 2-bd. house; all utilities included; washer/dryer, half of 2-car garage, extra storage, wood shop; fully furnished kitchen & living room; beautiful view; digital cable and wireless (extra); very quiet/peaceful; pets considered; more info and pictures avail.; I'm 31, single male; \$875. verdugoverde@comcast.net, 359-0285, Ben.

Vacation Rentals

BALBOA ISLAND duplex, weekly May-Aug.; fully furnished 2 bd., 1 ba. upstairs w/private covered patio, and 3 bd., 2 ba. downstairs w/patio & BBQ; newly renovated downstairs; washer/dryer, parking; located steps from bay & canal, and a short walk to main st. shops & restaurants; rent one or both; upstairs \$800-\$1,200/wk.; downstairs \$1,700-\$2,100/wk. bettyrs@earthlink.net or 626/351-9641.

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

FIVE-STAR RESORTS, local + worldwide, incl. Westin, Marriott & Sheraton; luxurious residential-style studios w/furn. kitchenette, starting at \$85/nt., taxes incl.; 1 bd. w/fully furn. kitchen & living rm., starting at \$130/nt., taxes incl.; 2 & 3 bedrooms also avail. 626/794-9579 or e-mail fivestarresorts@earthlink.net with desired dates and locations.

FLORIDA condo, beautifully furn. 2 bd., 2 ba., 2nd floor, on the surf of New Smyrna Beach, half-hour to Cape Canaveral, 90 min. to Disney World; enjoy all the comforts of home, quiet, relaxing, overlooks beach, BBQ/pool/ game room, easy walk to stores & restaurants. 760/439-7821, Darlene, dhfauge@yahoo.com.

GRAND TETON / YELLOWSTONE Nat'l Parks, visit in style, 2 bd. + loft townhome, totally outfitted, stunning Teton view, sleeps 6, cable, microwave, etc., borders Grand Teton. connie-matt@sbcglobal.net.

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., \$145/nite/2, \$20/nite/add'l person. 949/348-8047, jackandrandy@cox.net.

MAMMOTH, Meadow Ridge, 2 bd., 2 ba., + loft; sleeps 8, great family unit & location, walking dist. to Eagle Lodge; fully equipped kitchen: microwave, new dishwasher, new oven; cable TV's, VCR, DVD, CD/cass. stereo, free wireless Internet access; close to pool, Jacz., spa; JPL discount. 240-8763 or anahid@KazEng.com.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microwv., D/W, cable TV, VCR, phone, balcony w/mtn. vv., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt., no pets. 626/ 798-9222, 626/794-0455 or valeriec@caltech.edu.

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

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

JPL'S ONLINE NEWS SOURCE

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