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JPL to map the moon on India mission

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

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

will provide a much-needed long-term baseline for future exploration activities.

The mission's observations will address several important scientifications.

materials across the surface at high spatial resolution. This data

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.

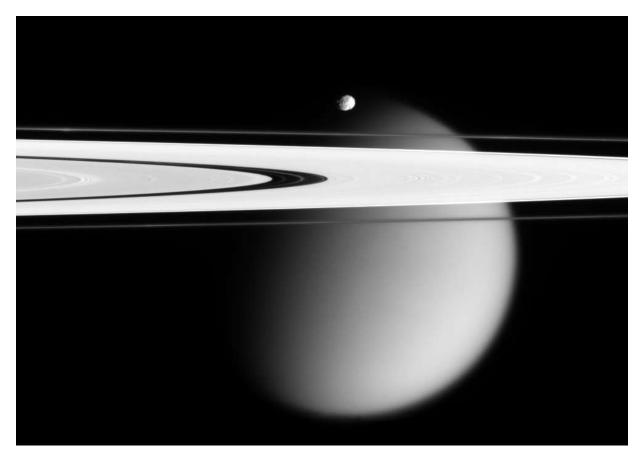
On May 9, NASA Administrator Mike Griffin and his counterpart, Indian Space Research Organization Chairman G. Madhavan Nair, signed two Memoranda of Understanding in Bangalore, India, for cooperation on India's Chandrayaan-1 mission.

"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.

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, Mc-Cleese 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. Nesnas, 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 agenc 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

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 JPLmanaged 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 JPLsponsored 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, Lonne 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. jplcaltechtoastmasters.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-

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

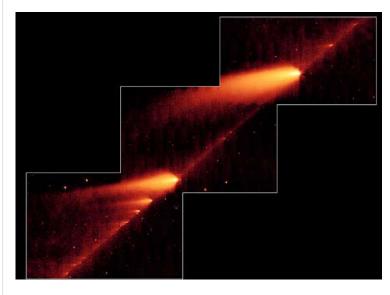
"The Challenge of Landing Humans on Mars"-Mars Exploration Directorate chief engineer Rob Manning will speak at noon in von Kármán Auditorium.



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

"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.

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.







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 ac ceptable 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

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.



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.

retired engineer, died April 16.

Stearns worked at JPL from 1954-88, tions to, among other things, electrical by his wife, Marjorie; daughters Barbara and Robin; sons Gregory and Roger; grandchildren.

JOHN CHESTER, 78, retired from

Chester worked at JPL from 1979 Jacqueline; children Cynthia, Thaddeus, dren Rvan, Maegan, Allison, Jennifer,

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 Croissette joined JPL in 1962. On June 2, 1966, Surveyor 1, launched about three days earlier from Cape Kennedy, became the first U.S. spacesette was responsible, the television camera and the surface sampler on Surveyor 3, were returned to Earth by

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

Jill, and sister Eileen Younghusband.

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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.

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

JOHN "JACK" STEARNS JR., 80, a

much of it in the Advanced Concepts and Propulsion Research Section, where he made significant contribuspacecraft propulsion. He is survived and many grandchildren and great

Section 6211, died April 27.

to 1994. He is survived by his wife, Jon Marie and Sandra; and grandchil-Sam. Ricky and David.

craft to land safely on the moon. Parts of two instruments for which Le Crois-Apollo astronauts in November 1969.

of radiology at USC medical school.

Le Croissette is survived by his wife, No services were scheduled. Donations are suggested to the American Cancer Society or San Diego Hospice.

■ etters

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

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 vears; Tommy Dearmond, 15 years, Section 373D.



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). thinkblue06@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 $22\ensuremath{^{\circ}}$ D, fits a TV up to $30\ensuremath{^{\circ}}$ L x $38\ensuremath{^{\circ}}$ W x $20\ensuremath{^{\circ}}$ D, pictures available, purchased brand new 1 year ago for over \$1,800, sell for \$900/ob 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

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; nut 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.

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

\$250, sell for \$100. 653-9037.

MISC: Brookstone elec. foot massager, multispeed, \$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; bedrm. 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; 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, Mercvrivs, 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 1/2years old, \$200; battery-operated Casio 2",

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

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-entert'nment-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 trans-

mission, 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 thup. 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 nlus 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) LR, FR w/fplc, 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,

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 BBO area; available July; \$2,250 (water incl) + \$2,400 sec deposit. marjorie.schmeltz@free.fr or 626/497-8801.

ALTADENA: "Dillinger House" is comprehen-

sively furn, for extended stays: 3 bd., study boundary Angeles Nat'l Forest, 3 mi./JPL, trail

access view fireplace oak floors antique 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 neighborh'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 fwys., 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" commit ment; female preferred; avail. June 1; \$850. 626/396-3910, Kelley Brock, Sotheby's Realty.

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.

GLENDALE triplex, front house, 2 + 2 + ofc.

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

PASADENA, charming 1920s-era unit near Lake Ave. shopping district & Caltech; 1,500 sq. ft., 2 bd., 2 ba., LR, 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 resi dential-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, 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. conniematt@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 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, 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.