Universe

Jet Propulsion Laboratory

Inside

News Briefs 2

Special Events Calendar 2

Earth Radar Anniversaries 2

Keck Making Stars Disappear 3

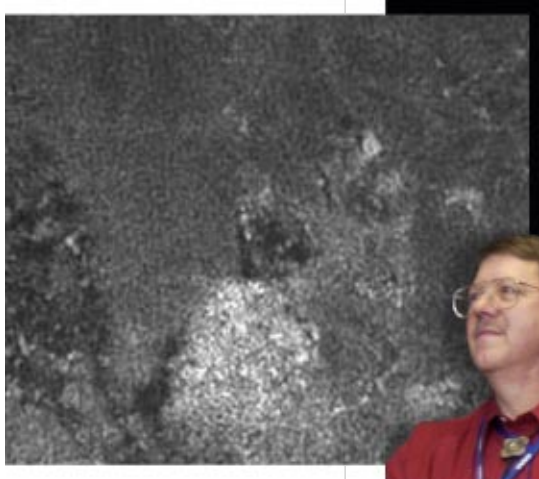
Cafe Makeover II 3

Passings, Letters, Classifieds 4

November 5, 2004
Volume 34 Number 22

Titan flyby reveals complex features

By Carolina Martinez



Bob Brown / JPL Photolab

Cassini team members react upon the spacecraft's successful Titan flyby. From left: Dr. Torrence Johnson, Vance Haemmerle, Dr. Elizabeth Turtle, Dr. Alfred McEwen, Trina Ray, Dr. John Spencer, Dr. Claudio Sollazzo, Brian Paczkowski.

Above: This radar image of Titan's surface was acquired on Oct. 26, when Cassini flew approximately 1,600 kilometers (994 miles) above the surface and acquired radar data for the first time.

The first radar images of Saturn's moon Titan show a very complex geological surface that may be relatively young. Previously, Titan's surface was hidden behind a veil of thick haze.

Early analysis of images and other data captured during the Oct. 26 close flyby of Titan by the Cassini spacecraft reveals greater surface detail than ever before and shows that Titan has lost much of its original atmosphere over time.

"Unveiling Titan is like reading a mystery novel," said JPL Director Dr. Charles Elachi, team leader for the radar instrument on Cassini. "Each time you flip the page you learn something new, but you don't know the whole story until you've read the whole book. The story of Titan is unfolding right before our eyes, and what we are seeing is intriguing."

"Titan has incredible diversity," added Project Scientist Dr. Dennis Matson of JPL. "We are glad that we have a full complement of instruments on this spacecraft because it is going to take all of them to reveal the story of Titan."

The flyby marked the first time Cassini's imaging radar was used to observe Titan. The radar instrument works by bouncing radio signals off Titan's surface and timing their return. This is similar to timing the returning echo of your voice across a canyon to tell how wide the canyon is. Radio waves can penetrate the thick veil of haze surrounding Titan.

Approximately 1 percent of Titan's surface was mapped during the Oct. 26 flyby. Radar images from Titan's northern hemisphere, a region that has not yet been imaged optically, show great detail and features down to 300 meters (984 feet) across. A wide variety of geologic terrain types can be seen. There are bright areas that correspond to rougher terrains and darker areas that are thought to be smoother.

"We are seeing features and patterns on the surface, and there are processes creating these patterns, and that gives us something to chew on for a while," said Dr. Carolyn Porco, team leader for the imaging team, Space Science Institute, Boulder, Colo. "We can't figure out what the features are, but they are intriguing. This is an environment we have never seen before. It is a very different place and it will take some time to unravel and piece it all together."

Cassini scientists were intrigued that the spacecraft's ion and neutral mass spectrometer found that Titan's atmosphere has more of the heavy isotope of nitrogen, compared to the lighter form. They believe that when nitrogen molecules rose to the top of the atmosphere, the lighter form was swept away with greater efficiency than the heavier form.

"In the two days since this flyby, our understanding of Titan has grown tremendously," said Dr. Jonathan Lunine, Cassini interdisciplinary scientist, University of Arizona. "Titan is a dynamic place with complex geologic processes that may be shaping its surface. Its surface may well be covered with organic materials, but we still don't know how much of the surface is liquid or solid. The fact that we have seen few craters tells us that Titan's surface is young."

The radar images show a world brimming with features that are dark and white, indicating sharp contrast. One area—dubbed "Si-Si" or the "Halloween cat" because it is shaped like a cat's head—is very dark and relatively smooth. That leads scientists to speculate that it might be a lake of some sort, but they caution that it is too soon to know for sure.

"With the radar in its active mode, it is like shouting at Titan and listening for the echoes," said Dr. Ralph Lorenz, Cassini radar team member, University of Arizona. "But we can also just listen with the sensitive radar receiver, the radiometry. The radiometry data shows early indications of the composition of the surface materials. One interpretation of what it is telling us is that Titan is a place covered with organics."

The optical imaging cameras on Cassini show streaks on the surface. The streaking may be caused by movement of a material over the surface by wind, flowing hydrocarbon liquids, or a moving ice sheet like a glacier. Imaging scientists are also seeing multiple haze layers in Titan's atmosphere that extend some 500 kilometers (310 miles) above the surface. At the surface Titan's atmosphere is about four times denser than Earth's.

Eleven of Cassini's 12 instruments were on during the flyby. Ten instruments returned data successfully. Engineers were working on a software glitch that caused the composite infrared spectrometer to malfunction. The team is confident that subsequent flybys of Titan will allow them to collect any data not gathered Oct. 26.

Cassini swooped down to within 1,174 kilometers (730 miles) of Titan during the close encounter. During the flyby, ground controllers were not in contact with the spacecraft, because it was turned away from Earth to make its observations. The signal was re-acquired as expected at 6:25 p.m. Pacific Daylight Time on Oct. 26.

Titan holds great fascination because it is the only known moon in the solar system to have an atmosphere. That murky atmosphere may be similar to that which existed on Earth before life formed. Cassini will become a frequent visitor to Titan, with 44 more targeted flybys planned during the mission.

With a remarkable flyby and complicated set of spacecraft gymnastics, Cassini will try its luck with Titan again on Dec. 13, 2004. The European Space Agency's Huygens probe will detach from Cassini on Christmas Eve and descend through Titan's dense atmosphere on Jan. 14, 2005.

"A major goal of this flyby was to measure the properties of Titan's atmosphere to see if our models to simulate the Huygens entry and descent are accurate, and to assess the feasibility of subsequent flybys at the 950-kilometer altitude [590 miles]," said Dr. Earl Maize, Cassini deputy program manager at JPL. "Preliminary data from [the] flyby are consistent with current predictions."

"It's as if we were building a puzzle without the top of the box," said Lunine. "It will be necessary to piece together the clues provided by Cassini and Huygens over the next few years. Sometimes we'll be wrong and we'll need to take the pieces apart and reassemble them again, until finally, a complete picture of the nature and evolution of Titan pops into view," he said.

More information on the Cassini-Huygens mission is available at *http://saturn.jpl.nasa.gov* and *http://www.nasa.gov/cassini.*

"We can't figure out what the features are, but they are intriguing. This is an environment we have never seen before. It is a very different place and it will take some time to unravel and piece it all together."

DR. CAROLYN PORCO

News Briefs

Adriana Ocampo

Ocampo receives college alumni honor

ADRIANA OCAMPO, a JPL planetary scientist and a 1978 graduate of Pasadena City College, has been selected by the California Community College League as one of five recipients to receive the 2004 Distinguished Alumni Award. This prestigious award is bestowed upon community college graduates who are accomplished professionals and contributing citizens of their communities.

Ocampo, who has worked at the Lab for 17 years, currently works on the Mars Odyssey Project as well as for JPL's Solid Earth and Natural Hazard Program.

Ocampo was the first to recognize that a ring of sinkholes found in the Yucatán peninsula was related to an impact crater known as Chicxulub. Most scientists now agree it's the "smoking gun"—evidence that a huge asteroid or comet crashed into Earth's surface 65 million years ago causing the extinction of more than 70 percent of the living species on the planet, including the dinosaurs.

Born in Colombia and raised in Argentina, she moved to the United States with her family when she was 14 years old and became avidly engaged in her passion for space science. As a high school student she joined JPL's "space explorer" club. Ocampo attended PCC from 1975 to 1978.

"The professors at Pasadena City College were all memorable to me and I am deeply honored to have been selected for this award, " Ocampo said.

She received her bachelor's degree in geology from Cal State L.A., her master's from Cal State Northridge, and is currently completing a doctorate in geology at Vrije Universiteit in the Netherlands.

Ocampo will be honored Nov. 18 at a banquet during the California Community College League's annual convention dinner at the Anaheim Marriott. The other four recipients selected to receive the Distinguished Alumni Award are Governor ARNOLD SCHWARZENEGGER; SEAN ASTIN, actor/director; PAT KELLER MCCORMICK, President of the Pat McCormick Educational Foundation; and ROBERT WHARTON, chief research officer, Idaho State University.

See Lab's Rose Parade float testing

JPLers and their families are invited to view the JPL/Caltech float for the 2005 Rose Parade, and to see the testing of the float. The test will occur Saturday, Nov. 20, between 7 and 8:30 a.m.

The float will be fully assembled and operational, but will not have any floral or dry decorations.

Two other floats are scheduled for test during that time period. Orange juice, coffee and doughnuts will be served starting at 6:30 a.m. The event is free, but tickets are required, and are available at the JPL Store. The location of the test is 950 South Raymond Ave., Pasadena. Parking will be provided at the Art Center College of Design and on neighboring streets.

AIAA conference a success for Lab

JPL played a major role in the planning and development of the American Institute of Aeronautics and Astronautics' SPACE 2004 Conference and Exposition, held the final week of September in San Diego.

The annual event brought together representatives of civil space, military space, NASA and others in the aerospace community. It was sponsored by Northrop Grumman.

The event was organized in nine tracks spanning science, technology and policy, each with seven to 10 technical sessions. JPLers presented 34 technical papers and chaired 10 technical sessions.

About 1,200 people attended the conference.

A JPL-sponsored booth featuring Mars, Jupiter Icy Moons Orbiter and PlanetQuest was part of "Education Alley," a variety of exhibits visited by 450 San Diego–area middle- and high school students who attended the event over its four days. The students' teachers also attended evening workshops on NASA educational programs.

The conference also featured an inaugural AIAA lecture in the name of former JPL director DR. WILLIAM PICKERING. Speaking were Mars Exploration Program Manager DR. FIROUZ NADERI and Mars Exploration Rovers payload principal investigator DR. STEVE SQUYRES.

Planning is already underway for the 2005 AIAA conference, which is set for Aug. 30–Sept. 1 in Long Beach. Raytheon will be the sponsor.

Gift wrap sale benefits childcare

The JPL/Caltech Child Educational Center has begun its annual fall gift wrap sale, for which the CEC receives 50% of all purchases with all proceeds directly benefiting its Tuition Assistance Program.

Products may be purchased online at *www.innisbrook.com*, using the CEC's ID #117336. Purchases may be made anytime until August 2005, with the CEC still receiving 50% of purchases.

The CEC is an early childhood education organization that provides nationally accredited child care for the Caltech and JPL communities as well as teacher training, parent education and educational outreach. For more information, call ext. 4-3418.

Just-In-Time Vendor Fair Nov. 19

The Acquisition Division's Rapid Procurement Group (265) will host a Just-In-Time Vendor Fair on Friday, Nov. 19, from 10 a.m. to 2 p.m. in von Kármán Auditorium.

Featured suppliers and organizations include VWR Scientific (supplier of chemicals, critical environment and Laboratory supplies), Dynamic Systems (Unix-Sun), Final Assembly (seating supplier), Catalogue Stationer (office supplies and paper supplier), Wareforce (software supplier), Airgas (cryogenics and gases supplier), JPL Central Supply and P-Card.

Earth radar anniversaries, honors noted

Members of JPL's shuttle imaging radar teams gathered last week to note two anniversaries: the 20-year observance of the flight of Shuttle Imaging Radar-B and the 10-year anniversary of the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR) mission. Earth Science and Technology Director Dr. Diane Evans also showed the group a trophy she accepted on behalf of JPL from the German Space Agency, given to the Lab in recognition of the anniversary and the U.S./Germany partnership on SIR-C/X-SAR.

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, November 5

Caltech German Language Film Series—"Die Schweizermacher" ("The Swissmakers") will be presented at 7:30 p.m. in Baxter Lecture Hall. The 1978 film will be shown in Swiss German with English subtitles. Free admission and reception after the movie. For more information, e-mail *aebi@hss.caltech.edu.*

Saturday, November 6

Beckett or The Honor of God—Tony Award–winning actor Denis O'Hare stars as St. Thomas Beckett in this L.A. Theatre Works production at 8 p.m. in Caltech's Ramo Auditorium. Tickets: $20; $10 for youth. For more information, call (626) 395-4652 or visit *www.events.caltech.edu.*

"Planning for Your Child's Educational Future"—David Levy, assistant dean and director of financial aid at Caltech, and Catherine Thomas, associate dean of admissions and financial aid at USC, will appear from 10 a.m. to noon at Verdugo Hills Hospital, 1812 Verdugo Blvd., Glendale. Hosted by the Child Educational Center. For more information or to RSVP, call ext. 4-3418.

Sunday, November 7

Chamber Music—The Sequenza Trio will appear at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are $29, $25, $21 and $17. For more information, call (626) 395-4652.

Tuesday, November 9

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

Wednesday, November 10

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

JPL Library Orientation—Stop by at 11:30 a.m. at Building 111-104 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, for information.

Thursday, November 11

"How Much is That Software in the Window?"—At noon in conference room 167, Ron Morillo (Section 316) will discuss a disciplined approach to software acquisition at JPL. He will also discuss best industry practices for planning software acquisition, monitoring and tracking supplier performance, and accepting the acquired software prior to its operational use.

Saturday, November 13

Countdown to Kidspace's Reopening—The 17th annual Rosebud Parade will be held at South Lake Avenue at San Pasqual, Pasadena. Decoration starts 8 a.m., parade begins 10 a.m. Kids can bring their bike, scooter or wagon and participate. For more information, visit *www.kidspacemuseum.org.*

Skirball Cultural Center—Caltech/JPL Day at the center's Einstein exhibition will be offered. Buses will depart at 11:15 a.m. and 1:15 p.m. from Hollister Avenue at Avery Circle. Buses will return to campus at about 3:30 p.m. The exhibit is the most comprehensive presentation ever mounted on the life and theories of the greatest scientist of the 20th century. Admission is free for the first 150 (limit of two tickets per ID). Tickets are available at the Caltech Ticket Office, 332 S. Michigan Ave. For those unable to attend, Skirball is offering a special discount for JPL employees through the run of the exhibit. Those with JPL identification will receive the discount rate of $8 per ticket. For more information, call (626) 395-4652.

Tuesday, November 16

JPL Stories—Rob Manning, Mars Exploration Rovers systems engineering manager and entry, descent and landing development manager, will present "MER: Disaster Averted?" at 4 p.m. in the Library, Building 111-104. So if landing was so easy, why were all those people in tears when it landed? Was MER just lucky? Manning will recount some of the many emotional close calls the MER team experienced on the long road to Mars. If you have questions about the story series or wish to participate, call Teresa Bailey at ext. 4-9233.

Thursday, November 18

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.

God Bless Americana—Charles Phoenix's free retro holiday slide show will be presented at 8 p.m. in Caltech's Beckman Auditorium. For more information, call (626) 395-4652.

Thu.–Fri., November 18–19

Von Kármán Lecture Series—Dr. Wolfgang Fink, JPL senior research scientist and assistant professor of ophthalmology at USC, will present "To See or Not to See ... Tools for Early Detection, Diagnosis and Prevention of Eye Disorders in Space and on Earth" at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Thursday's lecture will be webcast at *http://www.jpl.nasa.gov/events/lectures/nov04.cfm.* For more information, call Public Services at ext. 4-0112.

Friday, November 19

Caltech-Occidental Concert Band—"Voyager and Stardust" will be presented at 8 p.m. in Caltech's Beckman Auditorium. The band's performance of "Voyager" will depict in music the travels of the Voyager spacecraft. Free admission. For more information, call (626) 395-4652.

Continuing

"The Misanthrope"—Presented by Theater Arts at Caltech and held Fridays, Saturdays and Sundays, Nov. 5–21. Performances will be at Dabney Lounge at 8 p.m. Fridays and Saturdays; 2 p.m. Sundays. Cast includes David Seal, head of Cassini's mission planning office, and Craig Peterson, acting chief technologist for JPL's Systems and Software Division. Tickets are $10 for JPL staff. Call the Caltech ticket office, (888) 2-CALTECH or e-mail *events@caltech.edu.*

KECK INTERFEROMETER

team ready to make stars 'disappear'

The Keck Interferometer team has installed and tested a new instrument that can make stars disappear almost completely from a telescope's view and reveal the close-in regions where planets may have formed.

Giving a "thumbs up" after the Keck nuller obtained first fringes on the night of Aug. 6 are, from left, Andrew Booth, JPL; John Gathwright, California Association for Research in Astronomy (CARA); Jean Garcia, JPL; Chris Koresko, JPL; Chris Neyman, CARA; Peter Wizinowich, CARA; Sam Ragland, CARA; and Jim Fanson, JPL.

This fall, astronomers will continue integration and test of the instrument, called the "Nuller," which will contribute to NASA's search for planets around other stars.

"We have successfully combined infrared light from both 10-meter (33-foot) Keck telescopes using the new nuller instrument," said Dr. Jim Fanson, Keck Interferometer project manager at JPL. "This permits a so-called 'visibility' measurement, where we can measure the size of objects with exquisite precision.

"Later this year, when we complete our functional tests of the nuller, we'll be ready to attempt our first null measurement," Fanson said.

The Keck Interferometer is a NASA project that combines light from the world's largest optical telescopes to create a new type of telescope with unprecedented power. An interferometer is a device that gathers light waves from multiple telescopes, then combines the waves in such a way that they interact, or "interfere" with each other. Depending on how the light waves are combined, they can combine constructively, creating higher intensity, or they can combine destructively, creating lower intensity. The resulting light pattern, called an "interference fringe," can be decoded by astronomers to make high-precision measurements, such as a star's diameter or the size of an accretion disk around a black hole.

Keck Interferometer team members transport part of the starlight nuller instrument in preparation for its installation inside the observatory. The nulling instrument is designed to combine the starlight waves destructively, so they cancel each other out. With the starlight glare suppressed, the faint light from dust orbiting around the star can be detected.

"You're getting rid of this great big searchlight that the star is, and you're seeing the faint stuff orbiting nearby that you normally can't see because of the glare," said Dr. Andrew Booth of JPL, software engineering lead for the Keck Interferometer.

The "faint stuff" that astronomers hope to glimpse with the Keck Interferometer nuller is the exozodiacal dust (dust in the plane of other solar systems) that may surround many stars. It is the leftover material from which planets are believed to have formed. Large amounts of exozodiacal dust could obscure the signature of a planet. "This dust, if it's thick enough, could defeat our attempts to image planets around other stars from space telescopes now in the planning stages," Fanson said. "We need to find out how bright this dust is."

Nulling interferometry is considered an essential technology in NASA's quest for new planets. Although more than 100 planets have been detected around other stars in recent years, so far none have been observed directly. This is because the relatively faint light of the planets is swamped in the brilliant glare of the stars they orbit. Future planet-finding missions, such as Terrestrial Planet Finder, will use nulling interferometry to directly observe and characterize planets around nearby stars.

The W.M. Keck Observatory domes sit atop the dormant volcano Mauna Kea on the "Big Island" of Hawaii.

Before shipment, the Keck Interferometer nuller was tested extensively in a laboratory at JPL using a configuration similar to how it will be used on the sky. In these tests it was able to cancel 99.9 percent of the light from its test star, according to Dr. Mark Colavita, the project's instrument manager.

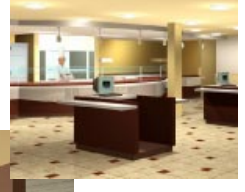
After years of development, seeing the instrument work for the first time produced feelings of both "relief and excitement," recalled Nulling Scientist Dr. Gene Serabyn.

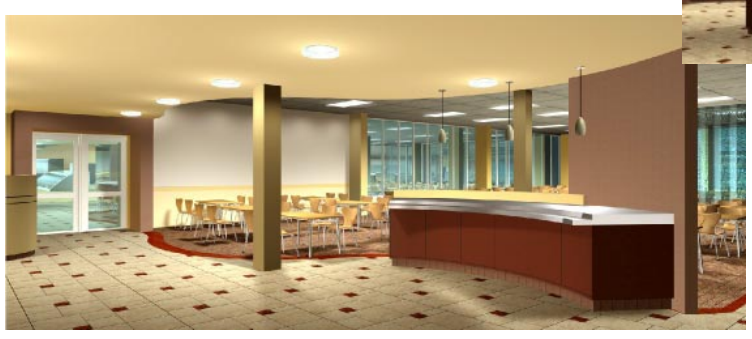
"It's a very challenging problem to make light of all wavelengths subtract away, so it took a while to find the proper technique. We had to come up with some newer and better ideas along the way to simplify the process," Serabyn said.

The development of the Keck Interferometer is managed by JPL for NASA's Science Mission Directorate. It is part of NASA's Origins program, a series of missions and studies designed to answer the questions: Where did we come from? Are we alone? The W.M. Keck Observatory is funded by Caltech, the University of California and NASA, and is managed by the California Association for Research in Astronomy, Kamuela, Hawaii.

CAFE MAKEOVER II

Like its sister 167, cafe 190 will soon undergo remodeling





JPL Facilities, Human Resources and Caltech Dining Services will soon collaborate on a major remodeling of the Building 190 cafeteria. Bob Develle, manager for Facilities Engineering and Construction; Bonnie Gerszt, JPL cafeteria liaison; and Andre Mallie, director of Caltech Dining Services, discuss the project and planned alternatives for food service during construction.

What is the scope of the project?
Develle: This project is to renovate the cafeteria area on the first floor of Building 190. The modifications will include the demolition of existing walls and construction of new ones to accommodate a new servery layout. Also included is the installation of new doors, flooring, ceiling and lighting. A new air-handling system will also be installed. New high-efficiency kitchen and servery food service equipment will be installed along with the necessary support plumbing and electrical utilities. The duration of this project is 270 calendar days; however, the contractor plans on beating that schedule and completing in April.

When will the cafeteria close down, and when will it reopen?
Mallie: We will serve the last meal on Friday, Nov. 19.
Gerszt: The cafe is expected to reopen between the end of April and mid-May.

Above, artist's renderings depict the remodeled 190 cafeteria.

Can you re-model/upgrade without closing down the facility?
Gerszt: No.

Will there be alternative dining options in the 190 area?
Mallie: Yes. We will have a catering truck available for mid-morning breakfast and at lunch time. The other cafeterias will be ready to accommodate the customers from 190.
Gerszt: Also, we are placing additional vending machines around the 190 cafe.

Will the new cafeteria seat more people? What kinds of new and different amenities will be offered?
Gerszt: The cafe will have the same seating capacity. We will have a new expanded salad bar, pizza oven, deli, entree line and grill.

How is this project being funded? How much will it cost?
Develle: This project is funded from Construction of Facilities funds directly from Headquarters. The low bid came in at $1,498,735. Inasmuch as this is a remodel with unknown conditions, we anticipate the construction portion of this project will cost a little over $1.5 million.

Gregory Parrillo

JPL'S ONLINE NEWS SOURCE

http://dailyplanet

View this and previous issues of Universe at

http://universe.jpl.nasa.gov

E-mail us at

universe@jpl.nasa.gov

Universe

Editor
Mark Whalen

Design + Layout
David Hinkle, Audrey Steffan/ Design Services

Chief Photographer
Bob Brown/Photo Lab

Advertising
Laurita Borst

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

Notice to Advertisers

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

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

Passings

WILLIAM HULLINGER, 74, retired from Section 3193, died Oct. 8.

Hullinger joined the Lab in 1968 and retired in February 2004. He is survived by his wife, Marjorie, daughter Pamela, sons Garen and William, and step-granddaughter Lynda.

Services were private.

GREGORY PARRILLO, 31, a television producer/director in the Media Relations Office, died Oct. 15.

Parrillo had worked at the Lab since 1997. His family requests that remembrances in his name may be sent to Monastery of the Angels in Hollywood, City of Hope in Duarte, The Sons of Italy Foundation in San Francisco or donations of blood to Cedars Sinai Hospital in Los Angeles.

Letters

Never to my knowledge in the history of JPL have I seen organizations pull together in a time of need. My family and I would like to thank the 5X organization. I had an acute pancreatic attack in New Jersey while on travel for JPL. As I lay in touch-and-go state of life and death, my daughter came to my aid; meanwhile I accrued an outrageous debt. These costs were not paid by my travel report. To my rescue, the 5X organization presented me with a check paid in full for my outstanding debts. I want to thank everyone! In addition, there were other groups who sent money, flowers, called or came to visit me in the hospital. Thanks to all my friends in Bldg. 103, FHLP, vanpool #031 and of course 5X.

Roberta DeLaO

I would like to thank JPL for the card and plant sent to my home in sympathy for the recent passing of my mother, Helen Huneycutt. I really appreciate your expression of sympathy.

Bryan Huneycutt and family

We greatly appreciate the beautiful flowers from JPL-ERC in connection with the recent passing of Robin's dad. Thank you so much for the kind thoughts. Sincerely,

Robin and Kim Leschly

Thank you to my wonderful colleagues and friends here at JPL who supported and encouraged me during the recent passing of my mother. Your cards, contributions, e-mails and calls were greatly appreciated during this difficult time. I appreciate the kindness and thoughtfulness extended to me and my family. Sincerely,

Annmarie Eldering

Retirees

The following JPL employees retired in November:

Rudolf Schindler, 46 years, Section 383; Herbert Blackhall, 44 years, Section 352; Alvin Willems, 42 years, Section 3696; George Danielson, 37 years, Section 380; James Carter, 26 years, Section 314C; Ivan Gall, 22 years, Section 357; Katherine Collinson, 15 years, Section 366A.

Classifieds

For Sale

ANGEL & CHERUB COLLECTION, unique, make offer. 648-7032.

ARMOIRE/entertainment center, lg., blonde wood, Mediterranean-style w/shelves, crown moldings at top, vertical carving on front & door panels, semi-transparent antique white finish, back can be cut out (has perforations) for lg. TV, exc. cond., can e-mail photo, $400 firm. 626/794-6860, leave msg.

BABY FOOD PROCESSOR by Dex, brand new in orig. packaging, dishwasher safe, $20. 714/280-7368.

BED, Cal. king, mattress, box springs, frame & sheets, $50. 626/305-0591.

BOY'S BIKE, Diamondback Octane 20, 6 speeds, 20" wheels, top cond., $75/obo. 790-6851, Roger.

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

COMPUTER PARTS: ASUS motherboard, new, P4T533-C w/1 GB, Samsung, PC 1066 RamBus, RIMM memory, $250; Pentium 4, 2.53 GHz, boxed, processor (factory wrapped, new), $125; PNY Quadro4, 750 XGL, 128 MB graphics card (factory wrapped, new), $250; or all for $500. 970-6283, Asim.

ENTERTAINMENT WALL UNIT, oak, exc. cond., wall center: 2 raised panel doors, 2 double raised panel locking doors, 8 pull-out DVD/CD/tape shelves, 1 pull-out DVD/VCR shelf; 2 side open stereo (placed on each side of center unit), can e-mail photo, $1,000/obo. 352-4510.

ESTATE SALE, antique dishes/furniture, 10" band saw + other items too numerous to mention, Sat.-Sun., Nov. 6-7, 9 a.m.-3 p.m., 2107 Oakdale St. (near Caltech, cross street Craig), Pasadena.

EXERCISE EQUIPMENT: benches, flat, $50; incline, $50; dumbbells free with benches, all in exc. cond. 626/449-6799, Bob.

EXERCISE EQUIPMENT, Health Rider, top of the line, mint cond., monitor, sheep skin seat cover, 50# additional weights, two video tapes, $200/obo. 626/582-8562, Karen.

EXERCISE EQUIPMENT, Health Rider, exc. cond., $100; ICE BOX REPLICA, antique, oak, small size, $20. 626/793-7937.

FAX CARTRIDGE for Brother machines, model PC-102RF, brand new; $20; DIET TAPES, Jenny Craig, set of 14, $25; COMPUTER POWER CONTROL CENTER, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, $20. 790-3899.

FREEZERS (2), Frigidaire, upright, white, 19.1 cu. ft, $75; 15 cu. ft., $50. 626/798-2472.

FURNITURE, antique Victorian: circa 1850, Renaissance Revival, John Jelliff settee (couch), carved lion's head on back, trademark wooden caryatids on sides, exc. cond., recently upholstered with antique scarlet velvet fabric, $3,500/obo; lady and gentleman's Louis XV 1890s Victorian parlor chairs, upholstered in cream fabric, vg cond., $900/obo for the pair, call or e-mail for photos. 323/257-8640, microssec@yahoo.com.

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

FURNITURE, queen size bamboo bedroom set, natural color, headboard, one side table w/drawer, one chair w/cushion, gd., clean cond., no kids/pets/smoking house, $50. 626/683-0706.

FUTON PAD, full size, black, gd. cond., $30. 626/574-9664, Ray.

HEADBOARD, king size? old, solid pecan wood, ornate, dark finish, $45. 626/798-3235.

HUTCH, gorgeous, wood, $75. 626/345-1476, Stacey.

JEWELRY: ladies ESQ Contessa gold-tone watch, $50; ladies New Coach metropolitan brown leather strap watch, $50; ladies New Coach classic stainless steel watch, $50; diamond-cut bracelet, 14K gold, tri-color, $150; diamond-cut necklace, 14K, two-sided, 18", $200; oval garnet tennis bracelet, 14K gold, $60. 626/644-0890.

MICROWAVE, Sharp carousel, exc. cond., $50; HOT PLATE, GE, near-new, exc. cond., $10; FRY PANS, 12" & 14", non-stick alum., restaurant quality, $15 ea.; SKI RACK, used once, $25; SKI BOOTS, men's, used once, exc. cond., $25. 626/449-6799, Bob.

MISC: pool table, 8', $500; tablecloths, 2 slate blue oval, 18 matching napkins & rings; mailbox, oversized, green, $10; mailbox, new, black, $10; wig, red, shoulder length, never used, $20; electric fry pan, $10; answering mach., $5; basketball set, portable, needs net, $200; fishing pole, saltwater, $25; mattress for bunk bed, gd. cond., $10; baseball glove & conditioner, small, gd. cond., $25. 626/357-8210.

MISC: baby crib by Childcraft, Simmons mattress, $50; Graco baby carseat/carrier, $30; bed tray, $5; 10-cup rice cooker, $8. 714/280-7368.

NECKLACE, new ladies Paloma Picasso daisy pendant, platinum, round, brilliant diamonds from Tiffanys, .15 carat total, G color, VS clarity, on 16" chain, paid $1,395, sell for $900. 626/644-0890.

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

PATIO FURNITURE, 60" rectangular glass table, olive green alum. frame, 6 matching high-back chairs w/straps, matching 2-per-son love seat bench, $200. 701-6882, Paul.

REFRIGERATOR, Hotpoint, white, 16 cu. ft., gd. cond., runs great, $100. 626/794-5484.

REFRIGERATOR, Kenmore, 18 cu. ft., black, 8 yrs. old, $190; DRYER, Whirlpool, gas, 3 spd., 10 yrs. old, $85; WASHER, Maytag, 10 yrs. old, $85; MONITOR for computer, Sony, 17," color, $50; all in great cond., (Covina, you haul). 626/859-6393, Cheryl LaGue.

RUG, 9 x 12, Karastan, wool, Karman pattern, cranberry color, best offer. 626/796-8925.

TRAVEL CRIB/PLAY PEN, Graco Pack & Play, navy blue, folds up for easy transport, incl. navy blue nylon tote bag, non-smoking home, great cond., $25. 626/256-6606.

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

WAGON WHEEL HUB, oak, dark (not rustic), 12" H x 7" W, sits on separate 1" wood platform, incl. electric bulb, emits light through the many slats, $25/obo. vivdavies@earthlink.net. 909/593-4046.

WINNIE THE POOH DÉCOR, several pictures, decorations, knickknacks, stuffed animals, crib dust ruffle, etc., non-smoking home, great cond. 626/256-6606.

Vehicles / Accessories

'96 ACURA, 2.5 TL, immaculate cond., full power, white, can e-mail pictures, 118K mi., $7,500. 626/793-7937.

'93 ACURA Legend, white color, 4-dr., exc. cond., auto, power everything, no accidents, new tires/brake, 140K mi., see to appreciate, $5,300/obo. 909/896-7225.

AUTOMOBILE OIL, Chevron Supreme, detergent, multi-grade 10-40, $11/case of 12, six cases left. 249-6071.

'92 DOLPHIN motorhome, 22 ft., V6, cruise, rear bath floor plan, dinette makes child's bed, gaucho couch makes bed, overhead double bed, awning, microwave, 4-burner stove/oven, coach/cabin air, furnace w/thermostat, runs great, 80K plus mi., Blue Book $11,310, sell for $10,500. 626/795-5235.

'87 DUCATI Paso 750 motorcycle, legendary Italian v-twin sound and perf., unique fairings set industry standard, aftermarket carbs and exhaust, great ride, new tires, recent tuneup, vg cond., 20K mi., yellow, $3,000. 626/794-7343.

'00 FORD Explorer Sport, white, 2 dr., 2wd, V6, stick, a/c, power seats/brakes/windows, keyless entry, LoJack, am/fm/cass., 38K mi., pristine cond., see at http://home.comcast.net/~macmaven/explorer.jpg, $9,790. 353-2103 or 653-7312.

'98 FORD Astro minivan, 8 pass., 32K mi, exc. cond., garaged, $13,000/obo. 323/725-2516.

'96 HONDA Civic tires, rims, hubcaps: 2 Dunlop SP40 P175/70R13, almost new; 2 Effecta P175/70R13 with about half tread wear; 4 official hubcaps, $120 for all, will divide into pairs if desired. 353-2103 or 653-7312.

'95 HONDA Accord LX sedan, gold, auto, 78K mi., runs great, regular maint., $5,300. 310/709-1397.

'87 HONDA Civic DX, 5-speed, air, CD player, recent tires, new battery, 210K mi., all systems work fine, will apparently run forever, $1,700. 626/794-7343.

'91 JAGUAR XJ6, Vanden Plas, 44K mi., luxury, garaged, all power accessories, $12,000/obo. 323/725-2516.

'00 LEXUS ES 300, automatic, leather powered seats, moonroof, CD changer, metallic two-tone black, power everything, exc. cond., 29K mi., $19,500. 909/630-5176.

'98 LEXUS ES 300 sedan, 4 dr., V6, 3.0L, 4-speed, auto overdrive, front wheel drive, 68K mi., auto climate control, power steering/windows/door locks, tilt wheel, cruise control, AM/FM stereo/cass., CD changer, dual front/side airbags, anti-lock brakes, $14,000/obo. 562/833-9006, Lisa.

'02 MAZDA Protege 5, loaded, exc. cond., 5-speed, dual airbags, 4-wheel disc brakes, limited blue color, chrome wheels, keyless entry, power windows, 6 CD player, great mpg, one-family ownership, well-maintained (babied), priced below Kelly Bluebook at $11,200. 661/753-9876.

'93 MERCEDES E-300, 6 cyl., 3.0L, auto, 133K mi., hunter green metallic, tinted windows, cream leather int., custom sound system, garage kept, all service records, vg cond., nice to drive, must sell, $6,700. 626/797-6824.

'94 MERCURY Sable Wagon, auto, V6, 3.8L, 90K mi., 2nd owner, power steering/brakes/door locks/windows, a/c, cruise, am/fmcass. garaged, well-maintained, vg cond., must sell, $3,195. 626/585-8213.

'93 MERCURY Villager minivan, gray, new motor, new front & rear a/c, exc. cond., first owner, $5,000/obo. 909/823-4711, Loni.

'99 SUBARU Outback, 75K mi., runs great, green color, tinted windows, great gas mileage, $9,500/obo. 249-4395.

'99 TOYOTA Camry XLE, top of line, loaded, V6, CD player, moonroof, power leather seats, auto, 50K mi., exc. cond., $11,000. 909/599-3230.

TRANSMISSION OIL, Dextron/Mercon, $12/case of 12, four cases left. 249-6071.

Lost & Found

LOST: Men's white gold wedding band, on Oct. 8. Please call ext. 4-3575.

Free

CAT, wonderful, peaches & cream tabby named Fiona needs loving "Mom," 8 yrs. old, green eyes, a bit shy with men, not declawed but likes her scratcher. 626/791-1768.

GUINEA PIGS (2), to good home, brand new cage, 1 female, short hair, calico color, 1 male, long hair, rust red color, easy maintenance, vg with kids, need love and attention. 626/798-6618, Teresa.

KITTENS (2), 6 mo. old (brother and sister), 1 gray, 1 tabby, looking for loving home. 310/515-3931.

STORAGE SHEDS, metal, you haul (from La Crescenta). 249-2925.

WALL HANGING, hand-painted (signed by Wilcher) American Indian on gray/tan suede leather, 18" x 56," features male & female yei figures on background of surrealistic symbolism, long beaded fringe at bottom, hangs on a yucca branch, no photo avail. 909/593-4046. vivdavies@earthlink.net, in La Verne.

Wanted

SINGER for jam sessions, having fun is key, rock, folk, originals, various styles. reverb2020@yahoo.com.

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

STONE MASON and/or upholstery shop referral, reasonably priced. 626/794-6860, Carol.

VANPOOL RIDERS, from Victor Valley/Hesperia (Main St). 4-1424, Scott.

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

For Rent

ALTADENA, beautiful guest house, 2 story, 2 bd., 2 ba., 1,400 sq. ft., full kitchen, a/c, washer/dryer, 1-car garage, non-smoker, no pets, close to bus, $1,800 + sec. deposit. 949/689-8103.

ALTADENA, beautiful house, great family neighborhood, 2 mi. from JPL, 3 bd., 1.75 ba., hardwood floors throughout, wood-burning fireplace, washer/dryer, dishwasher, attached garage, gated backyard with patio, mature avocado and orange trees, gardener included, asking $2,300. 626/791-7081.

ALTADENA, 3 bd., 2 ba., pool, garden, 2-car gar., all utils., furnished, attractive area, cul-de-sac, 4 mi. to JPL, $2,500. 626/798-1937, 626/791-2434.

ALTADENA, roommate wanted to share 3 bd., 1 ba., fully furn. home, female prefer'd, close to JPL, no pets or smoking, $450, (util. incl.) + security deposit + $450. 626/398-5725.

ALTADENA "sabbatical house" for visiting professionals: 3 bd., study, boundary Angeles Nat'l Forest, 3 mi./JPL (trails to Lab behind house), view, fireplace, oak floors, antiques. Completely furnished: dinnerware, utensils, pots/pans, bed linens + towels, fine soaps, necessities incl.; just bring toothbrush & clothes; TV/DVD/VHS, Dish satellite, wireless DSL, gardens, patio, parking; private, immaculate. 626/798-3235.

LA CRESCENTA, above Foothill, 3 bd.,1 1/2 ba., single family house, living rm. with fireplace, formal dining room, breakfast area, laundry rm., detached 2-car garage, near elementary/middle/high schools, walking distance to public library, brand new paint/carpet, gardener paid, no pets, 1-year lease + deposit, $1,700. 790-9772.

MONTROSE, studio guest house in Briggs area; 1 rm. w/galley kitchen and full ba.; new carpet, paint; very private at rear of deep residential lot with large trees; quiet; $600, trash, water and gardener paid. 248-7499.

PASADENA house, 1 1/2 mi./Caltech, near Allen & Orange Grove, pretty st., 2 bd., lg. master, lots of closets, 2 full ba., dw, stove, frig., washer/dryer, ac/fireplace, fenced yd., 2-car garage, water/trash/ gardener paid, $1,850 + security dep. 626/793-2320.

PASADENA, 2 bd., 1 ba. + large den, Spanish house, near Caltech & PCC, large living room, dining room, new carpet, laundry hookups, gated yard, pets OK, 15 min. to JPL, $1,650 + deposit. 626/676-1482.

PASADENA, easy going, non-smoking housemate wanted, small bedroom in 4-bedroom house, walking dist. from JPL (2 blocks), central air/heat, fireplace, patio, backyard, laundry & kitchen privileges, no pets, off-street pkg., $600 + $300 deposit, util. incl. 626/807-0699, Myr.

TUJUNGA, 3 bd., 2 ba., 2,000 sq. ft., 2 story, gorgeous private woodsy hillside home; 2-car attached garage, large lot, lots of parking, stove, dishwasher, new heating/cooling, fireplace, beautiful large yard and garden, washer/dryer, will consider pet; $2,100 + $2,500 security, avail. Dec. 11; prefer lease, will consider month to month. 352-3840, Jim.

Real Estate

COLORADO, build your dream home, 38.5 acres in Mesa Antero Estates, near Salida, "One of the 100 best artist communities in the country," 360-degree views of Collegiate Peaks, property sits on a mesa with many building sites, trees, meadows and deer trails; lots in area sell for over $300,000, this lot, $275,000. 249-4536, Steve or Shelley, or stevematousek@yahoo.com.

WEST VAN NUYS, beautiful home, clean, charming, 2 lg. bd., 1 & 1.5 ba., family rm. could easily convert to 3rd bd., lg. kitch, central heat/air, fireplace, pool, 2.5 garage, newer roof & windows, newly painted inside, 6746 Densmore Ave., fast access to 405 fwy., $425,000. 786-2289.

Vacation Rentals

ARROWHEAD cabin, lake view, 6 max., $140/weekends, $350/wk., others avail., security/cleaning deposit required. 818/952-6221, Mon.-Thur.; 909/337-1036, Fri.-Sun.

BIG BEAR LAKE: cozy cabin blocks from Snow Summit, sleeps 6, very private, plenty of parking, cable TV, DVD, shuffleboard table, $140/weekend, $350/week. 726-1270.

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

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

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

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

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

OREGON, Brookings, Moosehead Lodge at the Winchuck River Estuary, fully furnished 3 bd., 2 ba., residence, 1 mi. from Cal. border, walk Pelican Bay beach w/tidepools, surf and driftwood, fish Pacific Ocean/Wild Rivers along S. Oregon/N. Cal. coast, enjoy the redwoods and Siskiyou National Forest. 800/221-8175.

PLAYA DEL REY beach house, on the sand, 2 bd., 2 ba., wood-burning fireplace, sheets & towels provided, $1,050/week, free departure cleaning for JPLers, emailkerri@aol.com, 790-7088, photos/reservations.

RESORTS, 5-star, local and worldwide, luxurious residential-style studios with furnished kitchenette, starting at $450 for 7 nights; 1 bd. with full kitchen, living room, $700/week; 2 bd., $1,000/week; studio specials: Palm Springs, Lake Tahoe, Vail, Park City, Puerto Vallarta, $399/week. 626/794-9579 or fivestarresorts@earthlink.net, info or viewing.

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

SOUTH LAKE TAHOE, 1 bd., delux, 2 ba., sleeps 4, full kitchen, 1 mi. to Heavenly Valley Ski Resort/Tahoe Beach & Ski Club, http://www.tahoebeachandski.com, Dec. 11-18, '04, $850/wk. 626/791-2321, eves.

Universe
Jet Propulsion Laboratory

Inside

News Briefs 2
Special Events Calendar 2
Awards Program Underway . . . 2
Spitzer Sees Ice, Warm Glows . . 3
Opportunity Reversing Course . . 3
Passings, Letters, Classifieds . . 4

November 19, 2004
Volume 34 Number 23

Elachi highlights Lab's exciting year

By Mark Whalen

Dutch Slager / JPL Photolab

"Excellent"

In his Nov. 15 State of the Lab address, JPL Director Dr. Charles Elachi told a von Kármán Auditorium audience that in his 34 years here "there's probably no match for what has happened over the past year."

Citing the successes of the Mars Exploration Rovers, Spitzer Space Telescope, Galex, Cassini, Genesis and two major instruments on Aura, Elachi thanked everyone at JPL, particularly the staff members of the Deep Space Network, for their accomplishments. "All of this does not happen without getting all of the data down. The DSN delivered on 99% of its commitments. That's absolutely phenomenal, considering the number of missions JPL has been flying."

Capping what is perhaps the busiest year ever at JPL is the recent release of NASA's annual "report card," which scored the Lab's performance for fiscal year 2004 as "Excellent," with a numerical score of 96%. This is the highest award in the Lab's history. By category, JPL scored 97 on Programmatic/Technical, 93 in Institutional and 96 for Outreach.

"All of you should be extremely proud of these scores," Elachi said. "Al Diaz, Associate Administrator of NASA's Science Mission Directorate, was very delighted with us scoring this high, the Caltech president is extremely ecstatic and I have received a number of compliments from the Caltech Board of Trustees for all of you on your performance.

"It's going to be challenging to stay up at these levels," he added, "but these are the things we enjoy doing."

Indeed, the coming year promises more excitement and discovery. Next up is the Dec. 30 launch of Deep Impact, with a planned arrival at comet Tempel 1 on July 4, 2005; the Huygens probe will separate from Cassini on Christmas Eve, then will descend to the surface of Titan, Saturn's largest moon, on Jan. 14. Later in the year are the scheduled launches of CloudSat (May) and Mars Reconnaissance Orbiter (August).

Throughout next year, Cassini will execute 21 targeted encounters. The Lab will also operate 16 spacecraft and five major in-flight instruments throughout the solar system and beyond.

All of JPL's missions have been funded in the president's budget request for fiscal year 2005. Congress was expected to meet this week to consider passage of the budget bill.

Under NASA's Science Mission Directorate budget are the Solar System (Discovery, Cassini, New Frontiers), with some growth in the budget request; Mars, with the budget almost doubling over the next five years; the Origins Program, with significant growth in the near-term; the Structure and Evolution of the Universe, which is "fairly level now, but will get more attention in the next few years;" Earth Science, "flat for a couple of years but respectable growth later in the decade;" and the Sun-Earth Connection.

"I am hopeful that in the future Earth science will receive more attention," Elachi said. Still, its budget of $1.3 billion to $1.4 billion "is not shabby. I am sure NASA can do a lot of exciting things with that funding."

The Exploration Systems Directorate—which includes JPL's roles in Project Prometheus and Goddard Space Flight Center-led Robotic Lunar Exploration—will see "significant growth," Elachi said.

Overall, he added, the FY '05 request is encouraging. He is optimistic that NASA will be funded closer to the Senate level—expected to provide full funding as requested—than the House level.

The key challenges for NASA, Elachi added, are the cost of operating the space shuttle over the next four or five years; the Return to Flight initiative, which because of the importance of safety, costs have been more than were estimated; and the Hubble repair mission, not budgeted a year ago but added to the FY '05 budget.

Elachi highlighted institutional accomplishments over the past year.

• "The JPL entry in the 2005 Tournament of Roses Parade will show the whole world what the Lab is all about." He emphasized that the venture is funded by Caltech, not with government money, and that any participation from JPL employees is being done during off-hours and on a volunteer basis.

• Citing concerns from many staff members about the service from other health maintenance organizations, Blue Cross has returned as an option.

• About 1,000 people attended the Research and Technology Development poster session earlier this month. "I saw a number of people from project and line management and from Caltech and I am delighted how that program is working," Elachi said.

• The Human Resources Development Fund, which allows JPL to hire exceptional new graduates for up to six months until they are assigned a position, helped the Lab hire 162 "fresh-outs" out of 300 total hires in the past year. "It's important for JPL to regularly have fresh blood coming in," Elachi said. He stressed the importance of tutoring, mentoring and on-the-job experience.

• The director received many positive comments about the new outdoor furniture placed throughout the Lab, which consists of teak wood chairs and tables, some with umbrellas.

• To date, 63 of the 87 action items JPL committed to achieve over the three years since Elachi became director have been accomplished.

• The reorganization of the technical divisions has been a success. So far, all division managers and deputy division managers have been hired, as have all section managers, except one. "This was done with the next decade or two in mind," Elachi noted, "so that we are best organized to face the future."

Elachi particularly thanked Nerissa Parmelee and her team in Human Resources, who accomplished 5,000 system transactions over a period of a few weeks, without error, to help achieve a smooth reorganization.

Among other institutional issues still underway:

• The Lab has advanced its software maturity by developing efficient procedures and processes through the Capability Maturity Model Integrated (CMMI). Elachi acknowledged those who took the lead in helping the Lab reach CMMI Level 5, which JPL has committed to achieve over the next three or four years. Elachi hailed the efforts of the Navigation Software Group (Bill Taber, Mike Watkins and Alan Ferdman); the Dawn Project and the former Section 345 (Jim Wang, Ron Morillo and Dave Eisenman); and the former Sections 369 and 386, under Annette Larson and Susan LaVoie.

• The Lab is working on getting a Global Technical Assistance Agreement to comply with International Traffic in Arms Regulations (ITAR) of the U.S. Department of State. "I am still hopeful we can progress in our interactions with foreign nationals," Elachi said.

• As of now, the 2005 and 2006 budgets include funding for developing two new buildings. A flight development building with about 600 offices would be built across the street from Human Resources. The building could be occupied by late 2007 or early 2008. Also, Building 180 is "marginal" on meeting California earthquake standards. NASA has agreed to construct a new building, with a new education center as part of the project. "We have $5 million in this fiscal year to do the detailed design," Elachi said, "and we hope in the FY '06 budget to get funding to replace Building 180."

• A "respectable amount of funding" is set aside to improve JPL's technical infrastructure. Division 37 will make an assessment of the Lab's infrastructure needs for the next five years.

• Tuition funding has been increased for undergraduates in state universities as well as for those attending private colleges part-time.

• Establishment of a Fellow grade. Technical fellows will be the equivalent of division managers, with all equivalent benefits, without being a division manager. "This will be a position exclusively for people doing technical work—either research or engineering—and be of value to the whole Lab. They will not be assigned to one group or one function. It's going to be a very selective process."

Elachi noted that in the past, the Cold War was the major driver of the NASA program. The Apollo program was driven heavily by beating the Soviet Union, to prove the American system was better than their system.

Now, space exploration has "moved from a race to a journey of exploration." The fundamental message, Elachi emphasized, is "our nation is committed to a long-term program of exploration."

To help achieve the new vision, NASA's recent reorganization created four new directorates:

• Exploration Systems—developing the capabilities to do exploration
• Space Operations—operating the assets NASA has or will have
• Science—most of the robotic exploration and fundamental research
• Aeronautics Research

Among NASA's changes is the development of the Office of Advance Planning, which Elachi is leading on an additional-duty basis. The office will develop the inputs for NASA's strategic planning council, and a series of roadmaps will be developed.

Once a strategic plan is developed and put into place, the Office of System Integration will make sure it is implemented and coordinated correctly. Part of this office's goal is to discover which key core competencies are essential for NASA to have in-house at the different centers, and what is the best way to fund this.

From JPL's perspective, Elachi said, "We are going to have the right mix of in-house and out-of-house activities. Many of our other activities have a significant in-house role. There is strong support from Al Diaz, as well as from NASA Administrator Sean O'Keefe, that we should always have missions that are implemented in-house—this will make us a better organization." Elachi cited JPL's Mars Science Lab and Space Interferometry Mission scientific instruments, which will be accomplished in-house.

Agency-wide, Elachi said, "A bit of competition is fine, but I have seen a lot of positive signs of the centers working together. We are all working as one NASA. It is very important that the message of where NASA is going is transmitted to the public."

Elachi pointed out that former NBC senior correspondent Fred Francis has joined NASA as Associate Administrator for Strategic Communications. Francis, who visited JPL this week, will assist the agency in developing communication tools and strategies to help achieve this goal.

In summary, the director told JPL staff the importance of the Lab having a vision of where it is heading. "What legacy do we want to leave? In 20 years, how do we want our successors to remember us?"

Elachi provided a set of goals for achievement by the year 2020:

• In-depth exploration of Mars. Permanent outposts, both on the surface and in orbit. A full understanding of the planet—how it evolved, did it ever have life, does it have life on it now. Make it routine to go across Mars and between Earth and Mars and lay the groundwork for human exploration. Plans are in place through the Mars Science Laboratory in 2009. "By a year from now, we should have a plan of how this

Continued on page 4

News Briefs

Scientific American honors Lab

JPL has been named by Scientific American magazine as a research leader within the 2004 Scientific American 50, the magazine's prestigious annual list recognizing outstanding acts of leadership in science and technology.

JPL has been named Research Leader in the Aerospace category "for demonstrating the power of robots to explore the planets."

"We're honored that our robotic exploration is being recognized in this way," said JPL Director DR. CHARLES ELACHI. "It's a testament to the hard work of everyone here at JPL that has resulted in a string of mission successes this year."

Winners were selected by the magazine and outside advisors. The complete list appears on the magazine's website at *www.sciam.com*. Winners were honored Nov. 16 at the New York Academy of Sciences in New York City.

JPL's Iraq soldiers receive support

In August, the 4th Low Altitude Air Defense Battalion, 4th Marine Aircraft Wing, located at Paloma Street and Sierra Madre Boulevard in East Pasadena, was activated. About 300 local Marine reservists were deployed to Iraq for an expected tour of duty of seven months. Among those deployed were five JPLers.

On Nov. 6, friends and coworkers of the deployed JPLers volunteered to support the Marines through the American Legion East Pasadena Post 280, which sponsored the "Family Day" at the U.S. Marine Corps Reserve Center (Victory Park).

The Reserve Center received requests from the troops for reading materials and everyday snacks that are not available in Iraq. Generous donations were received from the community and care packages were prepared with items such as canned and dried foods, clothing, toiletries, magazines, books, cards, stationery, and thank you letters from the volunteers and local schoolchildren. Care packages were prepared for each Marine and a barbecue was held for the family members who remained home.

Of the five JPLers deployed in Iraq, SGT. OLGA CERITELLI and SGT. DAVID HERNANDEZ are from the 4th LAAD Battalion, 4th Marine Aircraft Wing, and are both in JPL Group 5127, Procurement Quality Assurance. Their manager, BUCK CRENSHAW, a U.S. Air Force retiree who served for 20 years, is an active member of the American Legion East Pasadena Post 280.

In addition to Ceritelli and Hernandez, JPL staff currently deployed in Iraq are JOE AGUIRRE (Section 2851), ALEJANDRO LEVI (3110) and ERIK THIESMEYER (3560).

Photo courtesy of Kien Nguyen

Among the volunteers at a Marines family event were, from left, Randy Thompson, Kien Nguyen, Roxann Santos and Buck Crenshaw, all from Group 5127.

Education Office plays host

JPL's Education Office hosted 125 NASA Space Grant directors on Oct. 20, a major event of the national conference held during the week in Pasadena. The group was given tours of JPL and presentations by LINDA SPILKER on Cassini, JOHN CALLAS on the Mars Exploration Rovers, STEPHEN KULCZYCKI on JPL's outreach activities and KAY FERRARI on the Ambassadors and Educators programs of the Solar System Exploration Education and Public Outreach Forum.

On Oct. 22, the group attended a banquet at Caltech's Athenaeum, where actor EDWARD JAMES OLMOS was the guest speaker. Olmos portrayed teacher JAIME ESCALANTE in the movie "Stand and Deliver." Also in attendance were THOMAS VALDEZ and SERGIO VALDEZ, JPL engineers and former students of Escalante. The pair acknowledged how Escalante and JPL had made a difference in their lives.

In 1988, Congress passed the National Space Grant Act to establish a college and fellowship program. NASA manages the higher-education program, designed to provide activities that increase the understanding, assessment, development and utilization of aerospace resources and to expand the educational, scientific and research base of all aerospace-related fields. Space grant consortia represent every state, Puerto Rico and the District of Columbia, which administer programs in research, education and workforce development and public outreach.

New awards program underway

JPL is participating in a new NASA-wide pilot program that rewards employees who effectively foster agency-wide collaboration.

Nominations are now being accepted for the One NASA Peer Awards. Employees may nominate staff members here on Lab or at other NASA centers who have demonstrated behaviors consistent with the spirit of the "One NASA" initiative.

Under the program, employees at JPL, other NASA centers and Headquarters are eligible to nominate and receive awards. As the name suggests, candidates must be nominated by their peers, rather than by their supervisors. In addition, employees may not nominate their supervisor.

Unlike the NASA Honor Awards—which recognize specific results and accomplishments—the Peer Awards seek to reward behaviors that promote One NASA themes. Examples include decision-making for the common good, collaborating to leverage existing capabilities and standardization that demonstrates efficiencies.

Award nominations will be judged on the following criteria:

• One NASA behavior: The degree to which the effort integrates a One NASA approach to problem solving, program/project management, decision-making, etc.

• Ingenuity: Innovative approaches that are displayed in the conception, design and execution of the project—planning, cost-effectiveness, transferability, shared resources, etc.

• Complexity: The degree to which the effort requires multiple phases; includes participation from additional centers.

During this pilot, nominations for the Individual/Team Award will be accepted November 2004 through February 2005. The nomination will be sent to the nominee's direct supervisor for validation of behavior. After evaluation by the JPL Awards Office in Employee Services and Recognition, Peer Award recipients will receive a One NASA certificate and memento, presented to them by their supervisor.

These recipients will be evaluated by the JPL Awards Office and One NASA point of contact for the "Center Best Award." The one JPL employee who is recognized for this award will receive a framed certificate signed by JPL Director Dr. Charles Elachi. The JPL Center Best Award will be presented concurrent with the NASA Honor Awards.

The 11 Center Best Award winners will then vie for an annual agency "Best of the Best Award," which will be decided by the Headquarters One NASA Team. The honoree will be awarded with a framed One NASA poster featuring signatures by all 10 NASA center directors and Administrator Sean O'Keefe.

The pilot program is underway through February, said Suzanne Bradfield Spencer, supervisor of the Employee Services and Recognition Group and JPL's award officer for the Peer Awards.

"This is a great opportunity to identify and nominate your peers who collaborate across Centers," she said. "Have you experienced any One NASA behaviors lately?"

To learn more about this new award program to nominate your peer from JPL or any other NASA center, log on to *http://eis.jpl.nasa.gov/hr/esr/OneNASA/Index.html.*

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, November 19

Just-In-Time Vendor Fair—The Acquisition Division's Rapid Procurement Group (265) hosts from 10 a.m. to 2 p.m. in von Kármán Auditorium. Featured suppliers and organizations include VWR Scientific (supplier of chemicals, critical environment and laboratory supplies), Dynamic Systems (Unix-Sun), Final Assembly (seating supplier), Catalogue Stationer (office supplies and paper supplier), Wareforce (software supplier), Airgas (cryogenics and gases supplier), JPL Central Supply and P-Card.

Von Kármán Lecture Series—Dr. Wolfgang Fink, JPL senior research scientist and assistant professor of ophthalmology at USC, will present "To See or Not to See ... Tools for Early Detection, Diagnosis and Prevention of Eye Disorders in Space and on Earth" at 7 p.m. in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. For more information, call Public Services at ext. 4-0112.

Fri., Nov. 19–Sun., Nov. 21

"The Misanthrope"—Presented by Theater Arts at Caltech and held at Dabney Lounge at 8 p.m. Friday and Saturday; 2 p.m. Sunday. Cast includes David Seal, head of the mission planning office for Cassini, and Craig Peterson, acting chief technologist for JPL's Systems and Software Division. Tickets are $10 for JPL staff. Call the Caltech ticket office at (888) 2-CALTECH or e-mail *events@caltech.edu.*

Saturday, November 20

Juggling and More—International juggling champion Mark Nizer will present a juggling and laser show at 2 p.m. in Caltech's Beckman Auditorium. His new invention, Laser Diablo, juggles four lasers that spin at 1,000 rpm about the audience's heads. Tickets are $12 for adults, $7 for children. For more information, call (626) 395-4652 or visit *www.events.caltech.edu.*

Wednesday, November 24

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

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

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

Monday, November 29

Claremont Graduate University Open House—To be held from 11:30 a.m. to 1 p.m. in the 180-101 conference room. This is great opportunity for the JPL community to acquire an overview of the different options available through the university, which is devoted to graduate-only programs. Certificates are available in General Management, Leadership and Strategy. There are also Executive Master of Business Administration and Master of Science in Advanced Management programs, intended to enhance participants' existing foundations in leadership and management. For more information, call Professional Development at ext. 4-3750 or visit *http://hr/et.*

Wednesday, December 1

Mars Odyssey Celebration—Hear the latest science results and stories told by team members past and present at 3 p.m. in von Kármán Auditorium.

Thursday, December 2

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

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

Friday, December 3

Caltech German Language Film Series—"Paul and Paula" will be presented at 7:30 p.m. in Caltech's Baxter Lecture Hall. The 1973 East German film will be shown with English subtitles. Free admission and reception after the movie. For more information, e-mail *aebi@hss.caltech.edu.*

Tuesday, December 7

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

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

Wednesday, December 8

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at La Cañada United Methodist Church, 104 Berkshire Place, La Cañada.

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

Thursday, December 9

JPL Stories—Johnny Kwok, planning manager for the Engineering and Science Directorate, will present "The Revolution and Evolution of the Spitzer Space Telescope Mission and Systems Architecture" at 4 p.m. in the Library, Building 111-104. If you have questions about the JPL Story series or wish to participate, call Teresa Bailey, ext. 4-9233.

Thu.–Fri., December 9–10

Von Kármán Lecture Series—Dr. Rachel Akeson, JPL research scientist at the Caltech Michelson Science Center, will present "Peering Into the Universe: Discoveries with the Keck Interferometer" 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/dec04.cfm.* For more information, call Public Services at ext. 4-0112.

Saturday, December 11

Caltech Ballroom Dance Club—End-of-term blowout holiday party will be held in Winnett Lounge starting at 8:30 p.m. Free admission. The club will collect donations of new, unwrapped toys for the "Toys for Tots" Foundation.

Tuesday, December 14

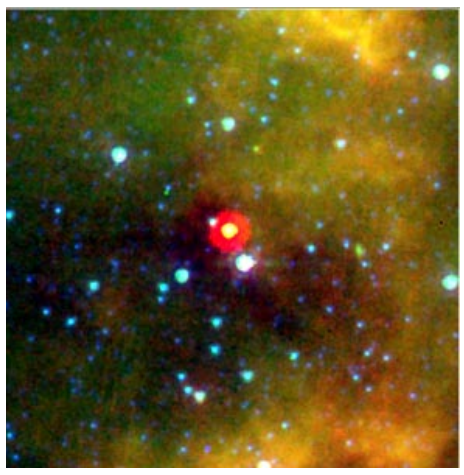
JPL Stamp Club—Meeting at noon in Building 183-328.

Wednesday, December 15

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

Spitzer
sees ice and warm glows in dark and dusty places

By Whitney Clavin



At left is "starless" core L1014, the 1,014th object in a list of dark, dusty "clouds" compiled by astronomer Beverly Lynds more than 40 years ago. To see color Spitzer image (right) showing a source of infrared light appearing where none was expected, log on to http://www.spitzer.caltech.edu/Media/releases/ssc2004-20/ssc2004-20a.shtml.

Two new results from the JPL-managed Spitzer Space Telescope are helping astronomers better understand how stars form out of thick clouds of gas and dust, and how the molecules in those clouds ultimately become planets.

Two discoveries—the detection of an oddly dim object inside what was thought to be an empty cloud, and the discovery of icy planetary building blocks in a system believed to resemble our own solar system in its infancy—were presented Nov. 9 at the first Spitzer science conference, held in Pasadena. Since Spitzer science observations began less than one year ago, the infrared capabilities of the space observatory have unveiled hundreds of space objects too dim, cool or distant to be seen with other telescopes.

In one discovery, astronomers have detected a faint, star-like object in the least expected of places—a "starless core." Named for their apparent lack of stars, starless cores are dense knots of gas and dust that should eventually form individual newborn stars.

Using Spitzer's infrared eyes, a team of astronomers led by Dr. Neal Evans of the University of Texas probed dozens of these dusty cores to gain insight into conditions that are needed for stars to form.

Starless cores are fascinating to study because they tell us what conditions exist in the instants before a star forms. Understanding this environment is key to improving our theories of star formation, Evans said.

But when they looked into one core, called L1014, they found a surprise—a warm glow coming from a star-like object. The object defies all models of star formation; it is fainter than would be expected for a young star. Astronomers theorize that the mystery object is one of three possibilities: the youngest "failed star," or brown dwarf, ever detected; a newborn star caught in a very early stage of development; or something else entirely.

This object might represent a different way of forming stars or brown dwarfs. Objects like this are so dim that previous studies would have missed them. It might be like a stealth version of star formation, Evans said. The new object is located 600 light-years away in the constellation Cygnus.

In another discovery, Spitzer's infrared eyes have peered into the place where planets are born—the center of a dusty disc surrounding an infant star—and spied the icy ingredients of planets and comets. This is the first definitive detection of ices in planet-forming discs.

This disc resembles closely how we imagine our own solar system looked when it was only a few hundred thousand years old. It has the right size, and the central star is small and probably stable enough to support a water-rich planetary system for billions of years into the future, said Dr. Klaus Pontoppidan of Leiden Observatory in the Netherlands, who led the team that made this discovery.

Previously, astronomers had seen ices, or ice-coated dust particles, in the large cocoons of gas and dust that envelop young stars. But they were not able to distinguish these ices from those in the inner planet-forming portion of a star's disc. Using Spitzer's ultra-sensitive infrared vision and a clever trick, Pontoppidan and his colleagues were able to overcome this challenge.

Their trick was to view a young star and its dusty disc at "dawn." Discs can be viewed from a variety of angles, ranging from the side or edge-on, where the discs appear as dark bars, to face-on, where the discs become washed out by the light of the central star. They found that if they observed a disc at a 20-degree angle, at a position where the star peeks out like our Sun at dawn, they could see the ices.

"We hit the sweet spot," Pontoppidan said. "Our models predicted that the search for ices in discs is a problem of finding an object with just the right viewing angle, and Spitzer confirmed that model."

In this system, astronomers found ammonium ions as well as components of water and carbon dioxide ice.

Opportunity
to reverse course for exiting martian crater

By Guy Webster

Operators of the Mars Exploration Rover Opportunity have determined that a proposed route eastward out of "Endurance Crater" is not passable, so the rover will backtrack to leave the crater by a southward route, perhaps by retracing its entry path.

"We've done a careful analysis of the ground in front of Opportunity and decided to turn around," said MER Project Manager Jim Erickson. "To the right, the slope is too steep—more than 30 degrees. To the left, there are sandy areas we can't be sure we could get across."

Before turning around, Opportunity will spend a few days examining the rock layers in scarp about 10 meters (33 feet) high, dubbed "Burns Cliff." From its location at the western foot of the cliff, the rover will use its panoramic camera and miniature thermal emission spectrometer to collect information from which scientists hope to determine whether some of the layers were deposited by wind, rather than by water. The rover will not reach an area about 15 meters (50 feet) farther east where two layers at different angles meet at the base of the cliff.

"We have pushed the vehicle right to the edge of its capabilities, and we've finally reached a spot where we may be able to answer questions we've been asking about this site for months," said rover principal investigator Dr. Steve Squyres. "But after we're done here, it'll be time to turn around. Going any farther could cut off our line of retreat from the crater, and that's not something anybody on the team wants to do."

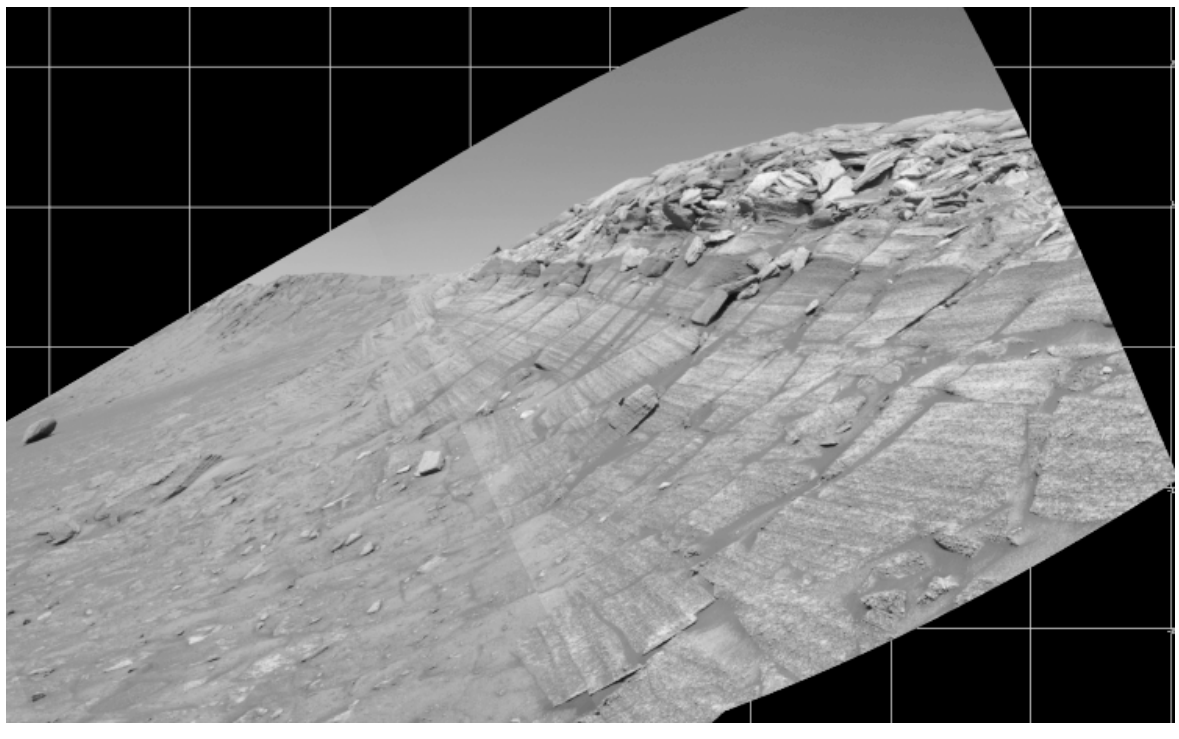
Opportunity entered the stadium-size crater on June 8 at a site called "Karatepe" along the crater's southern rim. Inside the crater, it has found and examined multiple layers of rocks that show evidence of a wet environment in the area's distant past.

Opportunity and its twin, Spirit, successfully completed their primary three-month missions in April. NASA has extended their missions twice, most recently on Oct. 1, because the rovers have remained in good condition to continue exploring Mars longer than anticipated.

Engineers have finished troubleshooting an indication of a problem with steering brakes on Spirit. The brakes are designed to keep the rover wheels from being bumped off course while driving. Spirit has intermittently sent information in recent weeks that the brakes on two wheels were not releasing properly when the rover received commands to set a new course. Testing and analysis indicate that the mechanism for detecting whether the brakes are released is probably sending a false indication.

The rover team will disregard that signal and presume the brakes have actually released properly when commanded to do so. This anomaly has not been observed on the Opportunity rover.

"We're going back to using the full steering capabilities of Spirit," Erickson said.



This cliff in the inner wall of "Endurance Crater" displays multiple layers of bedrock for the rover to examine with its panoramic camera and miniature thermal emission spectrometer. The farthest Opportunity can safely advance along the base of the cliff is close to the squarish white rock near the center of this image.

State of the Lab

Continued from page 1

nation will plan these permanent outposts and exploration on Mars. JPL will be the lead organization to make this happen."

• Explore our and neighboring solar systems. "We can have a 'family portrait' of the neighboring 2,000 solar systems—to see if there are planets similar to our own, how we compare them to other planets in our solar system. Is Titan really a prebiotic planet? How did our solar system evolve? Do comets have organic materials on them? Does Europa have an ocean under it?"

• Study the origin of the universe. "We can't account for the origin of about 90% of the universe. Missions such as the Spitzer Space Telescope, the Space Interferometry Mission and LISA will help shed light on that."

• Study and predict natural hazards. Develop the scientific capability to understand and predict earthquakes and phenomena such as El Niño and hurricanes; to better predict weather and climate patterns; to study the chemistry of the ozone hole and take corrective actions.

• Develop an interplanetary Internet. Both radio and optical communications, similar to fiber optics available for home use, will be tested on the 2009 Mars Telecommunications Orbiter, where high-definition TV of the Mars rover will be available in near-real time. "About 10 years from now, we want to do this in an Internet environment."

"All of this is scientifically and technically possible. It just requires the brains and the talent of the people here," Elachi said.

"We should consider ourselves privileged that the nation entrusts us in carrying its quest of exploration and you all should be proud that we have delivered well beyond everyone's expectations over the past year," Elachi said in conclusion. "But of course for us here at JPL, it was another year on the job."

Elachi's talk is archived on the Daily Planet at *http://dailyplanet.jpl.nasa.gov/multimedia.php.*

Next Universe delayed

Due to the Thanksgiving holiday, the next issue of Universe will be delayed to Friday, Dec. 17. The ad deadline will be Monday, Nov. 29. This issue will also be the last of 2004.

Universe will resume its normal schedule on Friday, Jan. 14.

JPL'S ONLINE NEWS SOURCE

http://dailyplanet

View this and previous issues of Universe at

http://universe.jpl.nasa.gov

E-mail us at

universe@jpl.nasa.gov

Universe

Editor
Mark Whalen

Design + Layout
David Hinkle, Audrey Steffan/ Design Services

Chief Photographer
Bob Brown/Photo Lab

Advertising
Laurita Borst

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

Notice to Advertisers

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

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

Passings

LESTER PEEBLES, 89, a retired propulsion engineer, died Nov. 1 in Lowell, Oregon.

Peebles came to JPL after completing work in the famous Lockheed "Skunk Works" in 1947. He held a number of positions in fuel control systems on JPL research and development liquid propulsion rocket motors, including the Army Corporal Missile System. He retired from the Propulsion Section 384 in 1970.

He is survived by a cousin, Eyloe Jean Norman; her daughters, Sally Dennis, Susie Hasuike and Billie Jane Eastman; and cousin Arlene Thomsen.

Letters

I would like to thank the staff from the Space Exploration Technology Program office and Art Murphy for the lovely flowers, cards and their expressions of sympathy toward me for the loss of my mother. Thank you very much for your sympathy and support. I also want to thank everyone who expressed their sympathy to me. Your sympathy and support meant a lot to me. I also want to thank ERC for the lovely plant.

Satish Khanna

I would like to thank JPL for the card and plant sent to my home in sympathy of the recent passing of my father, Cecil McCormick. I would also like to thank my colleagues and friends on the SIM project for the lovely card and plant arrangement as well as their support. I also wish to thank my friends and colleagues on the Spitzer and WISE projects for the card and their support. These expressions of sympathy made a difficult time easier for me and my family. My heartfelt thanks to all of you.

Robin Dumas and family

Classifieds

For Sale

BOOKS: Oracle, 8i, including DBA exam guides. 548-8148.

BOY'S BIKE, Diamondback Octane 20, 6 speeds, 20" wheels, top cond., cost $200, sell $75/obo. 790-6851, Roger.

CELL PHONE, Sprint LG, never been used, incl. desk + car charger, $35. 626/303-5174, Joe.

COMPUTER, Apple iMac G3, great working cond., extra memory, lots of software: Software Install, Software Restore, Photoshop 5.0, Illustrator 8, Office 98, Norton Utilities, Disk Warrior, Adobe Page Mills, Williams-Sonoma Cooking, Photo Soap Images, Encyclopedia, Quicken; hardware: CD-ROM, 160 MB built in, single processor, hard drive, 6 GB, 333 MHz, 15" screen, 8.6OS, green, $290/obo for all. 219-9993, Debbi, earth2dgirl@earthlink.net.

COMPUTER, Apple iPOD, 10MG, $150; optical mouse, Apple, digital, $20. 213/810-8801.

CRIB, white maple, convertible (crib to youth to double bed), from www.forevermine.com, 2 yrs. old, exc. cond., includes mattress, orig. cost, $330, sell $200. 626/355-0474, Dave.

DINING ROOM CHAIRS (4), contemporary, walnut, navy blue upholstery, exc. cond., $150. 626/793-7879.

DRYER, Sears Kenmore, electric, model 90 series, white, only briefly used before moving to a home requiring a gas dryer, still has plastic protector covering control panel, NE Pasadena, $100/obo. 626/407-5201, John Battle.

EXERCISE EQUIPMENT, alpine climber stepping machine, compact size, 46" H x 19" W x 27" L, gd. cond., $50. 626/289-2795.

FAX CARTRIDGE (model PC-102RF) for Brother machines, brand new; $20; DIET TAPES, Jenny Craig, set of 14, $25; COMPUTER POWER CONTROL CENTER, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, $20. 790-3899.

GUITAR, Kramer electric, with 15W reverb amp., gigbag, & elec. tuner, bought 4 yrs. ago & hardly touched, great starter kit for beginner, shipping boxes too, $120 for all. 626/296-3441.

HEADBOARD, solid pecan wood, ornate w/dark finish, fine cond., 1960s?, make offer. 626/798-3235.

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

JEWELRY: Ladies used ESQ Contessa Gold Tone watch, $50; ladies New Coach Metropolitan brown leather strap watch, $50; ladies New Coach classic stainless steel watch, $50; 14K tri-color gold diamond cut bracelet, $150, 14K two-sided 18" diamond cut necklace, $200; oval garnet tennis bracelet in 14K gold $60. 653-9037.

LAWNMOWER, power Craftsman, 6.0 hp, 22" cut, self propelled power gear drive, nearly new, $200. 626/798-2472.

LAWNMOWERS, push type, have 3 of various ages, all work fine, $30/ea. 626/296-3441.

MAH JONGG SET, brand new, all white tiles, hand carried from Hong Kong, $75/obo. 714/280-7368.

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

MISC: pool table, 8', $500; mailbox, oversized, green, $10; mailbox, new, black, $10; red wig, shoulder length, never used, $20; electric frying pan, $10; answering machine, $5; portable basketball set, needs net, $200; fishing pole, saltwater, $25; mattress for bunk bed, gd. cond., $10; baseball glove & conditioner, small, gd. cond., $15. 626/357-8210.

MISC: mountain bikes, Trek: 13.5" frame w/26" tires, 18-speed, cyan/indigo color, and Trek, 6-speed, red, 12.5" frame, both vg cond., $85 each; boy's snowboard jacket, Billabong, red w/white trim, L, fits about 4'10", used once, $40; suit/shirts, Nordstrom, same size; heater, quartz; lawn mower, w/catcher; kid's chemistry set, Smithsonian, slightly used; Erector set; all negotiable. 952-8455.

MISC: storage bldg, metal, 10' x 9', barn style, gable roof, new, unassembled kit by Arrow, incl. foundation kit, $150; refrigerator, counter height, gd. cond., used in cabana, $30; Epson all-in-one ink-jet color printer/ scanner/copier, model CX5200, only 1 yr. old, separate ink cartridges, perfect cond., $60. 626/798-2925.

MISC: Blue & oak high-back swivel desk chair, $69; toddler wood bedframe, looks like a red car, $49; wireless intercom set, $39; golf ball retriever, telescoping alum., 12', $19; floor lamp with silk shade, $19; tray tables set, blonde wood, $19; kid's rolling duffle bag, multicolor, never used $10; turntable w/amp & speakers, $10; bathroom rugs set, blue, never used $7. 626/798-4510.

MOUNTAIN BIKE, specialized FSR Enduro, lg. size, comes with helmet/shoes/pump, bought in 2000 for $1,900, used just a few times, $900. 626/351-8608.

MOVING SALE: shade trees, 6-15' H, in separate pots, $50-$100 each; new 14" LCD Panasonic color TV, extremely light, silver color attached speakers, with remote and tilt function, sacrifice, $495; computer monitor, 19" flat screen, new (still in box), dpi .21, resolution 1600 x 1200, $200. 323/344-7163.

NECKLACE, new ladies Paloma Picasso Daisy pendant, platinum, round brilliant diamonds from Tiffanys, .15 carat total, G color, VS clarity; on a 16" chain, paid $1,395, sell for $900. 653-9037.

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

PERSONAL NAVIGATOR, GPS Garman V, latest model, map source city CD incl., all accessories, in box, exc. cond., $500 new, sell $400. 626/793-7879.

PIANO, Tiger Oak, upright grand, circa 1910-20, exc. cond., great for beginner, $600. 952-8032.

POSTER PRINT, Monet's "The Artist's Garden at Vetheuil," size 27.5" L x 39" H, framed in glass with black (matte finish), metal frame, from Norton Simon Museum, paid $80, sell for $50/obo; CAREER SUIT, woman's, red camel-hair, sz. 10/12, finely tailored, fully lined, fitted skirt, mid-calf, new cond., $50. 626/289-2795.

REFRIGERATOR, Kenmore, black, 8 yrs. old, exc. cond., Covina, you haul, $200, best offer accepted. 626/859-6393, Cheryl.

SCUBA TANK, new, never used, aluminum 80, $75. tcfs@aprelix.com.

TELEVISION, HD-ready, Panasonic, 32", PureFlat 4:3 screen, dual tuner, progressive scan line doubler, (makes standard 480i look like 480p), < 4 yrs. old, vg cond., minor cosmetic blemishes, model # CT-32HX40, great TV but we upgraded to plasma, orig. $1,500, compare to current models for $1,000, we can deliver locally, $500/obo. 626/844-9286, Dave.

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

VIDEO GAME, Nintendo Game Cube, w/games: Lord of the Rings, Ikarugz, City Racer, Mario Party 4 & Super Mario Sunshine, all for $99. 626/289-3373.

VIDEO GAME, Nintendo 64, w/games: Quest 64, Harvest Moon 64, Command and Conquer, Superman, all for $49. 626/289-3373.

VIDEOTAPES, Disney VHS, brand new, sealed, various titles avail. 714/280-7368.

WALL PAPER, approx. 6 (double) rolls, spring flower pattern, $10/ea. 628/798-3658.

Vehicles / Accessories

'01 BMW 325iT Sport Wagon 4D, automatic, Premium pkg., moonroof, alloy wheels, roof rack, Alpine white, 58K mi., $21,300. 249-4053.

'98 CHEVY Astro minivan, 8 pas'ng'r, 32K mi., exc. cond., garaged, $13K/obo. 323/725-2516.

'78 DODGE Tradesman 200 maxivan conversion, sleeps 5 adults, stove, oven, propane refrigerator, low org., 53,401 mi., runs good, $1,600/obo. 626/862-6200.

'00 FORD Explorer Sport, white, 2 dr., 2wd, V6, stick, a/c, power seats/brakes/windows, keyless entry, LoJack, am/fm/cass., 38K mi., pristine cond., see at http://home.comcast. net/~macmaven/explorer.jpg, $9,790. 353-2103 or 653-7312.

'97 FORD Mustang GT, 8 cyl., 2-dr., 100K mi., manual, green, gd. cond., $6,500/obo. 818/653-3083 or 909/305-9922, Cindy.

'99 GMC 4x2 Yukon SLE, loaded, leather, rear air, tow package, etc., vg cond., 88K mi., $10,500. 626/794-4744, home or 626/862-0649, cell, Allen Hubbard.

'96 HONDA Civic tires, rims, hubcaps: 2 Dunlop SP40 P175/70R13, almost new; 2 Effecta P175/70R13 with about half tread wear; 4 official hubcaps, $120 for all, will divide into pairs if desired. 353-2103 or 653-7312.

'95 HONDA Accord LX sedan, gold, auto, 78K mi., runs great, regular maint., $5,300. 310/709-1397.

'95 HONDA Accord LX, 2-dr. coupe, 5 speed, 66K mi., new tires, registration good 'til July 2005, leather int., $9,700/obo. 909/225-7804.

'91 JAGUAR XJ6, Vanden Plas, 44K mi., luxury, garaged, all power accessories, $12,000/obo. 323/725-2516.

'98 MERCEDES BENZ CLK, dream car in great cond., 2-dr., silver w/black interior, 90K mi., Bose stereo, automatic everything, 1 owner, $16,500/obo. 542-6424, Patricia.

'91 PLYMOUTH Grand Voyager minivan, 7 passenger, 84K mi., white/wood, auto trans., power steering/brakes/windows, leather, white, runs well, 1-family ownership, well-maintained, $2,400/obo. 323/254-8415.

'98 SATURN SC1, automatic, exc. cond., new tires, just smogged, must see, $3,400. 626/379-3503, Erik.

'97 SATURN SC2 coupe, 5 speed, green w/tan inter., sun roof, full power, exc. cond., just smogged, $3,200. 626/379-3503, Erik.

SEATS for Aerostar van, blue, gd. cond., make offer. 248-0853.

TIRE/WHEEL (spare), donut, t105 80d-13, used once, $39. 626/798-4510.

'04 TOYOTA Rav L model, 4 dr., automatic, loaded, exc. cond., dark interior, CD, moonroof, 19K miles; pics avail. at Hector.delatrinidad@verizon.net; $17,000. 909/392-7053 or 909/319-8067.

'99 TOYOTA Camry XLE, top of the line, loaded, V6, CD player, moonroof, pwr. leather seats, auto, 50K mi., exc. cond., $11,000. 909/630-5176.

'93 TOYOTA Camry LE, 3.0L V6, runs great, gd. overall cond., 125K mi., clean history, cheap to run, reliable, just serviced & smogged, clear until Oct. 2006, I'm returning to Europe, KBB value $3,470, sell $3,200. 288-6851, Brian.

'92 TOYOTA motor home, Dolphin, model 900, pastel blue, 16 mpg, 82M, V6 auto, cruise, awning, roof & cab a/c, microwave, like new inside, well maint., slps. 5, innerspring mattr. (not foam), rear bath, crank-up TV antenna, easy-clean linoleum floor, battery-saving fluorescent lights, all manuals incl., long-time senior owners must sell, photos at http://tinyurl.com/ysgmw. 626/798-4510.

'02 VOLVO V40 wagon, only 15,900 mi., 4-cyl., 1.9L turbo, exc. cond., silver color, a/c, stereo/cassette/CD, dash cover, garage parked, all service records avail., 15K mi. service completed, new rear brakes, both dealer and extra VIP extended warranties avail., (only $50 transfer fee, orig. cost of VIP warranty pkg. $1,530), $15,990. 626/355-5631, Tim.

'87 VOLVO 740 GLE wagon, auto, a/c, all power, sunroof, third seat, silver w/tan interior, new upholstery/tires/brakes, well maintained, $1,500/obo. 952-1303.

Free

WINDOW BAR UNIT, for up to 50" by 72", hinged and opens like shutters, key lock, heavy. 626/458-5410.

Lost & Found

FOUND: Cape in 180 ladies' restroom, 2nd flr.; to identify, call Penelope Franks, 4-1416.

FOUND: Ladies jacket, navy blue, small, in Building 601 conf. rm. 4-9550, Barbara.

Wanted

EXTERNAL STORAGE DEVICE, USB key, 128MB or better; USB storage zip drive, 100MB (compatible w/Iomega cartridges), either unit is good but would prefer external USB zip drive. 909/857-2107, CJ, betw. 8 a.m. & noon, M-F.

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

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

VOLLEYBALL PLAYERS, coed, no beginners please, Tuesday nights 8-10:00 at Eagle Rock High School, $4/night. 956-1744, Barbara.

For Rent

ALTADENA "sabbatical house," for visiting professionals: 3 bd., study, boundary Angeles Nat'l Forest, 3 mi./JPL (trails to Lab behind house), view, fireplace, oak floors, antiques; completely furn.: dinnerware, utensils, pots/pans, bed linens + towels, fine soaps, necessities incl.: just bring toothbrush & clothes; TV/DVD/ VHS, Dish satellite, wireless DSL, gardens, patio, parking; private, immac. 626/798-3235.

ALTADENA studio guest house, fully furn., bright, clean w/lots of character, garden access, washer/dryer in unit, all utilities pd., $800. 626/798-5796.

EAST PASADENA, 2 bd., 1 ba., quiet, clean bldg., water and trash paid, laundry rm., private fenced yard, no dogs, approx. 3 mi. to JPL, $1,250. 626/390-1207.

LA CRESCENTA, above Foothill, 3 bd.,1 1/2 ba., single-family house, living rm. w/fireplace, formal dining rm., breakfast area, laundry rm., detached 2-car gar., near elementary/middle/ high schools, walking dist. to public library, brand new paint/carpet, gardener paid, no pets, 1-yr. lease + deposit, $1,700. 790-9772.

NORTH SAN GABRIEL house in Temple City school district, 3 bd., 2 ba., family rm., private garden with swimming pool & Jacuzzi, fireplace, hardwood floors, gardener & pool service provided, $2,700. 626/798-5796.

PASADENA, guest quarters of a beautiful house in beautiful setting, ~1,000 sq. ft., re-modeled bathrm, carpet, etc., washer & dryer, ideal for 1 person with a very quiet lifestyle, no pets, $1,100 + util. 626/798-4056.

PASADENA condo near Rose Bowl & Old Town, approx. 3.5 mi. from JPL, 2 bd., 2 full ba., living rm., dining rm., kitchen, balcony, 1,340 sq. ft., gated secure complex, subterranean parking for 2 cars, outstanding arroyo view, pool, wet bar, storage, no pets, exc. cond., $2,000, 1 yr. lease + security deposit. 626/458-5410.

SOUTH PASADENA, Spanish style, lg. (~1,100 sq. ft., 5 separate rooms) duplex, 1 bd., 1 ba., wood floors, formal living & dining rm., garage w/washer & dryer hook ups, walk-in closets, recessed light in kitchen., built-in bookcases, lease, avail. Nov. 8, $1,350 w/garage; no garage, $1,250. 323/344-7163.

SUNLAND apt., lg./nice/clean 1+1, all like new, walk-in closet, hall cabinets, air, parking, laundry, new carpet, dining area, lg. kitchen w/built-in oven/cooktop, counter bar w/bar stools, partly furn., incl. refrigerator (or use yours), 6-unit bldg., quiet, $795. 248-7610.

TUJUNGA, 3 bd., 2 ba., 2,000 sq. ft., 2 story, gorgeous, private, woodsy, hillside home, lg. lot, 2-car attached gar., lots of parking, stove, dishwasher, new heating/cooling, fireplace, beautiful lg. yard & garden, washer/dryer, 10359 Pinyon Ave., will consider pet; $2,100, $2,500 security, avail. Dec. 11, prefer lease, will consider month-to-month. 352-3840, Jim.

Real Estate

SAN FERNANDO VALLEY (Pacoima), 2 bd., 2.5 ba., 2 story, 2-car attached garage, fire-place, 1 patio, 2 balconies, end unit, new flooring, granite counters, garage cabinets/ workbench, new tub enclosures, near Hansen Dam Recreation Ctr., complex has 2 Jacuzzis and a pool, close to 5/210/118 fwys., low HOA, $284,900. 897-1203, Valerie Pickett.

Vacation Rentals

ARROWHEAD cabin, lake view, 6 max., $140/weekends, $350/week, others available, security/cleaning deposit required. 952-6221, Mon.-Thur., 909/337-1036, Fri.-Sun.

BIG BEAR LAKE, cozy cabin blocks from Snow Summit, sleeps 6, very private, plenty of parking, cable TV, DVD, shuffleboard; see Antler Lodge at www.getaway2bigbear.com; $175 day, $200 weekend. 726-1270.

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

CABO SAN LUCAS, luxury studio, sleeps 4, 2 pools, 2 restaurants on site, $450 for 1 week, www.cabovillasresort.com, tcfs@aprelix.com.

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

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

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

RESORTS, 5-star, local and worldwide, luxurious residential-style studios with furnished kitchenette, starting at $450 for 7 nights; 1 bd. with full kitchen, living room, $700/wk.; 2 bd., $1,000/wk.; studio specials: Palm Springs, Lake Tahoe, Vail, Park City, Orlando, Puerto Vallarta, $399/week. 626/794-9579 or fivestarresorts@earthlink.net, info or viewing.

SOUTH LAKE TAHOE, 1 bd., delux, 2 ba., sleeps 4, full kitchen, 1 mi. to Heavenly Valley Ski Resort/Tahoe Beach & Ski Club, www.tahoebeachandski.com, Dec. 11-18, 2004, $850/wk. 626/791-2321, eves.