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Voyager approaches final frontier

Artist's concept illustrating where our solar system's final frontier, the heliosheath, fits in relation to our galaxy.

THE JPL-MANAGED VOYAGER 1 SPACECRAFT IS ABOUT TO MAKE HISTORY AGAIN AS THE FIRST SPACECRAFT TO ENTER THE SOLAR SYSTEM'S FINAL FRONTIER, A VAST EXPANSE WHERE WIND FROM THE SUN BLOWS HOT AGAINST THIN GAS BETWEEN THE STARS: INTERSTELLAR SPACE.

However, before it reaches this region, Voyager 1 must pass through the termination shock, a violent zone that is the source of beams of high-energy particles.

Voyager's journey through this turbulent zone will give scientists their first direct measurements of our solar system's unexplored final frontier, called the heliosheath, and scientists are debating if this passage has already begun. Two papers about this research are being published in the journal *Nature* on Nov. 5. The first paper, by Dr. Stamatios Krimigis of the Johns Hopkins University Applied Physics Laboratory, Laurel, Md., and his team, gives evidence supporting the claim that Voyager 1 passed beyond the termination shock. The second paper, by Dr. Frank McDonald of the University of Maryland, and his team, gives evidence against this claim. A third paper, published Oct. 30 in *Geophysical Research Letters* by Dr. Leonard Burlaga of NASA's Goddard Space Flight Center and collaborators, gives evidence that Voyager 1 did not pass beyond the termination shock.

"Voyager 1 has seen striking signs of the region deep in space where a giant shock wave forms as the wind from the Sun abruptly slows and presses outward against the interstellar wind," said Voyager Project Scientist Dr. Edward Stone, a Caltech professor and former JPL director. "The observations surprised and puzzled us, so there is much to be discovered as Voyager begins exploring this new region at the outer edge of the solar system."

At more than 8 billion miles (13 billion kilometers) from the Sun, Voyager 1 is the most distant object built by humanity. Launched on Sept. 5, 1977, it explored the giant planets Jupiter and Saturn before being tossed out toward deep space by Saturn's gravity. It now approaches, and may have temporarily entered, the region beyond termination shock.

The termination shock is where the solar wind, a thin stream of electrically charged gas blown constantly from the Sun, is slowed by pressure from gas between the stars. At the termination shock, the solar wind slows abruptly from its average speed of 300 to 700 kilometers per second (700,000 to 1,500,000 mph).

Estimating the location of the termination shock is hard because we don't know the precise conditions in interstellar space, and even what we do know—the speed and pressure of the solar wind—changes which causes the termination shock to expand, contract and ripple. You can see a similar effect every time you wash dishes. If you place a plate underneath a stream of water, you notice the water spreads out over the plate in a relatively smooth flow. The water flow has a rough edge where the water



slows down abruptly and piles up. The edge is like the termination shock, and as the water flow changes, the shape and size of the rough edge change.

From about Aug. 1, 2002 to Jan. 31,

2003, scientists noticed unusual readings from the two energetic particle instruments on Voyager 1, indicating it had entered a region of the solar system unlike any encountered before. This led some to claim that Voyager may have entered a transitory feature of the termination shock. Just as small bumps and "fingers" appear and disappear in the rough edge of the water flow over a plate, Voyager might have entered a temporary "finger" in the edge of the termination shock.

The controversy would be resolved easily if Voyager could still measure the speed of the solar wind, because the solar wind slows abruptly at the termination shock. However, the instrument that measures solar wind speed no longer functions on the venerable spacecraft, so scientists must use data from the instruments that are still working to infer if Voyager pierced the termination shock.

"We have used an indirect technique to show that the solar wind slowed down from about 700,000 mph to much less than 100,000 mph," Krimigis said. "This same technique was used by us before, when the instrument measuring the solar wind speed was still working, and the agreement between the two measurements was better than 20% in most cases."

"The analysis of the Voyager 1 magnetic field observations in late 2002 indicate that it did not enter a new region of the distant heliosphere by having crossed the termination shock," Burlaga said. "Rather, the magnetic field data had the characteristics to be expected based upon many years of previous observations, although the intensity of energetic particles observed is unusually high."

The teams agree that Voyager 1 has seen a new phenomenon: a six-month period when low-energy particles were very abundant and flowing away from the Sun. Also, the observations indicate that the termination shock is a lot more complicated than anyone thought. For images, animation, and the complete press release, refer to <http://www.gsfc.nasa.gov/topstory/2003/1105voyager.html>.



Photos by Rima Bedevian



JPL families have a ball

More than 4,000 JPL employees, contractors, and family members stopped by the Lab for Nov. 1 Family Day activities. Here, young visitors get closeup views of the von Kármán visitors center and enjoy an ice cream bar. Family Day is funded with money from the Caltech Award Fee.

News Briefs



Dr. Margaret Frerking



Jeffrey Boyer



Leonard Charest

Women At Work medal to Frerking

DR. MARGARET (PEG) FRERKING, deputy manager of the Herschel/Planck Project, was recently chosen as the recipient for the 2003 Women at Work Medal of Excellence Award. Women at Work is a non-profit organization based in Pasadena that serves the greater Los Angeles community.

Frerking, a 23-year JPL veteran, has served as project manager for the Rosetta/Miro instrument and the Mars NetLander Discovery project, and as payload manager on the Marvel Mars Scout proposal. She also initiated and led the Submillimeter Sensors Program at JPL.

The Lab's Director's Advisory Council for Women coordinates the nomination and final selection of the winner from JPL. Frerking's nomination cited her technical accomplishments as well as her leadership and teamwork skills and community outreach efforts.

Women at Work provides a resource for women to learn about new or alternate career opportunities, and to help them advance their careers. Each year Women at Work holds an award banquet where a woman from each contributing company is honored with a Medal of Excellence.

New software architects chosen

The Center for Space Mission Information and Software Systems has announced the participants selected for the 2004 Software Architect Program. They are JEFFREY BOYER (Section 314) and LEONARD CHAREST (368). KENNETH C. CLARK (345) is this year's alternate.

The program is a half-time, one-year paid internship intended to help train JPL's next generation of software architects, system engineers and managers. Participants will receive instruction in concepts, principles and state-of-the-art methods in software architectures. On-the-job training and mentoring will take place in a variety of organizations to expose participants to software architectures and mission domains at JPL, and to foster communication and cooperation among them.

Boyer is the deputy mission sequence software engineer on the Uplink Operations Team for the Cassini/Huygens Program. He is also cognizant development engineer for both the Pointing Design Tool and the Science Opportunity Analyzer for the Cassini spacecraft. Boyer has a bachelor's degree in aerospace engineering from the University of Cincinnati and has been with JPL since 1978.

Charest is the integration lead for the Mixed-Initiative Activity Plan Generation Tool for the Mars Exploration Rover mission. He has a bachelor's degree in Computer Science from Rensselaer Polytechnic Institute. Charest began at JPL in 1989.

Clark, with JPL since 1990, is currently assigned to the Mission Data System technology development and Mars Science Laboratory teams. He has a bachelor's degree in computer science from Cal State Northridge.

Fundamental physics grants awarded

Four JPL scientists, along with 11 other researchers, have been awarded NASA grants totaling more than \$6.4 million over four years to conduct space fundamental physics research.

Sponsored by NASA's Office of Biological and Physical Research, the research program offers investigators the advantage of a low-gravity and space environment to enhance understanding of physical and chemical processes associated with fundamental physics.

The JPL grant recipients are:

- DR. MARTY BARMATZ: Finite Size Scaling of the Isothermal Susceptibility Near the 3He Critical Point;
- DR. JIM WILLIAMS: Improving Lunar Laser Ranging Tests of Gravitational Theory;
- DR. SLAVA TURYSHEV: Laser Astrometric Test of Relativity Mission Studies;
- DR. FANG ZHONG:

AC Heat Capacity Measurement Using Gravity Cancellation Approach.

Researchers will be able to use NASA's micro-gravity research facilities such as drop-tubes, drop-towers, aircraft and sounding rockets. All 15 grants are for ground-based research. Four are to continue work currently being funded by NASA, while the remaining 11 represent new research efforts.

NASA received 29 proposals in response to this research announcement. A complete list of awardees (by state), their institutions and research titles is available online at http://www.nasa.gov/home/hqnews/2003/oct/funphys_award_list.html.

3 win interdisciplinary science grants

Three JPL researchers are among those from 23 states who have been awarded approximately \$47.4 million in grants from NASA to conduct interdisciplinary scientific investigations. The research is expected to expand understanding of a variety of aspects of Earth system science.

Sponsored by NASA's Earth Science Enterprise Earth Observing System Interdisciplinary Science Program, the research will use a vast wealth of new data from Earth Observing Satellites.

The JPL grant recipients are:

- DR. ERIK IVINS: Global Polar Processes and Mass Change in the Solid Earth, Ice and Oceans;
- DR. ERIC RIGNOT: Contribution of Thinning Glaciers of South America to Sea Level Rise;
- MARC SIMARD: Large Scale Assessment of Landscape Changes and Recovery in Forest Structure of Mangrove Wetlands Subject to Human, Freshwater Diversion and Natural Disturbances using Enhanced SRTM Data.

Broad thematic topics of the research projects include global ecosystems, climate trends and variation, consequences of climate and sea level changes. The researchers will examine effects of increased human activities on coastal regions as well. NASA also aims to expand knowledge of the carbon cycle on Earth through the use of new classes of models.

NASA received 348 proposals in response to the research announcement. A list of the awardees and research titles is available online at http://research.hq.nasa.gov/code_y/nra/current/NRA-03-OES-03/winners.html.

New way to measure light revealed

A new and improved way to measure light has been unveiled by physicists at JPL and Caltech. The technology exploits the strange but predictable characteristics of superconductivity, and has a number of properties that should lead to uses in a variety of fields, from medicine to astrophysics.

Reporting in the Oct. 23 issue of Nature, JPL researchers DR. PETER DAY AND HENRY LEDUC, along with DR. JONAS ZMUIDZINAS, a Caltech physics professor, outline the specifications of their superconducting detector. The device is cleverly designed to sidestep certain limitations imposed by nature to allow for very subtle and precise measurements of electromagnetic radiation, which includes visible light, radio signals, X-rays and gamma rays, as well as infrared and ultraviolet frequencies.

JPL Store offers holiday drawings

Each week in December prior to the Christmas holiday, the JPL Store is offering a series of prize drawings for those who purchase items valued at \$25 or more, excluding film, photo processing, Entertainment books, tickets and gift certificates.

For entries received between Dec. 1 and 5, three winners will be chosen. Prizes for that week are a Catalina Island weekend, a \$50 certificate for Best Buy and a \$25 certificate for the JPL Store. Look for more information in the Nov. 21 issue of Universe.

In addition, all entries received between Dec. 1 and 19 will be entered into a drawing for a computer and accessories.

A newly renovated proposal area in Building 301-382 was dedicated with a ribbon-cutting ceremony on Sept. 19. The new Proposal Center, which took 2 1/2 months to renovate, will be an area for concurrent engineering in support of proposal preparation, said Rod Ziegler, the JPL Acquire Work Process owner. The facility will be an augmentation of the Building 67 proposal area. Proposal teams will use these new

rooms for preparing competitive proposals, such as the four Mars Scout proposals, one of which JPL was selected to manage (Phoenix, with Barry Goldstein as the project manager), and the New Frontiers proposals, which are being written in response to a NASA Announcement of Opportunity. The facility will support all JPL large proposal activities, including the Earth Space Science Pathfinder, Mid-size Explorer, Discovery, Small Explorer and other new NASA programs.

The ceremony acknowledged several JPLers who made key contributions to the facility. Associate Director for Flight Projects and Mission Success Tom Gavin was thanked for obtaining the space for the facility; Chief Information Officer Tom Renfro received kudos for providing the furniture, equipment and installation; and Gregg Vane, manager of the Office of Competed Mission and Science Instruments, was honored for project oversight and assuring that it was completed on time and within budget.

This new facility is part of the JPL Proposal Center managed by Dr. Ronald Salazar for the Proposal Support Office

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

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

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Fri., Nov. 7–Sun., Nov. 9

"Sweeney Todd"—The C.G. Bond melodrama will be performed by Theater Arts at Caltech in Ramo Auditorium at 8 p.m. Friday and Saturday and at 2 p.m. Sunday. Tickets are \$10 for JPL staff, \$5 for students. For more information, call 626-395-4652.

Tuesday, November 11

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

Tues.–Wed., Nov. 11–12

Blood Drive—Held in von Kármán Auditorium Tuesday from 10 a.m. to 4 p.m. and Wednesday from 7 a.m. to 1 p.m. Sign up at the Occupational Health Services home page at http://eis/medical/blood_form.html or at the Red Cross site (<http://www.givelife.org>) that provides an automated e-mail reminder for your appointment. Click on "login," then "make appointment," then enter your e-mail address, birthdate and the sponsor code "JPL." Advance signups are available at Occupational Health Services, Building 310-202, prior to the blood drive. For last-minute signups, or to change your appointment, call the Red Cross at 626-960-6956, ext. 225.

Investment Advice—TIAA/CREF representatives will be available for one-on-one counseling. For an appointment, visit <http://www.tiaa-cref.org> or call 877-209-3140, ext. 2614.

Wednesday, November 12

"Both Sides Now: The Dual Roles of Managers and Employees in Workplace Satisfaction"—Sharon Jordan-Evans and Beverly Kaye will speak at 3 p.m. in Caltech's Beckman Auditorium, and will give managers and employees tips for improving satisfaction, morale and productivity. Managers will hear about ways to engage their colleagues by employing research-supported strategies, while employees will learn how to get more of what they want from work, and to partner with their managers to identify areas of improvement. Sponsored by the Caltech Management Association, Caltech Business and Finance, and JPL Human Resources. Free admission for JPL personnel and retirees.

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

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

Thursday, November 13

JPL Hiking+ Club—Nonmembers, including skiers, are invited to stop by the Building 301 patio at noon to discuss membership information.

JPL Stories—Dr. Peter Poon, telecommunications and mission stems

work Directorate, will present "Close Encounters With Renowned Scientists Including Dr. Richard Feynman and Dr. Stephen Hawking, and a Panoramic View of JPL Projects" 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 at ext. 4-9233.

Friday, November 14

Caltech Concert Band—A free performance will be held at 8 p.m. in Beckman Auditorium. For more information, call 626-395-4652.

Fri., Nov. 14–Sun., Nov. 16

"Sweeney Todd"—See Nov. 7–9 listing.

Saturday, November 15

Caltech Folk Music Society—Grammy nominees Cathy Fink and Marcy Marxer will perform folk/bluegrass beginning at 8 p.m. in Beckman Institute Auditorium. Tickets are \$15 for adults and \$5 for children under 12. For more information, call 626-395-4652 or check the Folk Music Society web site at <http://www.folkmusic.caltech.edu>.

Shangri-La Chinese Acrobats—An evening of acrobatic displays, Kung Fu, colorful costumes and a touch of Chinese comedy will be presented at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$22, \$18 and \$14; high school age and under, \$10. For more information, call 626-395-4652.

Tuesday, November 18

JPL Hiking+ Club—Joe Springer of Section 3685 will present "Backpacking for the Non-Backpacker," a slide show about Yosemite's High Sierra Loop, at noon in Building 238-543.

Investment Advice—Fidelity representatives will be available for one-on-one counseling. For an appointment, call 800-642-7131.

Wednesday, November 19

"Experimenting With Social Norms"—Jean Ensminger, professor of anthropology and chair of Caltech's division of the humanities and social sciences, will deliver this free lecture at 8 p.m. in Beckman Auditorium. For more information, call 626-395-4652.

Thursday, November 20

"Developing An Investment Strategy"—This TIAA/CREF workshop is for employees looking for a more detailed overview of asset allocation principles. Participants will learn some of the key aspects that go into formulating an investment strategy. They will review investment basics, asset allocation, volatility of investments, benefits of managed portfolios, balancing portfolios, and selecting an investment company. To be held in Building 180-101 from 10 a.m. to noon.

Retirement Enrollment—This workshop, held from noon to 1 p.m. in Building 180-101, will assist employees newly eligible for the TIAA/CREF Caltech/JPL retirement plan with selection of investment options and the completion of enrollment forms.

Thu.–Fri., November 20–21

Von Kármán Lecture Series—"The Deep Space Network Challenge for 2003-2004: Tracking Dozens of Mission-Critical Spacecraft Events" will be held 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/nov03.html>. Call Public Services at ext. 4-0112.

Friday, November 21

The Umbilical Brothers—The pair will perform *Thwak*, a combination of comic imagination, physical skill and vocal ingenuity, at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21 and \$17; high school age and younger, \$10. Call 626-395-4652.

Proposal area opens

By Rima Bedevian

Kim Shepard, left, and Karen Pigeo snip a ribbon to dedicate the new facility.



MAKING A DIFFERENCE

Advisory Council for Women has been a valued resource on Lab for more than 25 years. For an update on the organization's activities, Universe spoke to ACW co-chairs Elynn McCoy, a mechanical engineer in Section 352, and Katrina Melendez, an administrator in Section 342.

What does ACW do? What is its purpose?

McCoy Our primary purpose is to serve as a resource to the Director and Deputy Director in matters that concern and impact female employees. What ACW does specifically changes from year to year depending on the needs that have been voiced as well as the interests of our members. In general, we have discussions with the Executive Council to let them know the concerns of the women at the Laboratory, we have ongoing activities to provide information to employees, we assist with recruiting, and we advocate for particular JPL rule changes or process improvements.

Melendez We also serve as a resource to all JPL employees and the Laboratory in general. Our activities include sponsoring noontime talks, hosting a yearly luncheon, facilitating panel discussions, and publishing newsletters. We also participate in the Society of Women Engineers' national conference, the Women at Work Medal of Excellence Award Luncheon, and many other events. Some of the issues we've recently advocated for include researching the feasibility of creating a child-care center on-Lab for those who are mildly ill, an on-site after school program, recommending an increase in undergraduate tuition reimbursement, secretarial training, and facilitating the inclusion of technical women on recruiting trips.

How does ACW get input or feedback from Laboratory women?

Melendez Women are encouraged to contact us via e-mail at acw@jpl.nasa.gov or voicemail at 4-8533 if they have any suggestions. We also periodically conduct surveys to monitor the status, perceptions, and attitudes of women employees regarding their employment at JPL.

What's the relationship of your ACW duties with your job assignment?

McCoy Membership is a voluntary commitment and is considered an "additional duty." ACW membership must not impact one's current job assignment.

How many members do you have? How are individuals appointed for membership?

Melendez We are always on the lookout for new members. Currently we have 13 members, but our charter allows for 15. Members roll on and off at different times of the year, so in recent years there has always been a need for new members that often goes unfulfilled for several months. This year, Elynn and I are hoping to develop a list of people willing to serve as ACW members in the future so that we can consistently maintain a group of 15. To be eligible for membership, candidates need to be full-time, JPL employees, who have been at the lab for one year.

McCoy The membership process begins with expressing an interest and submitting a resume to acw@jpl.nasa.gov. Katrina and I interview prospective members over lunch to determine specific areas of interest, a willingness as well as an ability to volunteer time and effort towards current activities and initiatives, and the ability to work well with diverse team members. Individuals are then recommended for membership by a unanimous vote of the current members and concurrence by an individual's reporting organization. Subsequently, the Deputy Director officially appoints membership.

What are some of ACW's past successes?

McCoy Some of ACW's accomplishments in its earlier years include modifications to JPL's maternity leave policy, the establishment of an on-Lab lactation station, the creation and development of the Child Educational Center, the installation of bus stop shelters and an increase in shuttle service to the east lot, the initiation of "Take Our Daughters to Work Day" (now sponsored by Human Resources and renamed "Take Our Children to Work Day") and the Health and Safety Faire (now sponsored by Occupational Health Services).

Melendez One of our biggest recent successes was facilitating the policy change that now allows parents to bring children on Lab briefly when they need to get something from their office. Also, this past summer we held a series of five well-attended panel discussions in which successful women engineers, scientists, line managers, project managers, and business professionals talked about their career opportunities and advancement at JPL.

Does the ACW provide mentors for women?

No, the ACW does not have a formal mentoring program, although individual ACW members have served as mentors and protégés in the past. Anyone who would like to request a mentor is encouraged to contact Mary Ellen Derro at 4-9833 or visit the mentoring website at <http://eis.jpl.nasa.gov/hr/development/careers/mentor.htm> for additional information.

Why did you volunteer for ACW membership?

McCoy I felt that it's important to maintain a voice for women and minorities. Upward feedback is extremely important for effective management. For some reason in my adult life, I have felt a pull towards looking beyond myself and seeing where I might be a positive influence. Other volunteer commitments outside of JPL were coming to a close last year and therefore the time was right to consider ACW.

Melendez Coming to JPL as a new employee back in 1998, I saw the ACW as an organization that was actively pursuing change for the better at JPL. I greatly admired the work that the ACW had done and I wanted to be a part of making JPL a true "Employer of Choice" by identifying those issues that were most important to women, raising them to a higher level, and advocating for positive change, so that ultimately all employees would benefit. Being a member of the ACW has given me such a completely different perspective and a greater understanding of JPL than I ever would have imagined. It has truly been a wonderful experience.

What can JPLers do if they want more information about ACW and its current activities?

Melendez They can visit our web site at <http://acw>. Our website is currently in the process of being updated and expanded, and in the near future we're hoping to always have a current list of our upcoming activities posted.



ACW co-chairs Elynn McCoy, left, and Katrina Melendez.



The Director's Advisory Council for Women (ACW) is an action-oriented group that was established in 1977 to serve as a resource to help foster an organizational climate in which equal employment opportunity for women and employee diversity are embraced to the fullest extent.



Front row, from left: Olga Ceritelli (Section 512), Kristan Evans (513), Deborah Watson (266), Yuki Salinas (383), and Elynn McCoy (352). Back row: Linda Spilker (322), Michele Schneider (267), Katrina Melendez (348), Laif Swanson (954), Vicky Martinez (680), and Jade Rosales (336). ACW members not pictured: Darlene Banks (530), Leslie Tamppari (314).

NASA Honor Awards bestowed

The annual NASA Honor Awards, which recognize individuals and teams who make outstanding contributions to the NASA mission, were handed out Oct. 16. Presiding were JPL Director Dr. Charles Elachi; Susan Henry, deputy director, Business Operations and Human Resources Directorate; and Dr. Ed Weiler, NASA's associate administrator for space science.

More than 80 individual awards, along with 38 team awards, were bestowed. Here are the award categories with the number of recipients.

- Distinguished Service Medal: 1.
- Outstanding Leadership Medal: 5.
- Exceptional Administrative Achievement Medal: 2.
- Exceptional Achievement Medal: 35.
- Exceptional Service Medal: 33.
- Exceptional Scientific Achievement Medal: 2.
- Exceptional Technology Achievement Medal: 2.
- Public Service Medal: 2.
- Group Achievement Award: 35 teams.
- Public Service Group Achievement Award: 3 teams.

For descriptions of the Honor Awards and a complete list of recipients, go online to <http://techinfo.jpl.nasa.gov/jpl/awards/index.html>.

Service awards



For the period of August and September 2003 the following JPL recipients celebrated 25 or more years of service and were invited to attend a luncheon and ceremony in their honor on Sept. 23.

- 45 years:** Dean Pruitt.
- 40 years:** William Whitney.
- 35 years:** Steve Bednarczyk, Samuel Gulkis, Dominick Panza-relo, Sheldon Rosell, Marvin Simon, Nicholas Thomas.
- 30 years:** Elizabeth Emmons, Frank Grunthaler, Raymond Jurgens, Loni Osmond, Tadas Sesplaukis, Danal Snyder, Lynn Stavert, Regina Wong, Lincoln Wood.
- 25 years:** Mark Allen, Clyde Bankston, Randall Bartman, Ronald Blom, Cecil Brower, Linda Brown, Seth Chazanoff, Linda Clifton, David Collins, Roger Crowe, Jefferson Hall Jr., Roger Helizon, Dennis Kern, Richard Key, Jerry Langmaier, Ranty Liang, Gary McCutcheon, David Meier, Steve Ogle, Herbert Pickett, William Revere, Stephen Stedry, Paul Stella, Richard Sunseri, Thomas Wolfe.

Letters

I want to thank all of my friends and coworkers for their thoughts and prayers on the sudden loss of my father. The support means a great deal to me and my family. I also want to thank you for the generous gift basket and JPL for the beautiful plant.

Mike Sierchio, Section 313

Classifieds

For Sale

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

BASKETBALL HOOP, portable, on wheels, net is missing, \$55. 909/465-9868.

BOOK CASE, mahogany, solid wood, 4 shelves, 72"x36", \$45. 970-8456, Steve.

CART/DESK for computer, mobile, cherry veneer, O'Sullivan, model 61925, exc. cond., bought for \$120, sell for best offer. 626/449-0997.

COFFEE TABLE FRAME, cast iron, dark brown, 4' x 4', needs glass, \$100. 244-8822.

COLLECTIBLES, Department 56, Dicken's Village Series, various pieces and accessories, many retired, prices vary. 626/791-7645.

DINING ROOM SET, table with 4 chairs, drop leaf, maple finish, 2 additional leaves; have a nice Thanksgiving; \$150/obo. 626/797-6490.

ENTERTAINMENT CENTER, oak, exc. cond., \$100/obo. 248-4356.

EXERCISE MACHINES: Marcy recumbent bike, \$40; Easy Rider rowing machine, \$30; Jane Fonda treadmill, \$20. 790-0088.

FAX MACHINE, Canon laser, model FAX-L775, commercial/office grade, extra toner cartridge, \$50/obo. 970-8456, Steve.

FURNITURE: sofa, dual-recliner and love seat, \$590; book case/entertainment ctr., oak, \$70; entertainment ctr., oak, lots of storage space, \$55. 626/799-7593.

GOLF BAG, Callaway, blk., exc. cond., \$50; PUTTER, Ping J-blade, exc. cond., \$60. 213/810-8801.

GUITAR, Takamine G230 acoustic, includes gig bag, \$175. 353-5156.

INFANTS' ITEMS: carseat, Graco, from a travel system, good until 26" or 20 lbs., locks onto many shopping carts, \$50/obo; swing, \$20/obo; kick-&-play, \$20/obo; kids-II play area with hanging toys, \$20/obo; mobiles, \$5/obo. 281-5092 days or 772-7611 eves, Amy.

KITCHEN TABLE SET, oak table, large leaf and 6 upholstered chairs, \$100. 626/447-6423.

LIVING RM SET: lg., dk. blue, sectional couch; fr. lamp, blk, 3-bulb; coffee table w/2 match-ing end tables, blk, marble-look, \$500; bedrm set, blk., qn sz. bed w/nightstand/shelf/head-board; dressers, 4- and 8-drawer, blk. w/ cherry drawers, all in vg cond., \$400; m.muckala@verizon.net for pictures. 626/931-1337.

LOVE SEAT, Rattan, chair with 3 shakable tables, exc. cond., cost \$1,000, must sell, \$350; DINING CHAIRS, 4, round pedestal glass table, \$150. 323/722-4412, Richard.

LOVESEAT & OTTOMAN, beautiful, down-cushioned, burgundy and green slip cover, very comfortable, exc. cond., orig. \$2,500, sell for \$1,000, see picture in ERC. 626/445-2616.

MATTRESS/BOX SPRING, queen, 5 yrs old, Restonic Marvelous Middle (specially designed for extra support in the middle), split box-spring, firm, ultra comfortable, only selling to replace with a King, \$300; HEADBOARD, Kincaid "Gathering House" line, beautiful cherry solid wood, curved version of the mission style, see <http://kincaidfurniture.com/casual.asp>, \$400. 626/441-6848.

MISC.: car waxer, 10" orbital, \$10; wig, red, shoulder length, \$20; table clothes, 2, slate blue, oval, 18 matching napkins and rings, \$10; car creeper, Huffy, \$10; shovels, \$2 each; hoe, \$5; punch bowl, 18 piece, \$10; mailbox, oversized, green, \$20. 626/357-8210.

Ethan Allen, \$40; end table, carved, \$25; computer, Mac, + monitor & printer, \$15; framed prints, one oil, various \$, TV & VCR, \$35; piano, Wurlitzer, retail \$1,500, sell for \$800. 790-5643.

PIANO, Yamaha grand C3, 6 ft., polished ebony, exc. cond., MSRP \$32,495, sacrifice, \$11,000; ORGAN, Yamaha, 415 electronic w/13 pedals, 3 keyboards, 144 rhythm patterns, \$2,000; PORT REPLICATOR, for IBM Thinkpad, works w/T20, T21/A20/A21/X/R series, like new, \$85; DIET TAPES, Jenny Craig, set of 14, \$40. 790-3899.

PLAY SET, redwood construction, 2 swings, trapeze, integrated monkey bars, raised club house w/roof & straight slide, eagles nest with enclosed twisting slide, sandbox w/seats, needs some work like resealing & bolt tightening, approximately 22' long x 15' wide, you disassemble & move, \$500. 249-2123.

PRINTER, Epson 1270, large format, inkjet, w/ extra black cartridge, prints up to 13" x 19", only used about 30 times, perfect cond., \$75. 323/257-7217.

SCANNER, Microtech Scan Master X6EL, PC/Mac compatible, scans up to legal size + photo negative scanner, Photoshop 4.0LE and OCR software, used only a few times, \$30. 626/303-1927.

SOFA, sectional, dark green, with 2 individual recliners and pull-out bed, good cond., \$500/obo. 909/465-9868.

SWINGSET, with 2 gliders, 2 swings, padded legs and monkey bar, \$100. 626/447-6423.

TREES, red banana plant, 5' tall, \$60/obo; fish tail, 6' tall, \$80/obo; ficus, 10' tall, braided, in 30" plastic pot, \$250/obo; CERAMIC BOWL, gray, 2' diam. w/planted geraniums, \$40/obo. 626/791-6101.

Vehicles/Accessories

'98 ACURA CL 23, manual trans., 77K mi., mostly fwy, 2-dr. coupe, all pwr., sunroof, exc. cond., silver, garaged, \$8,888. 626/432-4638.

'94 ACURA Integra LS coupe, 2-dr., automatic, blk., a/c, am/fm/cass/6-disc CD changer, power steering/windows/locks, cruise control, dual front airbags, ABS, moonroof, rear spoiler, fairly new tires, new battery, 146K mi., orig. owner, 0 accident, well-maint., good cond., \$4,000. 378-8368.

'95 CADILLAC Eldorado coupe, 62K mi., blk., loaded, sunroof, orig. owner, exc. cond., must see, \$8,500. 790-0364.

'98 FORD Explorer, vg cond., power everything, V8, 4 door, blk. w/tan leather int., 70K mi., new CD changer/cassette/stereo, below Bluebook price, \$9,000. 352-9418, Lee.

'97 FORD Crown Victoria LX, exc. cond., 68K mi., leather, full pwr. everything, keyless entry, tint windows, lt. green, new batt. tires, shocks, always garaged, super clean, real beauty, \$7,500/obo. 626/335-0775.

'95 FORD Windstar, 98K mi., new tires, good cond., perfect interior, carpets cleaned, 10-CD player under seat, air, pwr. windows/locks, seats 7, automatic trans., cruise control, tinted windows, dark green, \$4,000/obo. 957-7468, Bruce or Lori.

'01 GEM, 15" wheels, goes 35 mph, like new, seats 2, red and white, in San Dimas, \$5,300. 626/332-4734.

'70 HARLEY DAVIDSON Shovelhead/Chopper, all S&S motor parts, rebuilt motor, extra parts, very fast, must see, \$11,500. 244-8822.

'86 HONDA Civic Hatchback DX, 225K, 4 cyl. gas, 5-sp manual, beige, front wheel drive, a/c, power steering, tilt wheel, am/fm stereo cass., alloy wheels, new tires 14K, free rotation contract, 1 owner, zero accidents, vg cond., smogged 10/23/03, \$1,500/obo. 626/969-3479.

'80 INTERNATIONAL SCOUT 2, completely rebuilt engine but needs transmission and cosmetic work, \$1,500/obo. 626/794-4074, eves or 626/429-9123, days, Erwin.

JEEP Cherokee car cover, tan, exc. cond., sold for \$200 new, will sell for \$50. 626/359-7666.

'99 MAZDA Miata MX-5, conv., 2 door, 4 cylinder, 1.8 L, automatic, loaded with a/c, power steering, tilt wheel, cruise, am/fm, CD player, dual front air bags, in pristine cond., w/blk. exterior & tan leather interior, only 28K mi., but must sacrifice at \$13K/obo. 249-9437, eves.

'94 MAZDA MX-6, 120,000 mi., vg cond., green, new tires/battery, \$3,000. 626/351-9497.

'93 MERCEDES E-300, 6 cyl., 3.0 L, auto, 133K mi., hunter green metallic exterior, cream leather int'r, custom sound system, a/c, pwr. win-dows, alarm, garage kept, owner has service records, vg cond., beautiful drive, \$7,500/obo. 626/797-6824.

'92 NISSAN 300ZX, 108,267 mi., 2-dr. coupe, 6 cylinders, blk., auto trans., RWD, blue

cond., have maint. records, \$6,500. 805/527-6834, Tom.

'94 SATURN SL2, exc. cond., 4 dr., auto, air, am/fm/cass, ps/pb/tilt, 26-34 mpg, dealer serv-iced/well-maintained w/records, no accidents, 148K mi., great student or 2nd car, \$2,900. 249-4561.

'02 SHOCKS for Tacoma truck, TRD Bilstein, front & back with TRD coil springs, great cond., wear 15K mi., \$375/obo. 626/290-6199.

'01 SUBARU Legacy Outback Sedan Limited, everyone asks...is that a Lexus?; beautiful, super comfortable w/all the extras; we love it, but it just doesn't fit the family, \$19,000. 626/794-4074 eves, or 626/429-9123, Erwin, days.

'96 TOYOTA Camry, auto trans., power brakes/ windows/steering, cruise control, 109K mi., exc. cond., Laguna green, \$5,500/obo. 323/428-9065.

'93 TOYOTA Camry LE V6, 4-door, only 110K mi., drives Toyota new, dark green, everything automatic, clean title, non-smoker, \$4,550. 243-5907, Brian.

'01 VW Passat wagon, light green, exc. cond., very clean, 85K miles, auto, 6-CD changer, sunroof, \$9,500. 790-2666.

Free

FILL DIRT, clean, 12 cu yds. avail., haul as little or as much as you like, near Los Robles/Jackson, Pasadena. 626/791-3103, dtrask6@its.caltech.edu.

FURNITURE: coffee table w/glass top insert, 48" x 20" x 15", solid wood; microwave table w/ 2-dr. cabinet, Sauder, 27" x 17" x 35"; couch for liv. rm., 10-piece, modular, black; chest of drawers. 240-2147.

MIRROR PANEL, 19 3/8" x 77," glass panel, 12 3/4" x 68." 626/799-7593.

Lost and Found

Found: FDDI CABLES, orange, near south gate, Oct. 23 a.m. Ext. 4-6271.

Wanted

FEMALE SINGER for garage band, avg. band age is 35; originals, classic/hard rock, Beatles, blues, whatever. reverb2020@yahoo.com.

LP RECORDS from the '50s thru the '80s, pre-fer jazz, classical, rock, bluegrass. whartford@sbcglobal.net or 661/297-2988, Wayne.

MUSICIANS for JPL jazz band the "Big Band Theory;" need pianist, bari, drummer and bassist; regular and substitute. Steve, ext. 4-8456 or Rich, ext. 3-4326.

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

VOLLEYBALL PLAYERS, co-ed, no beginners please; Tues. nights 8-10:00 at Eagle Rock High School; \$4/nt. 956-1744, Barbara.

For Rent

ALTADENA executive home, beautiful, 3 bd., views, pool, very private and quiet, hardwood floors, beautiful kitchen and baths, 10 min. to JPL, pool/gardner, 1 yr. lease, avail. Nov. 15, \$2,850 + sec. 626/794-6860.

ANAHEIM, master rm. w/own ba., female preferred, incl. util., non-smoking, no kitchen privileges, nr. 5 + 57 fwy's., \$475. 626/272-1995.

LA CANADA house, 4 bd., 3 ba., 1 study, 7 minutes to JPL, gardener paid, \$3,000 + utilities, \$3,000 security dep. 626/744-3243.

LA CANADA 1 bd. apt., very close to JPL, La Canada schools address, next to Caltech Credit Union, across from shopping and Starbucks, \$1,000. 952-4444, ext. 201.

MONROVIA guest house + bonus bldg., sm. but clean & tastefully decorated, very private; incl. refrig., stove, w/d, trash, water provided, avail. Nov. 15, \$900 + \$600 dep. 626/357-6955.

PASADENA backhouse apt. for single person, 3 mi. from JPL, \$750 + util. 626/390-2474, Ann.

PASADENA, 3-story townhouse, 2 master bd. each with own ba. on upper level, kitchen, DR/LR, fireplace, deck patio and 1/2 ba. on main level; attached 2-car garage w/washer/dryer hookup on lower level, central ac/heat; near PCC/CIT, 110 N. Meridith Ave.; no smoking, no pets, avail. 11/15, \$1,400 + \$2,000 sec. dep. 626/462-1497, Mark or Tenny.

PASADENA, Caltech staff member seeks a non-smoking, cat-friendly roommate to share bright, clean, 2 bd., 2 ba. condo 3 blocks from Caltech; unfurn. bd. and ba., cent. air/heat, fireplace, 3rd fl. north-facing balcony, freshly painted, laundry + parking, terrific location, walking dist. to Old Town, Goldline metro &

more; min. 6-mo. lease, \$750 + 1/2 gas + electric. 626/833-2961, Jane.

PASADENA townhome-style apts., furn. + unfurn., 2 bd., 1.5 ba., patio, dishwasher, cent. a/c, new carpet & floors, refrig. & stove, laundry, parking, close to Caltech & JPL; furn. \$1,295; unfurn. \$1,275 + util. 626/577-3060, ext. 14, Dennis.

PASADENA apt. to share with JPLers, furn., 3 bd., 3 ba., townhome-style with patio, central a/c, laundry, close to Caltech & JPL. \$625 + utilities. 626/577-3060, ext. 14, Dennis.

PASADENA townhouse, large, 3 bd., 2.5 ba., cent. air/heat, washer/dryer hookups, fireplace, walk to Goldline, new paint, carpet, linoleum, stove, covered parking, no smoking or pets, \$1,800, water + trash incl. 626/394-5946.

SYLMAR FOOTHILLS, 2-rm. suite w/view & priv. full ba., unfurn., in lovely 2-story home; laundry, cooking, house privileges; non-smok-ing, mature person preferred; no pets, parking & ltd. storage; responsible for own phone + internet; \$700 incl. reasonable util.; furn. rm. avail. on request, additional mo. chg. applies, separately rented room w/shared ba., for \$350/ea. 367-8666.

TUJUNGA House for rent/lease, prestigious 7 Hills area, 3 bd., 1 3/4 ba., cent. air & heat, dining rm., 2-car garage, fireplace, patio; \$2,000. 957-1560.

Real Estate

GLENDALE, Maple Park condo, modern, 2 bd., 2.5 ba., 1,755 sq. ft., large living/dining room, bright kitchen with pantry, lg. office that can serve as a 3rd bd., 2 big balconies, central a/c, Ikea laminate floors in living and bedrooms, new carpet and paint, 2-car garage, 15 min. drive to JPL, \$382,000. 240-2802, Paul.

LA CANADA townhome, golf course/mtn. vws., end unit, 2,084 sq. ft., upgrades, quiet, open house Sat & Sun 1-5, 5327 Godbey Dr., La Canada, \$625,000 by owner. 790-5643.

NORTHBRIDGE, established home on private corner lot, great for entertaining, large, 3 bd., 3.75 ba., with open floor plan, including: 2 fireplaces, living rm., dining rm., family rm., studio, sun room pool with pool house and more, 35 min to JPL, \$625,000. 606-8386 or www.chriswilliams.com, Chris.

PASADENA, Madison Heights home, built on 9,800 sq. ft. lot, orig. y built in 1907, added in '89, 3 bd., 3 ba., office, living room, island kitchen, French doors open from family room to a large deck leading down to 2 gardens, walking distance to S. Lake, Old Town, Paseo Colorado, Metro line. 626/796-8803 or <http://tech.rapmls.com>, listing 22026812.

VALENCIA home, beautiful, 3 bd., 2 ba., 1,263 sq. ft., 2-car garage, new copper pipe, new paint inside/out, new garage door, custom kitchen, RV parking, great view, end of cul-de-sac, quiet neighborhood, perfect for small or senior family. regladden@yahoo.com.

Vacation Rentals

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

DEL MAR fully furn. condo, 7 nts 11/15-22/03, slps. 6, 2 bd., 1 1/2 ba., living rm., full kitch., cable TV/VCR, game room, Sauna, pool/spa, laundry rm., BBQ area, walk to racetrack and beach. kktwu@yahoo.com or 626/961-8771.

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 \$105/nite/2, high season rate \$120/nite/2, \$15/nite/add'l person. 949/348-8047, 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/view to mtns., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt. 626/798-9222 or 626/794-0455 or valeriee@caltech.edu.

OCEANSIDE condo, fully furn. 2 bd., 2 ba., fireplace, full kitchen, quiet, relaxing, beautiful beachside setting; BBQ, pool, spa, game room, great ocean vw.; easy walk to pier and restaurants, sleeps 8, avail. weekly or monthly. 909/981-7492, Darlene, or dthauge@yahoo.com.

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

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

Classifieds

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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.

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