

March 26, 1999

Ames' Lunar Prospector continues to deliver data

Lunar Prospector, the \$63 million "spacecraft that could," inaugurated NASA's new Discovery program of "faster, better, cheaper" space science missions. Prospector captured worldwide interest last March with its discovery of water in the permanently shadowed craters of the Moon's polar regions. That will always be its legacy. And rightly so! But the vehicle and the mission continue to provide a wealth of important scientific data long after completion of the primary mission.

At the 30th Lunar and Planetary Science Conference held in Houston, TX, in March, scientists reported that recent data from the spacecraft confirm that the Moon has a small, iron-rich core. This supports the theory that the bulk of the Moon was probably ripped away from the early Earth when an object the size of Mars collided with this planet over 4 billion years ago.

The new data show that the lunar core contains less than four percent of the Moon's total mass, with the probable value being two percent or less. This is very small when compared with the Earth, which has an iron-rich core containing approximately 30 percent of the planet's mass.

"This is a critical finding in helping scientists determine how the Earth and Moon formed," said Dr. Alan Binder of the Lunar Research Institute, the Ames-based principal investigator for the Lunar Prospector mission.

Similarities in the mineral composition of the Earth and the Moon indicate that they share a common origin. However, if they had simply formed from the same cloud of rocks and dust, the Moon would have a core similar in proportion to the Earth's. Alternately, as a third theory suggests, the Moon may have been captured fully intact by the Earth's gravity. However, in that case, there would be no reason to anticipate that the comparative mineral composition of the two bodies would be so similar.

Based on information first gathered during the Apollo era, scientists found support for the long-held belief that the Moon was created when a Mars-sized body hit the Earth during its earliest history. This impact occurred after the Earth's iron core had formed, scientists believe, ejecting rocky, iron-poor material from the outer shell into orbit. It was this material, they conjecture, that collected to form the Moon. This explains why the Earth and Moon share a similar mineral composition except for their

cores. However, there is still room for debate.

"Further analysis of Lunar Prospector data to refine the exact size of the lunar core and the amounts of elements like gold, platinum and iridium in lunar rocks



This is a painting by artist and planetary scientist William Hartmann depicting the way most scientists believe the Moon formed.

— all of which are concentrated with metallic iron — is required," Binder added. "This will do much to pin down for good if the 'giant impact' model of the formation of the Moon is correct or if the Moon formed in a different manner," as other theories suggest.

Current data from gravity measurements conducted by Dr. Alex Konopliv of NASA's Jet Propulsion Laboratory, Pasadena, CA, indicate that the Moon's core radius is between 140 and 280 miles (220 and 450 kilometers). This is consistent with independent magnetic data, evaluated by Dr. Lon Hood of the University of Arizona, Tucson, which suggest that the core radius is between 180 and 260 miles (300 and 425 km).

In other research areas, Dr. Robert Lin of the University of California at Berkeley, Dr. Mario Acuña of NASA's Goddard Space Flight Center, Greenbelt, MD, and Hood also found that a broad section of the southern far side of the Moon has large localized magnetic fields in its crust. These

fields occur opposite the large Crisium, Serenitatis and Imbrium basins — three of the "seas" that cover much of the Moon's near side. This result supports earlier evidence linking strong magnetized concentrations on one side of the Moon with young, large impact basins on the other side.

Results of efforts to map the composition of the lunar crust have surpassed the expectations of the spectrometer team, led by Dr. William Feldman of the Department of Energy's Los Alamos National Laboratory in New Mexico. Data obtained are so good that the distribution of thorium has been mapped with a resolution of 36 miles (60 kilometers). At this level of detail, scientists can detect individual deposits rich in thorium and related elements. Their current observations suggest that thorium was excavated by impacts of asteroids and comets, and then distributed around craters, rather than being deposited by volcanic activity.

"The superb performance of the spacecraft and the excellent quality of the operations team have allowed the mission to collect extraordinary data and to operate very smoothly, said Sylvia Cox, NASA's Lunar Prospector mission manager based at Ames. "This is due not only to the efforts of the Ames operations staff, but also the Goddard navigation support team and the Deep Space Network group at the Jet Propulsion Lab."

Lunar Prospector conducted its primary mapping mission at an altitude of 63 miles (100 kilometers) for almost one year after its arrival in lunar orbit on Jan. 11, 1998. This past December and January, the spacecraft was lowered to an approximately 15 by 23 mile orbit (24 by 37 kilometers).

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see related story on page 3

Ames ISO Web-site address:
<http://dqa.arc.nasa.gov/iso9000>

Robotic rover, spacesuit geologist work together in test of future exploration

NASA recently tested a remotely operated planetary rover and an advanced prototype spacesuit in southern California to see how robots and humans might someday work best together to explore other planets.

A team of scientists and engineers from Ames and Johnson Space Center (JSC), Houston, TX, is conducting the first field test involving the Russian-built Marsokhod and a geologist wearing a NASA advanced prototype spacesuit. Dubbed the Astronaut-Rover Interaction for Planetary Surface Exploration (ASRO) experiment, the four-day primary science mission was conducted Feb. 22-25 in the Mojave Desert, east of Los Angeles; a public demonstration was held on Feb. 27.

The rover activity was led by Ames, while JSC provided the spacesuit, visual-tracking software, and associated human space exploration expertise. Together, the team hopes to develop a synergistic relationship between the two explorers.

"We want to obtain a preliminary assessment of human interaction with a rover for future planetary exploration, and find out how they can best help each other," explained ASRO Project Science Leader Dr. Nathalie Cabrol of Ames. "We want to be ready when it is time to start human surface exploration on other planets."

"NASA envisions future planetary surface spacewalks to be a cooperative effort, with robots assisting humans to increase productivity during these time-limited excursions away from the base station," said Robert Yowell of the Extravehicular Activity Projects Office at JSC.

The ASRO Project should improve the safety and performance of human surface operations, and therefore help minimize the cost of human planetary missions. Specifically, the team hopes to learn how the rover and the astronauts can collaborate in various operational tasks, leading to recommendations for improving the designs of future advanced spacesuits and rovers.

"The test is part of a continuing NASA effort to better identify the challenges facing future human explorers of other worlds, and the technologies that will be needed to meet those challenges," explained Joyce Carpenter, Deputy Manager of the JSC Ex-

ploration Office. "While we are in the early stages of learning how to explore other planets, NASA has not identified any specific human missions beyond Earth's orbit."

NASA acquired the Marsokhod rover



photo by Cesar Mina

Team members during the Astronaut Rover Interaction Experiment (ASRO). Team members are from left to right are: Cesar Mina-Field Engineer; Linda Kobayashi-Electrical Engineer; Sergey Sokolov-Electrical Engineer; The Marsokhod rover (also wearing a NASA baseball hat!); Edmond Grin-SETI Scientist; Anne Wright-Computer Scientist; Hans Thomas-Field Test Manager; Seth Carter-Learning Technologies Project Journalist

from Russia and equipped it with improved avionics, computers and science instruments. It features six titanium wheels, a robotic arm to pick up soil samples and stereo video cameras mounted on a pan-and-tilt platform to transmit live images of the field test via a satellite back to scientists at Ames. The 165-pound (75-kilogram) rover is three feet (one meter) wide and 4.5 feet (1.5 meters) long, with a mast that extends about 4.5 feet high to hold the cameras.

The spacesuit is constructed primarily of fabric, with ball bearings that allow the wearer to move more easily when the suit is inflated to 3.75 pounds per square inch above the local pressure, as it would be on the Moon or Mars. A self-contained liquid air backpack provides life support, cooling, communications and power. The suit and backpack have a weight of about 150 pounds (68 kilograms) on Earth.

JSC geologist Dean Eppler wore the spacesuit during the test. The Marsokhod served as a scout and videographer, transmitting

advance images of the site and the geologist's activities back to Ames and JSC. The rover is equipped with JSC-developed software that should allow it to automatically track the human explorer's progress and move in response. In addition, the rover was designed to assist the astronaut by documenting science targets, and carrying rock samples and space-walking tools.

Although the field tests were not open to the public, project scientists showcased the Marsokhod rover and the new spacesuit during a public demonstration following the science mission. The demonstration was conducted in cooperation with the Bureau of Land Management on Saturday, Feb. 27, from 10 a.m. to 4 p.m. PST at the Barstow High School stadium, First and Campus Way, Barstow, CA.

Information about the Barstow school can be found on the school's web site: <http://www.barstow.k12.ca.us/bhs/> The public web site for the Marsokhod field test is located at: <http://quest.arc.nasa.gov/lrc/special/mars/>

BY MICHAEL MEWHINNEY



Astrobiology Seminar



photo by Dominic Hart

Dr. Paul C. W. Davies, world-famous scientist and author, was at Ames on Mar 3 where he presented a seminar on "Biological Determinism: Is life written into the laws of physics?" Dr. Davies touched on a broad array of topics, from human life and the laws of physics to questions of intelligence and morality.

Center Briefs

Solar structure can help forecast largest solar blasts

"S" marks the spot for scientists trying to forecast solar eruptions that can damage satellites, disrupt communications networks and cause power outages. Using the Japanese Yohkoh spacecraft, NASA-sponsored scientists have discovered that an S-shaped structure often appears on the Sun in advance of a violent eruption that is as powerful as billions of nuclear explosions.

Space research may accelerate development of flu-fighting drug

A NASA-industry team has used the results of Space Shuttle experiments to develop a new flu drug that may decrease the length and severity of the illness and even prevent the development of symptoms in those exposed to the virus. With NASA support for space and ground-based research, Dr. Ming Luo, a professor at the Center for Macromolecular Crystallography at the University of Alabama at Birmingham, and an international team of crystallographers developed the "molecular map" of the flu virus from space-grown protein crystals. The map was used to design drugs that block the undesirable characteristics of the virus.

NASA seeks proposals for advanced radar technology

NASA is seeking proposals for a low-cost, advanced imaging radar technology that will reduce the cost and enhance the performance of Earth observing satellites -- opening new opportunities for the U.S. commercial remote-sensing industry. The Lightweight Synthetic Aperture mission, or "LightSAR," is part of NASA's long-term effort in the development and productive use of imaging radars. Past NASA radar missions, which have been short in duration, have established the potential of imaging radar to expand scientific knowledge of Earth and the planets.

NASA plans an early servicing mission to Hubble telescope

NASA will launch a Space Shuttle mission to the Hubble Space Telescope in October so astronauts can replace portions of the spacecraft's pointing system, which has begun to fail. Hubble is operating normally and continuing to conduct its scientific observations, but only three of its six gyroscopes -- which allow the telescope to point at stars, planets and other targets -- are working properly.

The Ames calibration laboratory measures up

The Ames Calibration Laboratory anxiously awaits Inspection, Measuring and Test Equipment (IM&TE) users to submit their equipment for calibration/repair.

The Ames Calibration Laboratory, located in building N213/103, has just completed a renovation of its facilities, including newly installed independent climate controlled HVAC, dropped acoustic ceiling, low temperature lighting, and badly needed upgrades of laboratory standards. The Ames Calibration Laboratory, tasked with the responsibility of certifying IM&TE and insuring measurement traceability, is continuously challenged to maintain standards and capabilities sufficient to meet the needs of the Ames community.

IM&TE is widely used by the researchers, engineers, and technicians throughout the center. These instruments are employed in the wind tunnels to monitor critical parameters and model performance, in life sciences to collect data in experimentation, by facilities maintenance personnel, and in systems designed to ensure the safety of personnel and equipment.

Types of instruments supported by the Ames Calibration Laboratory include virtually any device used to measure voltage, current, pressure, temperature, humidity,



photo by Dominic Hart

Deputy Director Bill Berry chats with ISO auditor Ray Kemple in the Ecosystem Science and Technology Branch (Code SGE) Lab N-242.

tance or rejection of a product or process, the equipment must be calibrated. Calibrated equipment must have a "CALIBRATION" label applied per SLP 53.ARC.0011, 6.4.5 and we recommend that the item(s) be included in the center's IM&TE recall system. IM&TE used in applications where data accuracy is not essential should be labeled "CALIBRATION NOT REQUIRED". These labels can be obtained by calling the Calibration Laboratory at ext. 4-5465. The Centerwide System Level Procedure (SLP) can be found at <http://nasarc1.arc.nasa.gov/iso9000/> on the web.

There is currently no cost to the customer for normal calibrations of IM&TE. Should an instrument require repair however, the IM&TE user will be requested to submit a Service Request (SR) to cover materials and labor. If a RUSH or immediate service is required, Code FM assesses a 50% surcharge on the hourly rate (minimum two (2) hours labor), payable via a Service Request at the time of service. Normal turnaround time for calibration is from 5 to 10 working days. Due to the influx of IM&TE for the upcoming ISO audit in April, the backlog is presently about 30 working days. The Calibration Laboratory will provide pickup and delivery service.

To obtain calibration services or more information, call the Ames Calibration Laboratory at ext. 4-5465. Tom Spalding, Ames Metrology and Calibration Program Manager (Acting), can be reached at ext. 4-1743.



photo by Tom Trower

Ames Calibration Lab with John Durr, SIMCO, lead calibration technician.

length, mass, and frequency. The lab's off-site facility has the capability to support additional measurement disciplines and devices with lower uncertainties.

The upcoming ISO 9000 audit has everyone concerned about the choices of calibration. Simply put, if your IM&TE is used for: ensuring the safety of equipment or personnel, making critical qualitative or quantitative measurements or for accep-

BY TOM SPALDING 

Internship Program

Foothill/DeAnza program celebrates anniversary

Next year, during the Millennium, the Foothill-DeAnza (FCCD) Internship Program will celebrate its 30th anniversary. Since 1970, over 2000 students have graduated from this program; 150 interns currently work at Ames. The program's success is due to its "win-win" experience for both students and mentors.

The greatest benefit to Ames researchers and managers is the program's cost effectiveness. Current cost to support an intern is \$11,700 for a full year (1,200 work hours)—a bargain. As senior scientist Val Watson observes, these talented students "allow us to expand the scope of our research; not only do they provide manpower for research, but their fresh minds and enthusiasm contribute substantially to our environment for research." Jerry Mitvalsky, Manager of the Arc-Jet Complex, and currently mentoring his 40th FCCD intern, agrees that "we can't lose, professionally. Students are assets to mentors, because they do such excellent work and help increase productivity and quality in return for small costs in time and funding."

Some internship job advisors, like Marilyn Vasques, Logistic Operations Manager in Space Payloads, find personal satisfaction in helping today's students benefit from NASA programs. The real payback, though, says Marilyn, is that "students are a critical part of our activities, and we depend on their support. Our students are bright, conscientious, and enthusiastic...an important part of our team."

Foothill-DeAnza interns work in many different areas at Ames. More than a third hold computer-related positions, such as programming, systems administration, web design, multi-media development, CAD design, and technical writing. Another third perform a variety of office administration tasks, including marketing, budgeting, and purchasing. The rest are involved in lab research or are engineering or technical assistants. Interns rate the year highly for enhancing both their job and interpersonal skills, which gives them a critical edge on other college students entering the work force.

James Schilling's internship in Space Sciences opened up a whole new world of desktop publishing and computer graphics that he never knew existed. The work experience is invaluable to him, but even more important is the focus on a new career path. His supervisor, Sara Acevedo, expects James to make the necessary decisions to get his projects done. This emphasis that job advisors place on interns accepting re-

sponsibility—and the response they get from their students—is one of the great strengths of the program. Linda Vollenweider lets her students know from the beginning that her expectations are high. "I've worked each of them to the point of no return," she says, "but they keep coming back for more." But as Brenda

childhood fantasy." Barry and Chinley Chang both intern for Val Watson. Chinley's current work is making it possible for scientists from all over the world to work together in immersive, virtual environments. Barry is developing a virtual tour of the supercomputer facility. The emotional investment in NASA's achievements that interns develop makes them great NASA ambassadors. "It makes me feel good when people ask where I work," says Barry.

John Han, a graphic design intern in Space Life Sciences, parlayed his work for the project into a trip to Kennedy last fall to watch the shuttle launch. It was "his best experience ever...when I saw that shuttle lift off, I felt proud knowing that I work for NASA and that my work contributed to support STS-95." Flight operations assistant, Tom Colosi, who wants to become a commercial pilot but also aspires to be an astronaut, expresses the feelings of many interns: "I can't believe I'm here. It's like a dream come true."

The on-site internship coordinators, Marti Carlson, Pat Malan, and Susan Schenck, reinforce this excitement about NASA by requiring interns to attend regular "seminars" in which Ames researchers discuss their projects or offer tours of their facilities. These meetings also enable interaction between interns when they can learn about each other's work.

Internship coordinators also work closely with job advisors to make the relationship with their students harmonious and productive. They recruit extensively at local community colleges and find the very best students for supervisors.

Ames researchers and managers' interested in sponsoring an intern are encouraged to contact Mary Conway, the program administrator, at ext. 4-5560 or email her at mconway@mail, to request a position description form. For interns starting in July, the form should be returned to the Internship Office, T23B, no later than May 11.

BY PEGGY SCHMITZ

Lunar Prospector delivers

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Analysis of data from the lower-altitude observations is expected to refine understanding of the origin, evolution and physical resources of the Moon.

Ames manages the Lunar Prospector mission for NASA and is home base for mission operations and control. Further information about the mission and its science data return can be found at the project web site at: <http://lunar.arc.nasa.gov>

BY DAVID MORSE



Dr. Velvin Watson of Ames and intern Chinley Chang (seated at computer).

photos by Tom Trower



Jerry Mitvalsky of Ames with intern Heather Chiamori.

Brown, a re-entry business student in Army aeroflightdynamics, notes, it is the encouragement she gets from her mentor, Ava Geddes, that has pushed her to learn many new skills and increased her confidence in her abilities exponentially. "My internship has been one of the best career decisions I have ever made," said Brown.

Mentors get great satisfaction from observing this personal growth. Flight Operations' Trudy Schlaich echoes the feelings of many when she expresses her pride in "my" interns' accomplishments, as they go on to school and professional careers. Space Sciences' Kristina Wilmoth believes that young people are a rarely tapped resource of creativity and ability. "If we give them the tools and our faith in their ability to create, they come up with amazing things...they see their ideas used in productive ways, so they learn the value of their own work."

A more intangible benefit to Ames of the Internship Program is the message about NASA that students carry to the world outside. "Working at NASA is really inspiring," says Heather Chiamori, Jerry Mitvalsky's engineering intern. The stimulation of challenging work assignments and being made to feel part of a team is invaluable to her, but her experience is enhanced by Jerry's "wealth of knowledge, not only of the Arc-Jet Complex, but also of ARC and the people who made it what it is today." Many interns, like Barry Paul, grew up watching the shuttle launches and thought it would be "cool" to work at NASA. "Well," he muses, "I am no astronaut, but working here fulfills part of that

Minority universities conference held at Ames



photo by Dominic Hart

Deputy Director Bill Berry (left) chats with a participant at the minority universities conference.

The National Aeronautics and Space Administration (NASA) is poised, on the eve of a new millennium, to advance a bold and exciting program of cutting-edge scientific and technological research and development.

Fundamentally, NASA seeks "to expand frontiers in air and space to inspire and serve America and to benefit the quality of life on Earth."

Realizing this vision, however, will require the determination and creative genius of valuable human and technical resources. Ames is, therefore, eager to develop partnerships with top-notch educational/research institutions

To help us facilitate development of these vital partnerships, Ames worked in conjunction with NASA Headquarters' Minority University Research and Education Division (MURED), to host the Information Technology/Astrobiology Conference for Minority Institutions on March 9 and 10.

Women's History luncheon held



photo by Tom Trower

On March 3, the Women's History Month Luncheon was held at the Moffett Training and Conference Center. The keynote speaker was LTC Consuelo Castillo Kickbusch US Army (RET). LTC Kickbusch rose to be the highest ranking Hispanic woman in the Combat Support Field in the US Army.

Farewell to SWTS



photo by Dominic Hart

From right to left: Joe Cambra (typing), SWTS Project Manager (retired in 1981) executes the final "shutdown" during ceremonies at the Propulsion Simulation Calibration Laboratory; Herb Finger; Russ Molari, former Sterling Software employee and one of the original software developers; Semra Muratoglu of Sterling Software.

In the mid 1970's, a team of engineers, software developers, and technicians designed and implemented the Ames Standard Wind Tunnel Data System (SWTS). The system, which was developed by Teledyne Controls of El Segundo, CA, eventually became the primary data acquisition system for all the major wind tunnels at Ames, the Arc Jet Facility, and several research aircraft such as the early Tilt Rotor. The system had a design life expectancy of approximately 10 years.

On February 26, 1999, more than 25 years after the original installation, the final SWTDS system was be retired. Nearly 50 developers and users of SWTS from through-

out its 25-year history were on hand as the final shutdown occurred. Retirees and former contact employees participated in the event. Foremost among these was Joe Cambra, the original SWTS Project Manager, who was given the honor of entering the final command. Along with remembrances, a skit, and refreshments, a final toast was given to a data system that served Ames well beyond its expectation. To all in attendance, the event brought a sweet and sour closure to an era of flight and wind tunnel testing.

BY HERB FINGER



Nobel-Prize winner speaks at Ames



photo by Dominic Hart

Nobel-Prize winning professor and author Dr. Murray Gell-Mann addressed Ames' researchers at a Director's Colloquium on Astrobiology on February 26.

X-36 Honorees

NASA/Boeing X-36 team honorees included the following individuals who were omitted from the March 12 Astrogram edition: NASA Ames: Lloyd Corliss, Dwight Balough; NASA Dryden: Gary Cosentino; Boeing Phantom Works: Dave Abel, Rod Wyatt, Kevin Lowary, John Lentz.

Ames aero pioneer passes away

On March 6, airline travelers lost a friend and advocate when Leonard Roberts passed away at the age of 69.



Prof. Leonard Roberts

An aerodynamicist, Roberts retired from the aeronautics and astronautics depart-

ment at Stanford University in 1993. Previously, he worked at Ames for 15 years, ultimately serving as Chief of the Aeronautics directorate.

Jack Boyd, executive assistant to Ames Center Director Henry McDonald, served as Robert's deputy chief of Aeronautics at Ames for several years. Recently he recalled that, "in addition to being a close friend, Leonard lived his life in an elegant way. He was elegant in his research, in his management style and in his way of dealing with people. We at Ames will miss his inquiring mind and his spirit of searching for the truth."

Roberts was born in Wales and earned a fellowship to Manchester University in England. He received his doctorate in 1955. Shortly thereafter, he came to the United States, where he got a job as a mathematics instructor at the Massachusetts Institute of Technology. Two years later, he signed on with Langley Research Center in Virginia as an aeronautical research engineer. He rose to head the mathematical physics branch at Langley before transferring to Ames.

Roberts was an expert on vortices — the violent swirls of air that large aircraft leave behind that can be dangerous to smaller aircraft flying in their wake. His theoretical studies of these hazardous phenomena pro-

vided a basis for the rules that air traffic controllers now use to space aircraft of different sizes at safe distances during landing and take off.

Among his most important contributions at Ames were his leadership in the development of the tilt-rotor aircraft and the design, selling and implementation of the new 80' by 120' test section in the National Full-scale Aerodynamics Complex (NFAC).

Roberts received a NASA Distinguished Service Medal for his contributions in 1976, and was elected a Stanford-Sloan Fellow and a Fellow of the American Institute for Aeronautics and Astronautics. He served on several advisory boards for the U.S. Navy, U.S. Air Force, NASA and NATO.

Roberts was an avid golfer and world traveler until his recent illness. He is survived by his wife, Barbara; sons, Mark of Saratoga and Peter of Fremont; and five grandchildren.

A memorial service for Roberts was held on March 14 at St. Andrew's Church in Saratoga. The cause of death was the degenerative disease cerebella atrophy. Well-wishers are invited to make donations to the Prof. Leonard Roberts Scholarship Fund, Department of Aeronautics and Astronautics, Durand Building, 496 Lomita Mall, Stanford, CA 94305.

Ames employee wins Cindy award

"The Human Element", a five minute short, won a Bronze CINDY award in the category of "Employee Communications" in the 40th Annual International Cinema in Industry Competition held this March in San Diego, Calif. Megan Eskey of Ames, the producer/director of the video, accepted

against multi-million dollar productions from industry, government and academia throughout the world.

The CINDY competition is one of the oldest festivals of its kind. It began in the United States in 1959 as an industrial film competition. CINDY was created by a professional trade association known as the Industry Film Producers Association (IFPA). Later, this group became the Informational Film Producers of America and in 1984, the Association of Visual Communicators (AVC). This twice-a-year event is proudly presented by the International Association of Audio Visual Communicators (IAAVC), a non-profit group that continues to represent theatrical, broadcast, non-broadcast, and interactive media professionals throughout the world.

CINDY has changed dramatically over the years as the market for industrial films evolved into video and other media formats. Interactive media was introduced in 1985 making CINDY the very first interactive media competition in the world. Today, CINDY still honors the informational media producer with nearly a dozen media formats, but has expanded to include all production professionals. Contact Megan Eskey, meskey@mail.arc.nasa.gov, ext. 4-4863 for more information.

"Take Your Daughter to Work Day" meetings scheduled

Federally Employed Women (FEW) has scheduled meetings to plan "Take Your Daughter to Work Day." The following are the scheduled meeting times and dates:

March 31, Conf. rm, N-241, rm 237
April 7, N-241, B-1 basement
April 13, Conf. rm, N-241, rm 237



Cheryl-Ann Campbell

the award on behalf of the star of her video, Cheryl-Ann Campbell, formerly of Netscape Communications, Inc., who was killed in a car accident two weeks before the awards ceremony. The video was produced with a budget of \$500 and successfully competed

Calendar

Jetstream Toastmasters, Mondays, 12 noon to 1 p.m., N-269/Rm. 179. Guests welcome. POC: Jenny Kahn at ext. 4-6987 or Karen Matsuoka at ext. 4-6184.

Model HO/HOn3 Railroad Train Club at Moffett Field invites train buffs to visit and join the club in Bldg. 126, across from the south end of Hanger One. The club is in particular need of low voltage electricians and scenery builders & maintainers. Work nights are usually on Friday nights from 7:30 p.m. to 9:30 p.m. Play time is Sunday from 2 p.m. to 4 p.m. For more info, call John Donovan at (408) 735-4954 (work) or (408) 281-2899 (home).

Ames Bowling League meets at Palo Alto Bowl every Tuesday at 6 p.m. The league is in need of substitute bowlers. POC: Mina Cappuccio at ext. 4-1313.

Ames Child Care Center Board of Directors Meeting, Wednesdays, 12 noon to 1 p.m., N-213/Rm. 204. POC: Debbie Wood at ext. 4-0256.

Ames Ballroom Dance Club. Ames Ballroom Dance Club. Tuesdays: Merengue 3/30, Niteclub 2-Step 4/6, 4/13, 4/20. 3 levels of classes, from Beg. to Int., 5:15 - 6:45pm. Moffett Training and Conference Center, Bldg. 3/Showroom. Women dancers are especially encouraged to join. POC: Helen Hwang, hhwang@dm1.arc.nasa.gov. ABDC Website: <http://arcapps.arc.nasa.gov/Info/>

Hispanic Advisory Committee for Employees, Apr 1, 11:45 a.m. to 12:30 p.m., N-239/Rm. 177. POC: Carlos Torrez at ext. 4-5797.

Environmental, Health & Safety Monthly Information Forum, Apr 1, 8:30 a.m. to 9:30 a.m., Bldg. 19/Rm. 1078. POC: Linda Vrabel at ext. 4-0924.

Ames African American Advisory Group Meeting, Apr 1, 11:30 a.m. to 12:30 p.m., N-241/Rm. 237. POC: Mary Buford Howard at ext. 4-5095.

Ames Contractor Council Meeting, Apr 7, 11 a.m., N-200/Comm. Rm. POC: Greg Marshall at ext. 4-4673.

Computer Museum History Lecture, Apr 8, 7 p.m., Edwin Catmull, Executive Vice President and Chief Technology Officer, Pixar Animation Studios. "To 'A Bug's Life' and Beyond!" Café Ozone, Building 40, Silicon Graphics, Inc., Mountain View, CA. POC: Dag Spicer, at ext. 4-2578 or email at: spicer@tcm.org

Professional Administrative Council (PAC) Meeting, Apr 8, 10:30 a.m. to 11:30 a.m., Location TBD. POC: Janette Rocha, ext. 4-3371.

Nat'l Association of Retired Federal Employees, S.J. Chapter #50, Meeting, Apr 9, at the Elk's Club, 44 W. Alma Avenue, San Jose. Social hour: 10:30 a.m. Prog. & bus. mtg. follow lunch at 11:30 a.m. POCs: Mr. Rod Peery, Pres., (650) 967-9418 or NARFE 1-800-627-3394.

Southbay FEW Chapter Mtg, Apr 13, 11:30 a.m. to 1 p.m., N-241/Rm B1. POC: Christine Munroe, ext. 4-4695.

Ames Sailing Club Meeting, Apr 18, 11:30 a.m. to 1 p.m., N-262/Rm. 100. POC: Greg Sherwood, ext. 4-0429.

Secretary/Administrative Assistant Workshop Apr 21, 8 a.m. to 12 noon, Moffett Training Center, Bldg 3's Ballroom- register from 7:30 - 8:00 a.m. Open to all secretaries/admin. support personnel (contractor secretaries admitted on space available basis). All attendees must fill out a Training Application (ARC 301) no later than April 9. No cost workshop. POC: Gail James at ext. 4-5472.

Ames Multicultural Leadership Council Meeting, Apr 21, 11:30 a.m. to 1 p.m., Galileo Rm/Ames Cafe. POC: David Morse, ext. 4-4724 or Sheila Johnson, ext. 4-5054.

NFFE Local 997 Union General Meeting, Apr 21, 11:30 a.m. to 12:30 p.m., Bldg. 19/Rm. 2017. Guests welcome. POC: Marianne Mosher at ext. 4-4055.

Ames Asian American Pacific Islander Advisory Group Meeting, Apr 22, 11:30 a.m. to 1 p.m., N-241/Rm. B2. POC: Daryl Wong at ext. 4-6889 or Brett Vu at ext. 4-0911.

Ames Amateur Radio Club, Apr 22, 12 noon, N-260/ Conf. Rm. POC: Mike Herrick, K6EAA at ext. 4-5477.

Native American Advisory Committee Mtg, Apr 27, 12 noon to 1 p.m., Ames Café. POC: Mike Liu, ext. 4-1132.

Ames Java User Group, Apr 28, 2:00 p.m. to 3:30 p.m. (N258/127). Topic: Java Servlet Programming by author Jason Hunter (<http://www.servlets.com/jsp/about.html>). Q&A session will also include James Davidson, head of Sun's Servlet API. JUG URL: <http://jug.arc.nasa.gov/meetings.html>. POC: Sharon Marcacci (smarcacci@mail.arc.nasa.gov)

Ames Classifieds

Ads for the next issue should be sent to astrogram@mail.arc.nasa.gov by the Monday following publication of the present issue and must be resubmitted for each issue. Ads must involve personal needs or items; no commercial/third-party ads and will run on space-available basis only. First-time ads are given priority. Ads must include home phone numbers; however, Ames extensions will be accepted for carpool and lost and found ads only.

Housing

Room for rent, available now. Walking distance from Castro. Share bath/kitchen/garden/laundry facilities. Near Hwy 101/237/85/ Cent. Exp. Rent: \$550 mo. Call (650) 969-3932 or email at: solemate@best.com

Temp. or part-time use. Ideal for commuter or intern. Semi-private. Share bath/kitchen/phone/laundry. Near Hwy 101 /237/85. Weekly: \$100 (+ one mo.). Call (650) 969-3932 or e-mail at: solemate@best.com

Room for rent. Mtn View, from beginning of May. Quiet area of town, ten minutes from Ames, laundry, private yard at back. \$650 a month. Call (650) 493-6178.

Part time or full time roommate needed to share expenses. 2bd/1ba apt. in S'vale off Mary Ave. near El Camino. Rent negotiable for part time rentee. Available April 1. Barrie Anne (408) 736-8961.

Roommate wanted. Share a 2 bd/1ba duplex w/ nice back yard for \$650/mo. + 1/2 utils. Loc.: Piedmont/Berryessa in San Jose off of H280. Available 4/15 (will consider renting before if needed). Call (408) 259-0635.

Grad student/Ames intern needs furnished summer housing from June to mid-Aug. Must be near public transportation. Email Linda Hays at hays@hanover.edu or call Dr. April Ronca (650) 364-2644.

Room for rent in Mtn View: priv., large, furnished room in remodeled, attractive home, 3000+ sq ft. Safe residential neighborhood, convenient location. Limited kitchen privileges, no pets and N/S. \$675/mo - utilities included. Call (650) 965-4599.

2 bd/1ba house one mile from Moffett. Redone inside and out. Attached garage and small yard. \$1,250/mo. + sec. dep. Call (650) 965-0775.

Condo for sale in Mtn View. 2 bd/1 ba. Upstairs w/ balcony. Pool, laundry and priv. storage locker. Security bldg w/one underground, gated parking space, and one above ground. \$174,800. Ron or JoAnne if you would like to see unit, or for information call (408) 279-6500.

2bd/1ba condo in downtown Palo Alto. 2nd floor condo unit in 4-plex bldg. Garage w/driveway, W/D, fireplace, storage, deck. New paint, new floors. \$1,900/month + sec. dep., no pets, N/S. Call (650) 321-9008.

Long-time Ames employee, East Bay resident will house sit your home, grand, modest or remote, on peninsula side of the bay. Mature responsible, w/church activities. Long term or weekends. References available. Call (510) 581-2076 eves.

Transportation

'88 Pontiac 6000, auto, air, good, reliable transportation car. This is really a great deal. \$1,100 or B/O. Call (408) 729-4828.

'88 Mazda RX-7 convertible. Leather, BBS wheels, factory CD player. Low mls. Exc. cond. \$7,750. (650) 966-1206 nights or (831) 648-1423 weekends.

'89 VW Jetta GL 4DR, 5-speed manual, DK grey, 98Kmi., A/C, CD w/150W stereo, new tires. complete maintenance records, Runs great, very clean. \$2,400. Call (408) 295-2160.

'89 Bronco Eddie Bauer, loaded, interior like new, towing pkg, push button on-the-fly 4 WD, orig owner, 43.5 K mls, w/car cover, \$10,799. Jim (408) 996-7674.

'91 Honda Prelude Si Coupe, 4 cyl 2.0 L, automatic, anti-lock brakes, power everything, A/C, 10-CD changer, 76 K, one owner, great car with service records, black exterior, \$8,200. Steve (408) 736-3831

Miscellaneous

Black, female corgi-cocker spaniel mix, free to good home. Spayed, house-trained, current shots, about 9 years old. Good companion. Sandy (408) 927-7586

Upholstered sofa and chair: contemporary, ivory, \$300. EvenFlow stroller; 2 yrs old, very clean, dark blue/white, \$50. Call (408) 295-2160.

NordiTrack Excel, \$150. Cannondale touring bicycle rebuilt last year, fits male 5'9" to 6'1", \$150. Sheepskin seat covers, low-back, like new \$100 (\$300 new). Call (650) 969-6119 or email: jdemaio@mail.arc.nasa.gov.

Moving sale: microwave (Emerson; 0.6 Cu.Ft, 600W) \$50; blender (Hamilton Beach) \$14; comfortor (king size) \$30; iron (Proctor Silex) \$8. Call (650) 691-9041.

Big wooden desk, perfect for computer, free to good home. Luke and Christine (408) 749-8495

Moving sale: Bdrm set w/2 night stands and triple dresser \$350; sleeper sofa, brown plaid, \$100; desk, danish wood, \$75; industrial sewing machine (Nakajima) \$650; Organ, Hammond floor model, gd cond, must sell, \$50; 4 ext'l hi-fi speakers, \$50 ea. Call (510) 651-2195.

Dependable, mature, NASA intern available for house/ pet/ plant sitting. Very flexible, price negotiable, references avail. Katie (408) 316-9765.

Ames Day at the Ball Park, Apr. 11

Tickets on sale now at Ames Café during lunch. \$5 gets you a game seat and pre-game tailgate party with food and drinks. POC: D. Renick, ext. 4-0290.

Brand new wedding dress w/veil. White satin dress w/beautiful decorative hem, a cutwork pattern. Beaded applique bodice w/long lace fingertip sleeves. Size 14. \$500 or B/O. Kari Wagner (650) 988-1190.

Wedding favors. Lovely handcrafted clay heart boxes. Ready to be fired/glazed! Approx. 130 favors. \$150 or B/O. Kari Wagner at (650) 988-1190.

QuickBasic software needed. Prefer version 4.5 or later. Michael Hom (408) 738-4932.

Unique upright piano, rebuilt from antique (turn of the century) solid Tiger Oak player piano with new keys, strings and dampers (no longer a player piano). No space in new home for it. \$800 or B/O. Call 650-321-9008.

Alleycat bike (purple) for child under 70 lbs. Only used one season. Attaches to adult bike. \$100. Margie (408) 230-4212.

Macintosh Quadra 605 with 8MB RAM, 14 inch screen, Style Writer printer, ergonomic keyboard, software & cables. \$275 or B/O. Stephane (408) 245-5160

Car Pool

Looking for riders, from Sacramento-Fairfield area to Ames. Leaving 4:30 a.m. Work hours: 6:30a.m to 3:00 p.m. Jim (707) 421-0995 lv msg.

Vacation rental

Lake Tahoe-Squaw Valley Townhse, 3br-2ba, View of slopes, close to lifts. Wkend \$400, midwk \$150 nite. Includes linens, firewd, cleaning service. (650) 968-4155, DBMckellar@aol.com

Lost & Found

Lost: One navy blue blazer (sports coat) with gold buttons--single breasted. Probably left in someone's office after a meeting. Ray at ext. 4-6875

Moffett Field lost and found may be reached via ext. 4-5416 at any time. Residents and employees at Ames may also use Internet Browser at: <http://ccf.arc.nasa.gov/codejp/pages/lostFound.html> to view a list of found property and obtain specific instructions for reporting lost or found property and how to recover found property. Call Moffett Field Security Police Investigations Section at ext. 4-1994 or email at: smckelvey@mail.arc.nasa.gov.

Veggie van fights pollution

Imagine a world without acid rain, polluted air or global warming. This is the hope and expectation of the anticipated transportation for the new millennium. With an array of new environmentally friendly cars, scientists, engineers and environmentalists are hopeful the modern era's ecological problems can be mitigated. One such experiment making headway in the fight against pollution is the Veggie Van.

The Veggie Van project began in 1997 under the auspices of Josh and Kaia Tickell. The Tickells became interested in alternative sources of fuel after working on an organic farm in Germany where the farmer powered his tractor with vegetable oil. The Tickells drive a 1986 Winnebago with an unmodified diesel engine that runs solely on used restaurant fryer grease. The duo attached an oil purifier to the back of the van. The purifier was constructed from a fruit juicer motor, which draws vegetable oil from the fryer. Then, a tug boat fuel filter purifies the grease, removing any French fries or crumbs and sends it into a steam kettle. A boat motor swirls the concoction of vegetable oil, lye and methanol to create biodiesel: a non-toxic, biodegradable diesel-like fuel.

The van's fuel usage registers about 25 miles per gallon, the same average for diesel, and can maintain speeds of a normal car. Plus, biodiesel provides more lubrication than regular diesel thus prolonging engine life. In fact, the Tickells have driven the Veggie Van from coast to coast, stopping along the way to lecture about the efficient use of alternative fuels.

There are numerous advantages to using biodiesel. First, since it does not contain sulfur there are no sulfur dioxide emissions. Soot emissions are 40-60% less, while car-

bon monoxide and hydrocarbon emissions are reduced by 20% to 60%. Biodiesel is an ideal fuel for sensitive environments such as marine areas, forests and congested cities. Second, biodiesel is a renewable energy resource. Unlike fossil fuels where consumption outpaces the natural production, biodiesel can meet future generational demands. It can be processed from any type of vegetable or animal fat, making it an infinite source of energy. Biodiesel can be used in any unmodified diesel engine, including tractors, buses and trucks. Furthermore, the byproduct of biodiesel is glycerin, a non-harmful substance, which can be converted into soap. Lastly, biodiesel is affordable. If processed in your home, it costs about 50 cents a gallon and takes about two hours to make.

Want to learn more about the Veggie Van? Stop by Hangar 1, April 22 to celebrate NASA Ames' Earth Day Event "Transportation of the New Millennium," where you can learn more about biodiesel and see the latest electrical vehicles. Just think, in a few years, you may be ordering a gallon of grease to go with that Big Mac and fries.

By MICHELLE PERRY

Astrogram deadlines

All Ames employees are invited to submit articles relating to Ames projects and activities for publication in the *Astrogram*. When submitting stories or ads for publication, submit your material, along with any questions, in MS word by e-mail to astrogram@mail.arc.nasa.gov on or before the deadline.

DEADLINE	PUBLICATION
MON, MAR 29	FRI, APR 9
MON, APR 12	FRI, APR 23
MON APR 26	FRI, MAY 7

Ames' Environmental Services office to host Earth Day event in Hangar 1

The topic will be "Transportation of the New Millennium." The event will be held on April 22 in Hangar 1 from 10 a.m. to 3 p.m. and is free. All are welcome: employees, contractors, and fleet managers.

Become familiar with the newest models of production electrical vehicles available in California (e.g. GM EV1, Ford Ranger EV, Sparrow, Nissan Altra, Toyota Rav-4, and Solectria). See the latest in electrical powered bikes and scooters. View personal vehicles that have been converted to electrical power. Find out how charging systems work. Observe a vehicle fueled by vegetable oil. Learn about transportation alternatives. For more information, or to help with the event, call ext. 4-0924 or email Linda at lvrabel@mail.arc.nasa.gov.

THE AMES *Astrogram*

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