

Astrogram

Communication for the Information Technology Age

Hubbard delivers Vision message to the land down under

NASA Ames Center Director G. Scott Hubbard recently had the opportunity to convey the nation's Vision for Space Exploration to audiences in the 'land down under.'

In early September, Hubbard participated in a weeklong effort in Canberra, Australia, promoting the Vision to four separate groups of senior industry executives, representatives of



NASA Ames Center Director G. Scott Hubbard conveys the 'Vision for Space Exploration' message to conference attendees recently in Canberra, Australia.

national research organizations, government policymakers, students and fellow NASA employees.

"The Australia trip was extremely informative. I attended a major information technology conference and visited the Australian Centre for Astrobiology," said Hubbard. "Clearly, Australia is making tremendous strides in IT and astrobiology, both areas of great interest to Ames," he added.

Hubbard gave a keynote address at the Outlook forum, a conference sponsored by the Australian Commonwealth Scientific and Industrial Research Organization's Information and Communications Technologies (ICT) Centre. According to the ICT forum's Web site, the forum was designed to provide "a platform for industry and research to explore issues of Australian and global significance."

The forum focused on global marketing challenges confronting industry and how to address those challenges.

Forum attendees also discussed key ICT technology challenges and their impacts and how Australia ICT research and industry can make a difference.

The conference organizers were especially interested in hearing about the impact of information and communication technologies, how they have influenced NASA, and what sort of challenges concerning information processing, visualization, communications,

nanotechnology, human factors, and self-repairing vehicles, are expected in the future.

The Centre emphasizes on information and communication technologies. It serves as a 'single point of contact for technologists, customers and research partners with an ICT interest.' It also supports Australia's efforts "to compete in global ICT innovation, applying re-

continued on page 4

NASA provides Mt. St. Helens images

One day before Mount St. Helens erupted Oct. 1, in southern Washington, NASA Ames scientists took visible and infrared (IR) digital images that revealed signs of heat below the mountain's surface. Ames also produced similar, post-eruption images. The later images show an increase in the number of hot spots in the crater of Mount St. Helens and a plume of smoke emitting from the crater.

The images may provide valuable clues as to how the volcano erupted. Scientists flew an infrared imaging system aboard a small Cessna Caravan aircraft over the mountain to acquire the IR data.

"Based on the IR signal, the team predicted an imminent eruption," said Steve Hipskind, acting chief of Ames' Earth Science Division.

"We were seeing some thermal artifacts in the floor of the Mount St. Helens crater in southern Washington," said Bruce Coffland, a member of the Airborne Sensor Facility at NASA Ames. "We flew Thursday (Sept. 30) and used the 50-channel MODIS/ASTER Airborne Simulator (MASTER) digital imaging system. We are working to create images from the IR data that depict the thermal signatures on the dome," Coffland added just after the data was acquired.

MASTER is an airborne simulator instrument similar to the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) high-resolution infrared imager carried on the Terra Earth observation satellite.

The NASA Ames airborne sensor team was in the Mount St. Helens area taking data for a United States Geological Survey (USGS) study that was looking at some of the effects of the mountain's 1980 eruption.

"This had been planned for some time and we were there totally by coincidence," said Coffland. The science objectives for the USGS study included outlining the boundaries of lava flows



NASA photo courtesy JPL

NASA Ames scientists took visible and infrared digital images of Mount St. Helens on Oct. 12 from a light airplane. The images show an increase in the number of hot spots in the crater of Mount St. Helens, and a plume of smoke emitting from the crater.

associated with Mount St. Helens' previous eruptions in 1980.

"We flew four flight lines over the mountain," Coffland said following the last mission before the eruption. "It's a continuous scan image, eight miles (13 kilometers) long and about 2.3 miles (3.7 kilometers) wide," Coffland said. There were four adjoining flight lines flown for Joel Robinson, an investigator at

continued on page 5

Interns study forest carbon dynamics, invasive species

DEVELOP is a NASA-sponsored student intern program with activities at four NASA centers. DEVELOP creates pilot application projects using remote sensing and Earth science information to demonstrate to state, local and tribal governments how Earth science technology and data can be used to assist communities.

DEVELOP is a unique program because it is student-run and student-led, with advisors and mentors from the public sector as well as from NASA. The program is active all year long, but the most intense activity is during summer months. This program was designed to be an introduction to Earth science and Earth scientists, professional business/client relationships and the facilities available at the NASA centers.

During this past summer, NASA Ames' DEVELOP program initiated two projects focused on environmental problems relevant to stakeholders in the states of Oregon and Nevada. The first project was developed in conjunction with the Fremont-Winema National Forest in southern Oregon. The objective of this was to provide information to forest administrators, which will assist them in their decision making process for their 2005 forest management plan.

DEVELOP students evaluated different fuel load-reduction scenarios in relation to carbon sink values. Using Geographic Information System (GIS) and remote-sensing data, the group generated inputs for a NASA-developed carbon model as well as a comprehensive vegetation map and fuel model. The Oregon project team collected data for five consecutive days throughout the Fremont-Winema forest and the surrounding area. Work consisted of soil sampling for underground carbon data and species and fuel type identification for fire model and vegetation map validation. DEVELOP interns worked with a forest ecologist on species identification and a forest soil scientist on soil sample collections.

"DEVELOP is a great internship program because we work on entire projects from project development to the research and implementation," according to the author, a San Francisco State University graduate student in geography.

The second project was the development of a mapping protocol for tamarisk (also known as salt cedar), a prevalent invasive species in Nevada. Once a mapping protocol was established, a remote-sensing method using collected field data was developed in an effort to predict other potential locations of tamarisk presence. The Nevada invasive species team spent one week in northwestern Nevada collecting presence/absence

data for tamarisk. Ultimately, a vegetation classification method using NASA satellite imagery was implemented and combined with other environmental data. This project yielded a susceptibility map of tamarisk as well as an assessment of vegetation spread over the past 12 years in the study region.

Participating stakeholders for this study include the state of Nevada, local wildlife refuges and the Pyramid Lake Paiute Indian Tribe. The DEVELOP team will be presenting results to the state of Nevada and to the American Society for Photogrammetry and Remote Sensing.

"This was an excellent project because we were able to explore different field data-collection methods in conjunction with remote-sensing interpretation methods and produce decision support tools for our customers," said Dyuti Sengupta a graduate student in geogra-



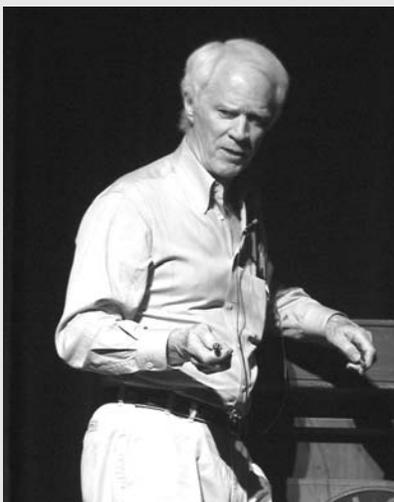
DEVELOP interns Michael Jin (center) and Catherine Huybrechts (right) discuss species identification with Karl Gruelich, forest ecologist with the Winema-Fremont National Forest, in Oregon during a July field trip.

phy at San Jose State University.

NASA mentors associated with DEVELOP at Ames are Jay Skiles and Cindy Schmidt of the Ecosystem Science and Technology Branch. DEVELOP is funded by the NASA Headquarters Applications Division of the Science Mission Directorate.

BY CASEY CLEVE

Apollo 9 astronaut presents at Foothill



Apollo 9 Astronaut Russell Schweickart spoke at Foothill College recently about the threat of asteroid impacts and methods being used for asteroid deflection.

Ames to celebrate 65 year anniversary

In recognition of NASA Ames' upcoming birthday and to celebrate our 65 years of innovation, all civil servants, contractors and students are invited to participate in a commemorative photo opportunity.

Tentatively scheduled for Dec. 7, Ames employees will assemble on the grassy area in the circle in front of Building 200 to create a giant numeral '65.' The formation will be photographed and preserved as part of the historic record.

Details about the exact time and place of the event will be provided in a later centerwide announcement.

Join us for this fun and historic event that will help us retain the excitement of the day -- and of our accomplishments as a center -- for years to come.

NASA symposium answers question of why we explore

Despite the dangers, explorers continue to take countless risks as they set out to explore the Earth, be it by land, by



Famed Apollo 13 astronaut James Lovell, center, spends a few moments with symposium attendees during a break.

sea, or even among the stars. Why do they do it? Why do we explore in the face of danger?

The answer came during a three-day NASA symposium 'Risk and Exploration: Earth, Sea and the Stars' held Sept. 26 to 29 at the Naval Postgraduate School in Monterey.

"It's not just to seek thrills, but to gain knowledge and to learn how to mitigate risk," explained NASA Administrator Sean O'Keefe during his opening remarks. "NASA is defined by great triumphs and unbelievable tragedies... and we have learned from both."

Joining NASA Ames Center Director G. Scott Hubbard and O'Keefe at the well-received symposium were approximately 150 people, including NASA astronauts and renowned explorers, who have traveled to the highest peaks and the depths of the oceans. Following a welcome by C. Glenn Mahone, NASA assistant administrator for public affairs, Hubbard opened the symposium with some introductory remarks before introducing the NASA administrator.

Noting that NASA had "learned some tough lessons" from the space shuttle Columbia tragedy, Hubbard said that risk can never be eliminated.

"We're here today to look at risk and how to accept it and how to mitigate it," he explained to the audience.

Staff from the Center Director's office and the Ames Public Affairs Division helped with organization of the symposium and coordinated logistics for the event. A technical crew of 30 people from Ames and vendor production companies produced 15 hours of live televised broadcasts on NASA TV and taped the three-day symposium for later rebroadcast. They also designed a set that drew praise from everyone, in-

cluding the NASA Administrator.

CNN anchor/reporter Miles O'Brien moderated the first discussion 'Public Perception of Risk' and proved an inspired choice as he facilitated the discussion featuring remarks by James Lovell, the famed Apollo 13 astronaut and Jack Stuster, principal scientist at Anacapa Sciences, Inc.

Eugene Roddenberry, son of Gene Roddenberry, creator of the famed Star Trek television series, was among those in attendance. He is working on a documentary and is planning to visit Ames this winter to conduct several interviews for the documentary.

Each of the three panels, Earth, Sea and Stars, were excellent and featured renowned leaders in their respective fields. Ames' Chris McKay moderated the Earth panel discussion, featuring scientist Nathalie Cabrol and astrobi-



Participants listen attentively to speakers at the recent Risk Symposium at the Naval Postgraduate School.

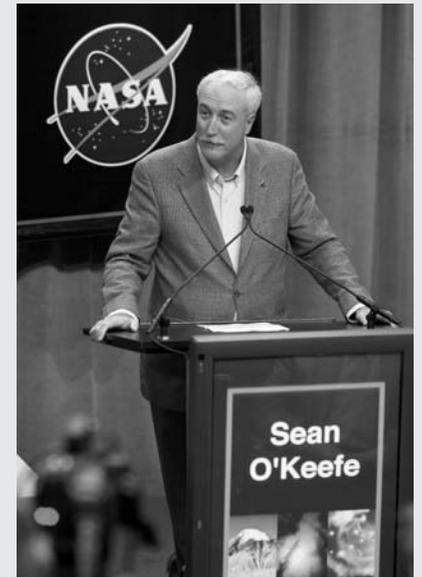
ologist Dale Anderson of Ames; Bill Stone, president of Stone Aerospace; writer David Roberts; mountaineer Ed Viesturs; and Penny Boston from the New Mexico Institute of Mining and Technology.

Cabrol, an Ames planetary geologist, said that "risk is inherent in exploration and a necessary part of discovery."

David Halpern, senior policy analyst for the White House Office of Science and Technology Policy, moderated the Sea panel discussion, featuring diver John Chatterton; Sylvia Earle, founder of Deep Exploration and Research; Jean Michel Cousteau, president of Ocean Futures Society; NASA astronaut Mike Gernhardt; Academy Award winning director James Cameron; and author Laurence Bergreen.

Earle, who has more than 6,000 hours of diving experience, said she wasn't as concerned about the dangers of taking risks, as she was about not taking risks.

NASA Chief Scientist John Grunsfeld moderated the Stars panel,



NASA photos by Dominic Hart

NASA Administrator Sean O'Keefe sets a bold tone during his opening remarks at the recent NASA Risk and Exploration Symposium at Monterey, Calif.

featuring NASA astronaut Shannon Lucid; former astronaut Harrison Schmitt; Steve Squyres of Cornell University and the scientific principal investigator for the Mars Exploration Rover mission; Jim Garvin, NASA chief scientist for Mars and the moon; John Mather, senior project scientist for the James Webb Space Telescope project; and Graham Yost, a writer and director 'From the Earth to the Moon.'

Grunsfeld, an astronaut who has traveled four times in space, said there was still much to learn about space. "We really are in the infancy of space exploration, and it's time to leave the cradle," he observed.

Since it was by invitation only at Headquarters' request, news media attendance was modest. However, Key Davidson, science writer for the San Francisco Chronicle; Sam Burbank of the National Geographic magazine; and Kevin Howe, science writer for the Monterey Herald, all attended the symposium.

Hubbard, who delivered the closing remarks for the symposium, predicted that NASA would continue to take risks and explore the home planet, as well as outer space, in search of exciting new discoveries.

"I think it's going to be an absolutely fascinating journey over the next 10 years," he ventured.

BY MICHAEL MEWHINNEY

Ames graces local Yellow Pages cover



Several members of the Ames Public Affairs Division challenged Sunnyvale students to support recycling efforts during a recent event at the Fairwood Elementary school. The new SBC local Yellow Pages cover, featuring a NASA Ames composite image designed



by Pia Navarro, was also unveiled. Students had the chance to see Ames' Personal Satellite Assistant and Personal Exploration Rover while being encouraged to become the space explorers of tomorrow.



Stores Stock thanks employees



NASA photo by Dominic Hart

The NASA Ames Stores Stock Office recently hosted a customer appreciation day, providing delicious, catered refreshments for Ames employees as well as providing the opportunity for employees to speak to vendors who provide the supplies to the store.

Hubbard delivers message down under

continued from front page

search results to challenges across all industry sectors, both internationally and in Australia."

Hubbard also gave a free public lecture discussing 'Exploring Mars with Humans and Robots: Technologies for the New Exploration Vision' to the Australia National University.

"I had an excellent opportunity at the Australia National University in Canberra to tell a wider audience about Ames, NASA, and the exploration vision," stated Hubbard.

While in Canberra, he also had the opportunity to visit and give a talk at NASA's Canberra Deep Space Communications Complex, one of the agency's three deep space network stations (the others are in Madrid, Spain and Goldstone, Calif.).

"I was very pleased to visit the deep space tracking station, which plays such a critical role in supporting NASA's missions," recalled Hubbard.

Hubbard ended his trip with a visit to the Australian Centre for Astrobiology. At the invitation of Centre Director Malcolm Walter, Hubbard gave a talk to Walter's astrobiology class and was given a tour of the center. The Centre became an affiliated member of the NASA Astrobiology Institute in January 2001. It is located at Macquarie University in Sydney.

BY JENNIFER KREMER

Ames' NET Web site launched

You are invited to visit the newly-launched NASA Engineering Training (NET) Web site at <http://net.larc.nasa.gov>. The NET Web site will provide NASA engineers with information and links to the training and career-development resources necessary for success. The site will also serve as a forum for news, discussions, lessons and strategies.

On the site, you will discover information (sponsored by NET through NASA Headquarters) about the engineering training that is available to the NASA engineering community, including a comprehensive list of all NET courses, course descriptions, syllabi and class schedules. The site also features news articles, testimonials and

links to NASA, government and other training and educational facilities.

Future features will include information on career growth opportunities, training workshops and conferences, discussion groups, a 'course workshop area' and an online subscription engineering newsletter.

The NET curriculum will continue to grow and expand to meet the needs of the engineering community. The Web site will also provide NASA engineers with a forum for discussing items of interest and a conduit for suggestions that will go directly to Headquarters engineering management. Join in often at this 'meeting place' and send in your comments and suggestions.

NASA receives GSA's Gold Star award

NASA recently received GSA's First Annual Gold Star award in the Computers for Learning Program. Lewis Braxton, NASA Ames director for center operations, accepted the award on

puter technology in American education.

Executive Order 12999, Educational Technology, directs agencies, to the extent permitted by law, to transfer computer and related peripheral equipment excess to their needs directly to schools and some educational nonprofit organizations. The Computers for Learning (CFL) Web site supports Executive Order 12999 and helps streamline the transfer of excess federal computer equipment.



The GSA Computers for Learning Gold Star Award was presented to the NASA team by Becky Rhodes and Robert Holcombe. From left to right: Robert Holcombe, Dave Melton, Jean Manning, Lewis Braxton, Frank Custer and Becky Rhodes.

behalf of NASA. The award was presented at the National Property Management Association educational seminar, in Reno, Nev. Presenting the award was GSA Deputy Associate Administrator Becky Rhodes. Other NASA attendees included David Melton, manager, warehousing and disposal programs, HQs; Jean Manning, property disposal officer, Dryden Flight Research Center; and Frank Custer, property disposal officer, NASA Ames.

The Gold Star award for excellence is presented annually to recognize a federal agency's innovative implementation of Executive Order 12999. GSA's goal in presenting this award is to publicly recognize the federal government's commitment to improving access to com-

puting technology in American education. According to CFL, NASA is the leading agency for fiscal years 2002 and 2003. In 2002, NASA donated 5,726 items, which had an acquisition cost of over \$16M, compared to the government total of 11,706 with an acquisition cost of \$31.3M. In 2003, NASA transferred 5,668 with an acquisition cost of \$11.7M, while the government total was 13,757 at \$55M.

Education is a national priority. Every child should be educated to his or her full potential. The CFL program helps accomplish this goal by increasing access to technology. Our nation ultimately depends on our children's success in school.

To learn more about the Computers for Learning Program, contact Frank Custer at Frank.E.Custer@nasa.gov

Dolores Huerta visits Ames



NASA photo by Tom Trower

Dolores Huerta addresses the audience during her recent visit to Ames in celebration of National Hispanic Heritage Month.

In celebration of Hispanic Heritage Month and in commemoration of the 40th anniversary of the passage of the Civil Rights Act of 1964, civil rights activist Dolores Huerta addressed NASA Ames employees in September.

Huerta is the co-founder and first vice president emeritus of the United Farm Workers of America. Responding to the needs of U.S. farm workers, Huerta worked closely with Cesar Chavez to organize them to improve their working conditions. Since 1955, Huerta has led voter registration drives, pushed for improved public services and battled segregation.

Safety corner...

So there you are in the bathroom, just minding your own business, when suddenly the room turns dark. All sources of light have made a hasty departure and you are surrounded by the inky blackness. "Uh oh!" you think to yourself "Power outage!"

In many bathrooms around Ames, such an occurrence is cause for concern because once the power shuts down, there is no secondary source of light to replace the illumination provided by overhead fixtures. Beyond the annoyance factor, personnel attempting to make their way to the bathroom exit by groping blindly at the walls may trip, bump into sharp corners or otherwise injure themselves.

In their ongoing efforts to increase safety at Ames, the folks at the Flight

Simulation Facilities (SimLabs) have hit upon an inexpensive, simple solution to this dilemma: plug-in emergency lights. These simple 'nightlights' illuminate when the power source to which they are connected ceases to operate. The Garrity Company retails these fixtures for less than \$10 each and they also manufacture a rechargeable flashlight for about \$20 that functions in the same manner. Other companies make comparable products.

So let's return to the dark bathroom where we stranded you a few moments ago. Now, instead of dark and forbidding surroundings, you see a pale glow that facilitates a safe exit of the premises. For less than ten bucks, a potentially hazardous situation has been avoided.

BY KATHLEEN STARMER

Mt. Saint Helens

continued from front page

USGS, Menlo Park, Calif.

After the plane landed, technicians downloaded data from a computer hard drive, and began to process the data to produce an image format for use by scientists.

Sky Research, based in Ashland, Ore., provided the Cessna Caravan, a propeller-driven, single-engine airplane that carried the IR imager. Images are available on the Internet at: http://www.nasa.gov/multimedia/imagegallery/image_feature_sthelens.html, at <http://amesnews.arc.nasa.gov/releases/2004/helen/helen.html> and also at <http://masterweb.jpl.nasa.gov/>

BY JOHN BLUCK

UARC Institute inspires next generation of scientists

Is Nanotechnology a viable career path for the future? According to the panelists at a recent Systems Teaching Institute's (STI) seminar series presentation, nanotechnology will impact many industrial sectors. The seminar was the first in a series designed for students to explore opportunities in scientific research. The panelists included Meyya Meyyappan, director of the Center for Nanotechnology at NASA Ames; Holger Schmidt, assistant professor of electrical engineering, University of California, Santa Cruz; and Robert Cormia, faculty member, computers, Technology and Information Systems, Foothill-DeAnza College.

Meyyappan discussed how industries such as IT, health and medicine, materials, energy, environment, transportation and national security would all benefit from current research being done. He remarked that, "Nanotechnology is an enabling technology" that will permit the development of products. Meyyappan explained how the achievements in materials science would be revolutionized because, "...instead of machining materials down, you start at the molecular level and build them up. This leaves little to no waste and greater cost benefits." Some innovations might be intelligent appliances, display technology, and memory, artificial limbs, organs and bones and early warning sensors in humans. Solar cells, lighting, filter membranes, fuel cells and lightweight vehicles are also possible developments that can be made using nanotechnology.

Although still in its infancy, some innovations utilizing this technology, such as airbags, have already appeared on the market. Schmidt came to the seminar wearing a nano-care® shirt designed by Nanotex. The shirt is made from fibers that "...feel softer, repel liquids, resist stains, stay dryer and release 'ground in' stains."

The educational requirements to enter this field are daunting. Life sciences, physical sciences and engineering are a start. Emphasis in physics, chemistry and quantum mechanics are essential and especially important is materials engineering. Bioinformatics, molecular biology and data modeling are also needed. Cormia stated that silicon experience is critical and the foundation for all of this begins with mathematics. He emphasized math throughout his presentation and called it, "...the operating system of the universe." He further stated that a four-year degree would be required for the 'technician positions' in this field and suggested a multi-tiered curriculum to advance beyond.

One challenge for students interested in this field is the lack of college-level degree programs offered in the United States. Only a handful of universities offer any nanotechnology programs and these are at the advanced levels. "A B.S. is being offered at a couple of Australian universities," Meyyappan stated. "Unless there is a large enough job market waiting, this won't sell in the U.S." Cormia is developing an entry-level course at Foothill College and hopes it will be available for the winter quarter in 2005.

Under the auspices of NASA and the UARC, a collaborative partnership

for higher education with UC Santa Cruz, San Jose State University and the Foothill-DeAnza Community College District, the Systems Teaching Institute serves as a kind of 'teaching hospital' for science and technology students. The faculty are skilled professionals who will mentor students on actual research projects. The next seminar is on Nov. 18 entitled 'external funding to grow your research.' Both seminars are open to students and interns at NASA Research Park, SISU Building 583c. For more information, contact Maria Blake at ext. 4-0529 or at mblake@mail.arc.nasa.gov.

BY OLA MARRA COOK

Chili cookoff a fun event for all

The 8th annual chili cook off was held in October and brought out chili lovers from all across the Center. Here are the competition winners:

Judges Choice Award

- 1st - Ames Fire Department
- 2nd - No Foo Foo-Just Chili, NAS Division
- 3rd - Team Tessada, Tessada & Associates Inc.

People's Choice Award

- 1st - Ring of Fire, Asani Solutions LLC
- 2nd - The Bourbon Street Gang, Integrated Asset Mgt.
- 3rd - Team Tessada, Tessada & Associates

Five Alarm Ring of Fire

Best Presentation Silly Chilly, Code EP



NASA photos by Dominic Hart

NASA scientists seek life's chemical dance in deep space

A NASA scientist has proposed a future space mission that will track the dance of interstellar chemistry from deep space back to Earth to find out where and how life began.

Scott Sandford, a space scientist at NASA Ames, is the principal investigator on a proposed new NASA mission called ASPIRE, an observatory that will look for organic compounds and other molecules in space. ASPIRE (Astrobiology Space InfraRed Explorer) also will investigate the role of organics in forming planetary systems like Earth.

Organic carbon-rich compounds, the chemical 'stuff' of life, are largely made of the elements carbon, hydrogen, oxygen and nitrogen. Not all carbon-rich molecules indicate the presence of life, but many can drive biological activity. Some carbon-containing compounds, such as diamonds, the graphite in pencil leads and carbon monoxide, for example, have no 'life' connection.

"The goal is to understand how organic materials are formed, evolve and find their way to planetary surfaces like the Earth's," Sandford said. "ASPIRE will help us address the 'astro' in astrobiology and give us a better understanding of the role cosmic organics play in the origin of life by tracing them through space, all the way from the interstellar medium (ISM), the space between stars, to comets, to Earth."

In July, NASA chose ASPIRE, along with eight other Origins Probe missions, to be funded for a concept study that will provide more details about the science and engineering that would be required to execute these missions.

The program is part of NASA's Astronomical Search for Origins Program, which seeks answers to two fundamental questions: "How did we get here?" and "Are we alone?" The first of the Origins missions, 'capped' at \$670 million each, might launch as early as 2012, with subsequent launches to follow every four years.

ASPIRE will use a cooled telescope equipped with mid- and far-infrared spectrometers, which are instruments that can detect the vibrations of chemical compounds. The instruments will detect and identify organic compounds and related materials in a wide variety of environments in space.

The main analytic technique the scientists plan to use is infrared spectroscopy in the 2.5 to 40 micron range, a wavelength range that is not visible to humans, but that we experience as 'heat.' This spectral region is the best for picking up the molecular vibrational signatures of organics in gases and solid molecular systems. Many atomic spe-

cies can be detected at these wavelengths as well. One micron equals one part in a million meters; a meter is a bit over one yard.

According to Sandford, the scientists plan to study molecules in several areas -- examining ejecta from dying stars, studying the diffuse ISM, examining dense molecular clouds where new stars and planets are born and scrutinizing comets and asteroids of the type that once rained down on Earth. "We will follow the flow of organic compounds throughout space to get a better sense of

the role they may play in (the origin and evolution of life," he said.

Sandford says he expects the team will track the most rapid chemical changes in the outflows from stars as they cool down from red giants to white dwarfs, and in dense molecular clouds, the roiling birthplace of new stars where newly formed compounds are screened from damaging ultraviolet (UV) radiation. The most stable area where there probably will be the least chemical variation, he predicts, is in the harsh radi-

continued on page 13

Homeland Security recognizes NASA role in National Response Plan

NASA has been recognized as an important player in the new National Response Plan issued recently by the Department of Homeland Security.

The National Response Plan is designed to help develop a unified approach to domestic incident management across the nation and is a first step toward integrating the many federal domestic prevention, preparedness, response and recovery plans into a single, all-hazards plan.

"I am very pleased that NASA and DART are specifically mentioned in the National Response Plan," said Bob Dolci, director of emergency services at Ames, "as are our research and test-bed facilities. This should help us obtain funding to develop and test the critical technologies needed by urban search and rescue personnel."

The document notes that NASA "provides personnel in appropriate technical disciplines, such as its Disaster Assistance and Rescue Team, to support urban search and rescue (US&R) task forces." It also acknowledges that NASA "provides and maintains training sites for use of US&R task forces; assists the Department of Homeland Security with identification as well as research and development of new technologies for first responders; provides test-bed facilities for ... testing of new US&R technologies; and provides temporary use of facilities for mobilization centers and staging areas for US&R assets." In addition, NASA is noted as a provider of buildings, airports and telecommunications as required for emergency support operations.

As part of its continuing contributions to emergency response preparedness, Ames earlier this year brought together emergency responders and

technology developers from across the country to test and refine new technologies and to highlight the importance of technology development to the emergency responder. The gathering was part of the center's 15th annual collapsed structure rescue workshop, an ongoing, nationwide collaborative effort to share knowledge and expertise and to develop and improve techniques and tools used in urban search and rescue. Better understanding of technology needs and priorities will make the emergency response task safer and more effective, Dolci added.

NASA Ames' unique collapsed-structure training facility includes a large concrete rubble pile with built-in voids and rooms, a simulated concrete collapsed structure, a 30-foot-long twin-engine aircraft 'crashed' into a portion of the collapsed structure and large concrete loads for lifting and moving. Other features include a hazardous materials field training facility, high-angle rescue training towers and confined-space and trench-rescue training props.

"Ames has a unique combination of facilities and expertise to help first-responders and technologists learn how to refine or modify existing technologies to meet the specific needs of emergency responders," Dolci said. "I am pleased that DHS has formally recognized our contributions."

NASA Ames' Disaster Assistance and Rescue Team has responded to disasters such as the Loma Prieta and Northridge earthquakes, the Oklahoma City bombing, and the Sept. 11, 2001, collapse of the twin towers at New York City's World Trade Center. For more information about DART, go to: <http://dart.arc.nasa.gov>

BY ANN SULLIVAN

San Jose Elementary students get taste of space exploration

Students at San Jose's Toyon Elementary School learned from NASA Ames Center Director G. Scott Hubbard and astronaut Marsha Ivins about the Vision for Space Exploration and how they can be an integral part of making it a reality. The theme of the September visit with the next generation of explorers was "There is a place for me at NASA."

"As NASA moves forward to carry out the Vision for Space Exploration, it is essential that we excite students about the thrilling opportunities that are opening up for them," said Hubbard. "NASA is committed to working in partnership with our schools to create exciting new

as a key architect of NASA's Mars exploration road map. Recently, Hubbard was the sole NASA representative on the Columbia Accident Investigation Board, which determined the cause of the Columbia accident and cited the need for a new national space exploration vision.



Ames Center Director G. Scott Hubbard challenges students at Toyon Elementary School to become the space explorers of tomorrow.

learning environments. America has always been a nation of explorers, but we can't possibly turn the space exploration vision into reality without the enthusiastic involvement of our young people."

The NASA Explorer School program provides opportunities for schools, administrators, students and their families to partner with NASA to improve student learning; participate in authentic experiences with NASA science and technology; apply NASA science, mathematics and technology knowledge to real-world issues and problems; and participate in special events and other opportunities.

"Being named a NASA Explorer school is such a great honor and opportunity for students, parents and staff in the Toyon community," said Deborah Washington, principal of Toyon Elementary School. "Our students will have their learning enhanced and extended far beyond my expectations as students of science, math and technology. When you speak of science, my students will know so much more than what other elementary students in northern California will know, because of this partnership with NASA," she added.

Hubbard served as NASA's first Mars exploration program director and



NASA photos by Dominic Hart

NASA Ames Center Director G. Scott Hubbard (right, back row) and astronaut Marsha Ivins (second from right, back row) at the recent visit to the NASA Explorer School, Toyon Elementary, in San Jose. The NASA team shared the Vision for Space Exploration with the kids and showed them how they can be an integral part of making it a reality. For more information about NASA Explorer schools, visit the Internet at <http://explorerschools.nasa.gov>

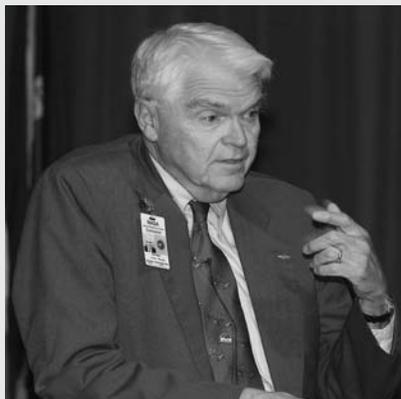
Ivins started at NASA in 1974 as an engineer developing the space shuttle's heads-up display. In 1980, she was assigned as a flight engineer aboard the shuttle training aircraft, used to train space shuttle pilots. Ivins joined the astronaut corps in 1984 as a mission specialist and has since amassed an impressive resume of technical assignments and space flights. She is a veteran of five space flights (STS-32 in 1990, STS-46 in 1992, STS-62 in 1994, STS-81 in 1997 and STS-98 in 2001) and has logged more than 1,318 hours in space.

Ivins was born in Baltimore, Md., and is a graduate of Nether Providence High School, Wallingford, Pa. She received her bachelor of science degree from the University of Colorado at Boulder in aerospace engineering in 1973. Ivins is an avid pilot and holds many ratings, including a multi-engine airline transport pilot license as well as airplane, instrument and glider instructor ratings. She has logged more than 6,300 hours in civilian and NASA aircraft.

For information about the NASA Explorer Schools Program, visit: <http://explorerschools.nasa.gov> For more information about the Vision for Space Exploration, go to: http://www.nasa.gov/missions/solarsystem/bush_vision.html

BY JONAS DINO

Hans Mark presents colloquium



NASA photo by Tom Trower

Recently, Dr. Hans Mark, left, presented a director's colloquium about the feasibility of using electro-magnetic guns in naval warfare. Mark specializes in the study of spacecraft and aircraft design, hypervelocity projectiles and impact, and national defense policy. Mark served as director of NASA-Ames, secretary of the Air Force, deputy administrator of NASA and most recently, the director of Defense Research and Engineering. He has published more than 180 technical reports and authored or edited eight books. Mark is a member of the National Academy of Engineering and an Honorary Fellow of the American Institute of Aeronautics and Astronautics.

Exploration Mission Directorate personnel test drive ISIS simulator

Exploration Mission Directorate representatives observed how investigators in the Human Factors Research and Technology Division are developing techniques to improve the human-computer interface between crewmembers and next-generation spacecraft.

The group utilizes the Intelligent Spacecraft Interface Systems (ISIS) laboratory, a part-task simulator of a spacecraft cockpit that is fully reconfigurable, enabling researchers and astronauts to test many possible human-computer system configurations.

Currently, the ISIS simulator is configured as a shuttle cockpit and is being used to measure the workload, situation awareness and fault management performance of shuttle crewmembers during normal and abnormal mission operations.

On next generation spacecraft that will carry humans beyond low-earth orbit, crewmembers will be interacting with onboard software systems that are considerably more complex and intelli-



Exploration Mission Directorate representatives experience the shuttle cockpit interface configuration of the Intelligent Spacecraft Interface Systems (ISIS) simulator at Ames. From left to right: John Mankins, deputy division director, Human and Robotics Technology Development Programs Division (seated); Mike Hecker, deputy director, Development Programs; Craig Cornelius, program Integration and Operations manager; and Bobby Watkins, assistant associate administrator.

gent than the systems aboard the shuttle.

The ISIS facility, led by co-principal investigator.s Robert McCann and Jeffrey McCandless of the Human-Automation Integration Research Branch, will

be used to develop and evaluate the advanced human-computer interfaces needed to support this interaction.

NASA turns 46



NASA photos by Dominic Hart

On Oct. 1, NASA Ames celebrated NASA's 46th anniversary. A special cake, along with other refreshments, were served to Ames employees at the NASA Ames Mega Bites cafe.



NASA awards Native American grant

NASA is inspiring the next generation of explorers through the Native American Tribal Colleges and Universities system. NASA recently awarded a \$7 million, five-year cooperative agreement grant to the American Indian Higher Education Consortium (AIHEC), Alexandria, Va.

AIHEC is comprised of presidents of all 34 tribal colleges and universities located throughout the U.S. The organization plays a vital leadership role in the American Indian education community.

The 'Building Bridges to Excellence in Math, Science and Technology' grant will increase the number of American Indian students pursuing academic studies and careers in science, technology, engineering and mathematics.

"NASA works to inspire, engage, excite and motivate our explorers and inventors of tomorrow. The Native American community contributes to our pipeline, and through this grant we seek to expand their participation in science, technology, engineering

and mathematics disciplines," said Adena Williams Loston, NASA's chief education officer.

AIHEC is responsible for strengthening the delivery and management of NASA-sponsored programs, recruiting, identifying participants and fostering a closer exchange of ideas and information among NASA, students, faculty and staff.

For information about NASA education programs on the Internet, visit the Web at <http://education.nasa.gov>



Inventions and contributions board inducts first Ames scientist

Jonathan Trent is the first Ames scientist to be invited to serve on the prestigious Inventions and Contributions



Jonathan Trent

Board (ICB). Trent will participate as the board expert in astrobiology and bio-nanotechnology.

His enthusiasm for his research and his ease in communicating the complexity of topics such as bio-nanotechnology makes him a valuable asset to the ICB and NASA.

Trent joined Ames in 1998 to conduct research in astrobiology. In his paper 'Extremophiles in Astrobiology: Per Ardua ad Asta,' Trent states "One of the prominent goals of astrobiology is to discover life or signs of life on planets beyond Earth. To approach this goal, it will be useful to know the physical and chemical limits for life on Earth..."

He began his academic career at UC Santa Cruz where he is now adjunct professor. He explored the effects of pressure and temperature on microbes in the ocean. This work started a life-long interest in the extreme limits of life on Earth. His research has taken him from acidic hot springs in Yellowstone National Park to a volcano in Kamchatka, Siberia.

After receiving a Ph.D. in biological oceanography at Scripps Institution of Oceanography studying marine microbiology, Trent spent six years in Europe at the Max Planck Institute for Biochemistry in Germany, the University of Copenhagen in Denmark and the University of Paris at Orsay in France studying biochemistry and molecular biology. He returned to the U.S. to work at the Boyer Center for Molecular Medicine at Yale Medical School for two years before establishing a biotechnology group at Argonne National Laboratory. There, he developed industrial and biotechnological processes such as organisms used for waste clean up.

The nomination and appointment came as a surprise to Trent and he acknowledges the privilege of "...being able to work with the crème de la crème." "I don't know the other members of the board, but I will enjoy learning about the larger realm of NASA research and diversity of people. It's a place I want to be," Trent stated.

"I am proud of the many ways in which Ames researchers contribute to the broader community," said NASA Ames Center Director G. Scott Hubbard congratulating Trent on being the first scientist from Ames on the ICB. "Becoming a NASA ICB board member is a much-appreciated labor of love. Trent is a perfect example of always choosing to go the extra mile and embodying the Ames goals of visibility, excellence and impact."

Trent is very pleased to be representing Ames and the biological research community. "I'm looking forward to reviewing patentable materials. I may be able to bring a perspective not achieved before," stated Trent.

Trent received the news from Walter Hussey, ICB staff director at NASA Headquarters. Theron Bradley, former NASA chief engineer and chair of the ICB, nominated Trent and NASA Administrator Sean O'Keefe conferred the appointment. Trent will serve a minimum three-year term.

The ICB was established in 1958 to reward outstanding scientific or technical contributions significant to aeronautics and space activities. The composition of the board reflects NASA's finest technical talent whose expertise covers more than 40 fields of science and technology. Members of the ICB must be experts in their field and working in an area of future research. The intention is to cover a broad scope of scientific and technical contributions and provide incentive for researchers. When expertise is needed in a particular discipline, a search is made to fill the gap. Currently, only 17 people possess this distinction.

The unpaid additional duty membership of the ICB was originally comprised of scientists from Headquarters, Langley and Goddard. According to Walter Hussey, ICB staff director "...we are now open to the entire agency due to the implementation of video-conferencing. This has permitted accessibility to all centers and greatly reduced travel expenses." Betsy Robinson of the Technology Partnerships Division is the Ames awards liaison officer. "Ames has a good history of award recipients, including such things as 'Software of the Year' for 2002 that earned designers \$51,000," stated Robinson.

Over the past 46 years, the ICB has

issued over 86,000 Space Act awards to NASA and its contractor employees, as well as to other government, university and industry personnel. The awards are designed as incentives for scientists and engineers to promote contributions to space, inspire innovation and for peer and public recognition. Anyone can receive an award, but to be eligible you must publish a NASA Tech Brief article, apply for a patent or obtain release authority approval for software. These 'initial' or 'pre-decided' awards are approved at the center level. The ICB individually reviews and 'values' other awards using a process similar to a patent search. The awards are not competitive and are granted throughout the year. In 2003, 1,007 awards were granted from \$350 to \$37,000. These monetary awards are given as personal checks and do not have to be used for further research. The Ames Technology Partnerships Division (Code EP) administers the Space Act award program. If you have questions, contact the Ames Space Act Award liaison officer, Betsy Robinson at Elizabeth.T.Robinson@nasa.gov. For more information, visit the Internet at <http://icb.nasa.gov/>

BY OLA MARRA COOK

Fluorescent light tube recycling

Did you know that fluorescent light tubes can be recycled? The NASA Ames Environmental Services Office manages the collection and recycling of fluorescent lights onsite through its hazardous waste program.

When you are ready to have your fluorescent light tubes recycled, simply fax a completed 'chemical material/waste pick-up and container form' to the Ames hazardous waste collection team at ext. 4-2612. This form can be found on the Ames Intranet at <http://q.arc.nasa.gov/qe/forms/index.php>.

To assist handlers, store intact lights in their original containers. If you have a broken light, sweep up the remnants and place them in a sturdy container for pick-up.

Battery recycling program is a success

In 2003, Ames' Environmental Services Office (Code QE) kicked off a campus-wide effort to recycle batteries. The objective of the program was to increase the ease of recycling lead-acid, nickel-cadmium and alkaline batteries, which are found commonly in the business setting (e.g. electronic equipment, mobile telephones and portable computers).

To achieve this goal, battery recycling containers have been placed in 45 locations across NASA Ames and the NASA Research Park. Since the program's inception, the number of batteries collected at Ames has increased about 50 percent, raising the amount of batteries collected from 1,506 pounds in 2003 to 3,529 pounds in 2004.

Onsite battery collection is coordinated by the NASA Ames hazardous waste team and then shipped to a recycling center in Pennsylvania where the battery metal is recovered, reusable parts saved and residual waste disposed of properly as hazardous waste. The steps for recycling a common commodity, the nickel cadmium (NiCd) battery, serve as an example of the recycling process. The nickel is reclaimed as a re-melt alloy and sold to make more stainless steel. The cadmium is recovered as minimum 99.95 percent pure cadmium and sold back to NiCd battery manufacturers to

make more NiCd batteries. Similarly, alkaline batteries and lithium ion batteries are dismantled and recovered for reuse.

The success of the Ames battery recycling program is evident, but increased employee participation is still needed.

Battery recycling is important because it saves the environment from heavy metals, such as lead and acid, which may leach from solid waste landfills, eventually ending up in our water systems and, ultimately the human food chain.

To obtain a battery recycling container, or to dispose of wet lead-acid batteries, which are considered hazardous waste, contact Erik Rockwell, the Ames waste management supervisor, at ext. 4-5360.

This Ames battery recycling program is intended for the recycling of batteries used for NASA Ames business. To recycle batteries used at home, visit these helpful Web sites for drop-off locations:

- the Rechargeable Battery Recycling Corporation at www.rbrc.com;
- Santa Clara County Household Hazardous Waste Program at www.hhw.org; and
- the Web site Earth 911 at <http://california.earth911.org>

Preparing international travel orders

Attention secretaries! Do you prepare international travel orders for your group? Then there are changes to the process that you need to know. They are:

- When you are creating the travel orders in Travel Manager, be sure you mark them as 'foreign travel' or the orders will not be routed properly (verify other designations, too).
- What goes on the travel orders and the NASA Form 1167? Some specifics are provided here and your associate gatekeeper can give you more guidance.
- Section 8 of the travel orders (and in most cases, Section 11 of the NASA Form 1167) must contain the following information:
 - Name of approving official in the Headquarters Program Office (non-program travel only);
 - Official passport number and expiration date;
 - In-country hotel name, address and phone number;
 - In-country contact person's name and phone number;
 - An account of any personal leave proposed to be taken on trip (if applicable); and

- Unless the travel is invitational/reimbursable/in-kind travel, do not include dollar amounts in Section 10 of NASA Form 1167.

- Make sure that you download the current version of the Advance Notice Form (ANF) from the Web site <http://travel.arc.nasa.gov/forms.html> and submit the completed form to your associate gatekeeper as soon as possible.

- Use the travel checklists to make sure you and your traveler have covered all the bases. The checklists are available at <http://travel.arc.nasa.gov/forms.html>.

- All travel packets must be routed through your associate gatekeeper.

Remember that your primary source of information is your associate gatekeeper, and your primary toolbox is <http://travel.arc.nasa.gov/>.

If you have questions about Ames' international travel process, check the Web site at <http://travel.arc.nasa.gov/>, contact the associate gatekeeper for your directorate. Visit the Web at <http://travel.arc.nasa.gov/gatekeepers.html> or contact the Ames principal gatekeeper during normal business hours at ext. 4-1955.

Wetherbee speaks about safety

As part of the center's standdown effort, James D. Wetherbee, a former test pilot and astronaut, was invited



NASA photo by Tom Trower

Former test pilot and astronaut James Wetherbee, addresses Ames employees during September's safety stand down events.

in September to talk to Center employees on NASA Ames' safety stand down day. Wetherbee is now the space shuttle lead for NASA's Independent Technical Authority, at Johnson Space Center.

Wetherbee's presentation included a discussion of the role and responsibility of leadership in creating and maintaining the conditions necessary to sustain a culture of high reliability.

Also included was a foundation for understanding the concepts of culture and high reliability organizations (HROs) and the interrelationship between the two.

Processes were introduced that are fundamental for the organization to create a collective state of mindfulness, which enable more effective decisions.

Other topics discussed included various techniques used to reduce the likelihood of accidents.

From Mountain View, to Utah, to Mars

Foothill student Ed Walker never thought he'd be spending part of last spring at a simulated Mars habitat in the Utah desert, working with remote-controlled robots. But before last year, he probably never dreamed that he'd be working for NASA either. In a job that he describes as "way cooler than I ever



John Ossenfort at the Mars Desert Research Center in Utah.

thought it would be," so far this has been the high point.

"Going to Utah has got to be the coolest thing. Playing with robots in the desert. I actually got to build part of the astronaut backpack and do some metal work and fabrication on it. We did all the wiring and testing it out. Getting it to work and just seeing it work out there was the coolest thing."

Walker and former intern John Ossenfort are system administrators in the Intelligent Mobile Technologies Lab of NASA Ames' Computational Sciences Division. For Ossenfort, much of the job's appeal is its variety. In addition to the usual "boring admin tasks," he's been able to work with innovative wireless technology and a variety of operating systems.

"What sort of separates it from a lot of other jobs is that we do so much research and development here. There's just a constant flow of different things to work on and every other group at NASA is kind of doing the same thing."

Walker and Ossenfort came to NASA through a unique partnership between Ames and the Foothill-DeAnza College District (FCCD). The program began in 1971, as an opportunity for technical and industrial students to gain hands-on training and experience. Since then, it has expanded in scope to include students of all ages and backgrounds. More than 3,300 students have graduated from the year-long program since its inception. Over 400 former interns, including Ossenfort, now work at Ames as civil servants or contractors.

One of these former students is Meaghan Haider, hired as an adminis-

trative intern in 1987. The program provided practical experience related to the courses she was taking, and motivated her to stay in school. Her supervisors soon recognized her potential and moved her from secretarial support into budget assistance. Today, Haider is the division chief of NASA Research Park, a collaboration between NASA and partners in industry and academia.

Haider has mentored other students, and continues to share her enthusiasm for the program with new interns she meets. "I always tell them when I find out that they're from DeAnza 'Hey, I came through that program and I've been here as a civil servant for 17 years and here are the steps I've gone through.'"



She also stresses the importance of advisors recognizing that student interns come to NASA for more than just specific job assignments. "I think it's important for the intern and the advisor to look back at the end of the quarter and say 'OK, these are the real things I accomplished, the tasks that I performed are going to help me in my future job. Whether that's at Ames or outside in industry, these are real experiences that I can count on.'"

For many FCCD NASA interns, working at NASA was a childhood dream they never really expected to come true. Ola Cook had planned her academic career up through high school to be in science, but ended up working first in IT and market research, then later in architecture and interior design.

"I didn't think they'd even accept me," she said. "I mean, it was a fluke. I really thought I'm way over-educated to be a student intern, but I'm not educated in this field, in the scientific field, so there's no way I can be placed here."

When she finally applied, she was offered a position in the Public Affairs Office. It appealed to her because it offered an opportunity to explore possibilities for blending her existing career background with her interest in science.

"I liked the broad strokes there. I liked the fact that they weren't specifically into one project. They were going to expose me to everything that's going on here. And, that's been true. It's been more than I imagined."

As it happens, the department was about to relocate, which gave Cook an opportunity to call on another side of her background that she hadn't expected to use, interviewing the staff members and planning office layouts.

Kay Walter is also a career changer. After studying civil engineering and working as a programmer, she began pursuing an interest in biology.

"Initially I started off being interested in bioinformatics. It's basically a convergence between biology, biotechnology, and computer science, especially with the first draft of the human genome project being completed. That's a lot of data, and all of a sudden biology became more computational."

As a biotechnology student at Foothill, she heard about the NASA internship program and was delighted to learn that it was one of the few such programs open to returning students.

"That was definitely another big plus when I went to the internship meeting and I saw someone who was clearly switching careers too speaking there. I thought, hey, that's possible. That's great. It's not just for traditional undergrads."

It took several quarters before a position opened up, but Walter feels it was well worth the wait. As a bioinformatics assistant, she has been able to gain experience both working with computer data and working in the lab on experiments the data generates.

"I think that's what's been really beneficial with the program, because in order to do bioinformatics, ultimately you just really need to understand the biology. So going to school at the same time and being able to learn all this biology as I'm applying it in the laboratory, that's been very satisfying. To me that's the best type of internship experience, where what you learn in class is actually relevant in what you do."

Walter also appreciates the mentoring she has received from her co-workers and from her supervisor Sigrid Reinsch, who "will take the time out to explain concepts, to make sure that I understand what's going on, and why I'm doing this experiment or why I'm doing this database search."

continued on next page

NASA scientists seek life's chemical dance in deep space

continued from page 7

tion environment of the diffuse ISM, where "probably only the toughest chemical hobbles can survive." Still, the ASPIRE team is prepared to be surprised by what they find. "We'll be studying things that have never been looked at so carefully or completely before, and we expect to find some pretty amazing stuff," Sandford said.

Sandford and his science team also will examine distant galaxies, thousands of light years from Earth, to find out if the compounds there have changed over cosmic time. To do this, they will study a wide variety of types of galaxies over as large a distance range as possible to see if the populations of organic compounds present depend on galactic conditions, galactic evolutionary history or time since the universe formed.

Principal partners on the mission are NASA Ames, NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., and the Ball Aerospace Corp. The international mission science team represents a number of institutions, including the three principal partner organizations.

Under the Origins Concept Studies Program, ASPIRE and the other eight selected studies will have eight months to further develop and refine concepts for their missions, each of which address different aspects of Origins Program science. The next phase is for all teams to present concepts to NASA in San Diego, Calif., in January 2005. The final concept reports are due for NASA review in spring 2005.

The products from these concept studies will be used to help NASA assess the need for future Origins probes, establish how they would best be carried out and determine how they might complement the existing suite of operating missions, including the Spitzer Space Telescope, and future missions still in the development phase, such as the James Webb Space Telescope and Terrestrial Planet Finder.

Currently, the ASPIRE team is developing science and engineering requirements for the mission, deciding which instruments and telescopes could be used to best address the mission's science goals, and finalizing the optimum orbit and the instruments' necessary 'lifetimes.' The current plan is for ASPIRE to be placed in a heliocentric orbit, which means orbiting the sun at the same distance as the Earth.

One of the main focuses of the mission will be "Follow the water," according to Sandford. Water is necessary for the existence of life as we know it. It is the solvent in which biochemistry occurs on Earth. Planners will design the mission to detect water in all its forms - as molecules trapped in rocks, as water

ice frozen on dust grains, and as a gas vapor, he said.

Another key element they will trace is a 'heavy' hydrogen, called deuterium. Deuterium is a stable isotope of hydrogen in which the nucleus contains an extra neutron. Deuterium is expected to be concentrated by many of the chemical processes thought to occur in space. As a result, its distribution is expected to provide important clues to the types of chemistry occurring in the ISM, the scientists say. Deuterium-rich organics also are seen in meteorites that fall on the Earth, indicating that the element also can be used as a tracer to help understand how organic compounds made in interstellar space survive entry into new planetary systems and delivery to planetary surfaces.

The science team will look carefully for infrared spectral features caused by the vibrations of atoms like carbon, hydrogen, nitrogen and oxygen in organic compounds. One class of compounds they will pay a lot of attention to is called polycyclic aromatic hydrocarbons or 'PAHs'. This class of stable hydrocarbons is known to be abundant in space and common in primitive meteorites, but the identity of the specific PAHs present, and how they form and evolve is currently not well understood. PAHs are of interest for astrobiology, not only

because they represent a large part of the carbon in space, but also because they can be easily modified into forms that are biochemically important. "Laboratory studies show that PAHs can be easily transformed in space into forms that look a lot like the compounds that play important roles in Earth biochemistry," Sandford says.

On the basis of organics found in meteorites and laboratory simulations of deep space, the scientists also expect other biologically interesting species are out there, too, including amino acids, sugars and amphiphiles. Amphiphiles are the compounds that make up the majority of the membranes in cell walls. "We're interested in examining all of the environments in space where studies suggest such compounds may be forming," Sandford said.

How long the mission will last is still undetermined. The lifetime of the mission is one of the issues the concept study must establish. "I'm guessing we will need a three-to-five-year mission lifetime," Sandford said, "but it will depend on the nature of the types and numbers of objects we'll study and the details of the instruments we'll use."

More information about NASA's Origins Program is available on the Internet at <http://origins.jpl.nasa.gov/>

BY KATHLEEN BURTON

From Mountain View, to Utah, to Mars

continued from previous page

Kobie Bruce is an administrative assistant in the Small Payloads division, which handles life science experiments for the space shuttle. She especially values the opportunity to be working "among some of the most intelligent people in this area." She's also found a tremendous variety in the content of their experiments.

"There's the yeast experiment; bacteria streptococcus—the bacteria that gives us strep throat, they've sent that up there; they've done some bone studies that come back and help us with data for osteoporosis. We get more than velcro and microwave ovens from the space shuttle."

Bruce hopes to become a nurse at the end of the internship, "so I have some more years of schooling to go. But, this ties in because this is all biology and everything just fits in together."

Posters across the Ames campus promote Foothill-DeAnza NASA internships to potential supervisors as a 'Win-Win solution for your group's needs.' To Haider, this is more than just a marketing slogan.

"I don't want to sound biased because I came through this program, but

I'm personally very supportive of it for two reasons," she said. "I think NASA gets great value for a full-time student throughout the summer and part time for the three quarters, 20 hours per week. But, from the student's standpoint, they get the experience. Whether they stay here or they leave and work for industry, it looks great on their resume. So I think for both sides it's a win-win situation."

Cook agrees "I haven't heard anybody say they're not having a good time, or at least learning something. Heck, if you just come here and go to the seminars they offer, that's great. You know, what would you pay for that? To sit for an hour with somebody doing cutting-edge research in astrobiology? I mean, I would pay to go see that."

As internship program coordinators say at campus information meetings "It's more than work experience, it's a life experience." Ames scientists and researchers interested in sponsoring interns should contact Valerie Sermon at ext. 4-5560 or via e-mail at vsermon@mail.arc.nasa.gov

BY SUE BLUMENBERG

Events Calendar

Ames Amateur Radio Club, third Thursday of each month, 12 noon, N-T28 (across from N-255). POC: Michael Wright, KG6BFB, at ext. 4-6262.

Ames Ballroom Dance Club. Classes on Tuesdays. Beginning classes meet at 5:15 p.m. Higher-level class meets at 5:50 p.m. Held in Bldg. 944, the Rec. Center. POC: Helen Hwang at helen.hwang@nasa.gov, ext. 4-1368.

Ames Bowling League, Palo Alto Bowl on Tuesday nights. Seeking full-time bowlers and substitutes. Questions to sign up: Mike Liu at ext. 4-1132.

Ames Child Care Center Board of Directors Mtg, every other Thursday (check Web site for meeting dates: <http://acc.arc.nasa.gov>), 12 noon to 1:30 p.m., N-210, Rm. 205. POC: Cheryl Quinn, ext 4-5793.

Ames Contractor Council Mtg, first Wednesday each month, 11 a.m., N-200, Comm. Rm. POC: Anita Fogtman, ext. 4-4432.

Ames Diabetics (AAD), 1st & 3rd Weds, 12 noon to 1 p.m., at Ames Mega Bites, Sun room. Support

group discusses news affecting diabetics. POC: Bob Mohlenhoff, ext. 4-2523/e-mail at: bmohlenhoff@mail.arc.nasa.gov.

Ames Federal Employees Union (AFEU) Mtg, third Wednesday of ea. month, 12 p.m. to 1 p.m., Bldg. 221, Rm 104. Guests welcome. Info at: <http://www.afeu.org>. POC: Marianne Mosher, ext. 4-4055.

Ames Mac Support Group Mtg, third Tuesday of ea. month, 11:30 a.m. to 1 p.m., Bldg. N262, Rm 180. POC: Julie ext. 4-4694 or Tony ext. 4-0340.

Ames Model Aircraft Club, flying radio-controlled aircraft at the north end of Parsons Ave. on weekend mornings. POC: Mark Sumich, ext. 4-6193.

Ames Sailing Club Mtg, second Thursday of ea. month (Feb through Nov), from 11.30 a.m. -1 p.m. in the special events room in the Ames Visitor Center in N-223. All are welcome. POC: Jeff Smith, ext. 4-2586.

Special Event: Thursday, Oct. 14, 12 noon to 1 pm, N-245 auditorium. Guest speaker Stan Honey, offshore racer and navigator, will discuss his transatlantic speed records and his experiences aboard Pyewachet. All are welcome. POC: Jeff Smith, 4-2586.

Environmental, Health and Safety Information Forum, first Thursday of each month, 8:30 a.m. to 9:30 a.m., Bldg. 221/Rm 155. URL: <http://q.arc.nasa.gov/qe/events/EHSseries/> POC: Stacy St. Louis at ext. 4-6810.

The Hispanic Advisory Committee for Excellence HACE Mtg, first Thurs of month in N255 room 101C from 11:45 a.m. to 12:45 p.m. POC: Eric Kristich at ext. 4-5137 and Mark Leon at ext. 4-6498.

Jetstream Toastmasters, Mondays, 12 p.m. to 1 p.m., N-269/Rm.179. POC: Becky Brondos at ext. 4-1959, bbrondos@mail.arc.nasa.gov or Bob Hilton at ext. 4-1783, bhilton@mail.arc.nasa.gov.

Nat'l Association of Retired Federal Employees (NARFE). Former and current federal employees. Your only contact with Congress. Join to protect your federal retirement. Chptr #50 meets the first Fri. of each month at HomeTown Buffet, 2670 El Camino (at Kiely), S. Clara, 11 a.m. lunch. POC Earl Keener (408) 241-4459 or NARFE 1-800-627-3394.

Native American Advisory Committee Mtg, fourth Tues each month, 12 noon to 1 p.m., Bldg. 19, Rm 1096. POC: Mike Liu at ext. 4-1132.

Computer History Museum presents

Located at 1401 N. Shoreline Boulevard, in Mountain View, the museum has the following scheduled events:

Wednesday, Nov. 3

Odseys in Technology
'What do they want?,' An evening with Bill Moggridge, cofounder of IDEO, a consulting firm dedicated to the user-centered design of products, services and environments
Time: 6:00 p.m. - Member reception
7:00 p.m. - Lecture
Sponsored by Sun Labs

Wednesday, Nov. 19

'Stump the Historians'
Board members of the IEEE's annals of the history of computing share how they view the history of computation and what they see for the future. Come loaded with your questions and try to 'stump the historians!'
Time: 6:00 p.m.

Tuesday, Dec. 14

Odseys in Technology
'Computers and Music - Computer Music Then and Now' with John Chowning (father of the digital synthesizer, inventor, composer) and Max Mathews (father of computer music) in conversation with Curtis Roads.
Time: 6:00 p.m. - Member reception
7:00 p.m. - Lecture
Sponsored by Sun Labs

To attend a museum event, register on the Internet at <http://www.computerhistory.org> or call (650) 810-1019.

Public tours of the visible storage warehouse display are available on Wednesday, Friday and Saturday at 1:00 p.m. and 2:30 p.m. Reservations are recommended for groups of 10 or more.

For more information, e-mail tours@computerhistory.org or at

brewster@computerhistory.org or call (650) 810-1013.

To volunteer at the Computer History Museum, you can sign up on-line at: www.computerhistory.org/volunteers and click on 'Become a Volunteer.'

Hill speaks on disability rights



NASA photo by Dominic Hart

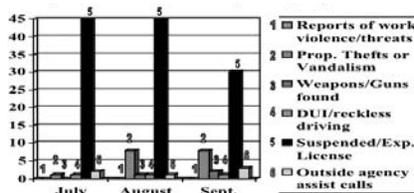
Eve Hill, Esquire, NASA Ames' National Disability Awareness month's guest speaker, is a nationally known expert on disability rights law. Hill has been the executive director of the Western Law Center for Disability Rights since 1998. She received the State Bar of California's first Diversity Award in 2002 for her efforts to open the legal profession to people with disabilities. Hill has authored numerous publications and is the co-author of the treatise 'Disability Rights Law and Policy' published by Thomson-West. She earned her J.D. cum laude from Cornell Law School.

Protective Services monthly activity

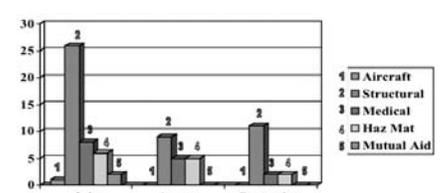
A statistical summary of activities of the Protective Services Division's Security/Law Enforcement and Fire

Protection Services units for the month of September 2004 is shown below.

Security/Law Enforcement Activity



Fire Protection Activity



Ames Classifieds

Ads for the next issue should be sent to astrogram@mail.arc.nasa.gov and must be resubmitted for each issue. Ads must involve personal needs or items; (no commercial/third-party ads) and will run on a space-available basis only. First-time ads are given priority. Ads must include home phone numbers; Ames extensions and email addresses will be accepted for carpool and lost and found ads only. Due to the volume of material received, we are unable to verify the accuracy of the statements made in the ads. Caveat emptor!

Housing

Two bdrm apartment for rent in Milpitas. Remodeled in beautiful condition. Have storage, laundry area and garage. Fourplex, located on the second floor. No pets. Call (650) 345-2069.

Two bdrm house in downtown Palo Alto in highly desirable location. Private, secluded garden. Fruit trees, birds and peace. A gem of a home. W/D, DSL, microwave. Furnished March 15 to April 15. \$2,000 plus utils. Dep. req'd. Mary (650) 327-9567.

For rent spacious 3bd/2ba 1,700 sq.ft. Yr. 2000 manufactured home located off of Shoreline Boulevard close to Moffett. Grmt. ktchn. w/bay windows. Mrbl. frplc. Huge mstr. bdrm and bthrm. w/jcz. Cntrl. A/C and heating. Lots of amenities. James and Chantal (650) 224-0094.

2bd/2ba mobile home in Campbell, \$70,000, 15 min. drive to Ames. End of cul-de sac unit w/gated access to Los Gatos Creek Trail for hiking, biking, fishing. Central A/C, laundry room, encl. frnt porch, 4-car parking, storage shed. Yards, vegetable and flr beds, trees, lawn, park pays all water. Current rent \$555 (cap 8 percent/yr.). Families welcome. Tim (650) 960-1102.

3 bd/2ba house in Fremont, \$1,850/mo. Minutes from 880, 84 free way. 17 miles to Ames. Remodeled kitchen and bthrms. Hardwood floors, dual pane windows. Avail. after Dec. 25. Call (510) 793-5103 or e-mail Janet.Y.Song@nasa.gov

1996 Skyline mobile home, 2/3 bdrm/2 ba, Pergo type floor in kitchen and dining area, almost new stove, washer and dryer stay, almost new bathrm floors and showers, dog door w/6 foot fence, space rent \$600/mo. includes water and garbage. Located between Fairoaks and Mathilda. Asking \$92,888. Diana (408) 887-4420.

Miscellaneous

The Ames Cat Network needs help finding homes for cats trapped at Moffett. They range from feral to abandoned/lost pets. Tested, altered and inoculated. Call Iris at ext. 4-5824 if you or someone you know are interested in fostering or adopting a cat.

Wooden rocking chair, blonde finish, 6 years old, in exc. condition. \$50. Call (408) 295-2160.

Crate & Barrel pine kitchen table w/fold-down sides and four chairs w/wicker seats. Call for pics. Great condition. \$200. Call (408) 295-2160.

Child trailer for bicycle. The Burley-Solo is a high-performance single-passenger trailer. 60 lb. carrying capacity; narrow 25" profile; 16" composite wheels with sealed bearings; super lightweight at 16 lbs.; tinted side and rear windows; transportable or stowable 32.5" x 25" x 16". Exc. condition; never used. Orig. \$289.99. Asking \$195 or B/O. Mark (408) 863-0835.

Four Goodyear Wrangler light truck tires. 235 X 75 / R15, List at \$113 each., sell for \$50 each. Like new with 4,500 miles. Rich (925) 455-4766.

Bedding, Stearns and Foster pop-up trundle w/two twin size mattresses: \$75. Exc. cond. Call (650) 949-5231.

Four 205 x 65 / 15 Goodyear Eagle tires mounted on 2001 Mustang alloy wheels. Like new with only 3000 miles. Rich (925) 455-4766.

Clothes washer, gd working cond. and double bed frame w/wheels, never used. No charge. Donna (408) 238-6681.

Lervad danish workbench with accessories. Exc. cond. Call (650) 960-6827.

Transportation

'00 Century custom sedan. Only 20,850 miles. 6-cyl, a/c, air bags, anti-lock brakes, cruise control, maint. records, champagne/beige, 20 MPG city/30 MPG hwy, was \$21,370 new. Clean. \$8,250 or B/O. Call (510) 657-7543.

'84 Alfa Romeo Spider Veloce 2000. Only 84K mls, well maintained. Cream exterior, navy leather interior. AC, AM/FM radio/cass., 5-spdr. No rust or dents. This car is all original, w/all repair records past 8 years. \$4,800 or B/O. E-mail redwoodcabin@aol.com

Safety Data

	Civil Servants	Contractors
Not recordable first aid cases	2	0
Recordable no lost time cases	0	0
Lost time cases*	0	0
Restricted duty days	0	0
Lost work days	0	0

Data above is as of 09/30/04. May be subject to slight adjustment in the event of a new case or new information regarding an existing case.

Note: Under new OSHA rules, lost time is defined as lost work days, restricted duty or job transfer.

Astrogram deadlines

Deadline:	Publication:
Oct. 29	Nov 2004
Nov. 22	Dec 2004

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 or be-fare to the deadline.

Ames emergency announcements

To hear the centerwide status recording, call (650) 604-9999 for information announcements and emergency instructions for Ames employees. You can also listen to 1700 KHz AM radio for the same information.

Exchange Information

Information about products, services and opportunities provided to the employee and contractor community by the Ames Exchange Council. Visit the web site at: <http://exchange.arc.nasa.gov>

Beyond Galileo N-235 (8 a.m. to 2 p.m.) ext. 4-6873

Ask about NASA customized gifts for special occasions. Make your reservations for Chase Park

Mega Bites N-235 (6 a.m. to 2 p.m.) ext. 4-5969

See daily menu at: <http://exchange.arc.nasa.gov>

Visitor Center Gift Shop N-943 (10 a.m. to 4:00 p.m.) ext. 4-5412

NASA logo merchandise, souvenirs, toys, gifts and educational items.

Tickets, etc...(N-235, 8 a.m. to 2 p.m.) ext. 4-6873

Check web site for discounts to local attractions, <http://exchange.arc.nasa.gov> and click on tickets.

NASA Lodge (N-19) 603-7100

Open 7 days a week, 7:00 a.m. to 10 p.m. Rates from \$40 - \$50.

Vacation Opportunities

Lake Tahoe-Squaw Valley Townhse, 3bd/2ba, balcony view, horseback riding, hiking, biking, golf, river rafting, tennis, ice skating, Equipped and more. Summer rates. Call (650) 968-4155, DBMcKellar@aol.com

South Lake Tahoe cottage w/wood fireplace, hot tub. Rates \$50 to \$130 per night. Call (650) 967-7659 or (650) 704-7732.

Vacation rental, Bass Lake, 4 mls south of Yosemite. 3bd/1.5 ba, TV, VCR, MW, frplc, BBQ, priv. boat dock. Sleeps 8. \$1,050/wk. Call (559) 642-3600 or (650) 390-9668.

Big Sur vacation rental, secluded 4bd/2ba house in canyon setting. Fully eqpd kitchen. Access to priv. beach. Tub in patio gdn. Halfway between Carmel and Big Sur. \$175/night for 2; \$225 for 4 and \$250 for more, plus \$150 cleaning dep. Call (650) 328-4427.

Tahoe Donner vacation home, 2 bd/2ba. trees, deck. Access to pools, spa, golf, horseback riding, \$280 wkend, \$650 week. Call (408) 739-9134.

Pine Mountain Lake vacation home. Access to golf, tennis, lake, swimming, horseback riding, walk to beach. Three bedrooms/sleeps 10. \$100/night. Call (408) 799-4052 or (831) 623-4054.

Incline Village: Forest Pines, Lake Tahoe condo, 3 bd/2ba, sleeps 8. Fireplace, TV/VCR/DVD, MW, W/D, jacuzzi, sauna, pool. Walk to Lake, close to ski areas. Visit Web page for pictures: <http://www.ACruiseStore.com>. \$120/night low season, \$155/night high season (holidays higher) plus \$156 cleaning fee and 12% Nevada room tax. Charlie (650) 355-1873.

Disneyland area vacation rental home, 2 bd/1ba. Nearing completion completely remodeled w/ new furniture. Sleeps 6 (queen bed, bunk beds, sleeper sofa). Air hockey and football tables. Introductory rate \$600/wk, once completed rate will be \$1000/wk. Security deposit and \$100 cleaning fee required. Call (925) 846-2781.

Ski Park City Utah, NASA Ski Week XIV, Feb 5 - 12, 2005. Space limited. E-mail Steve at exnasa@sbcglobal.net or call (408) 432-0135.

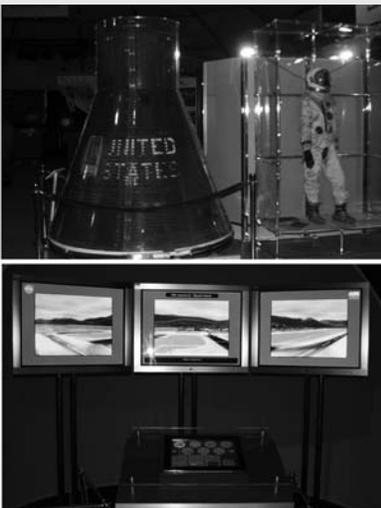
New York, 5th Ave. One fully furnished bedroom in 24 hour security bldg. overlooking Washington Square Park, \$1,000/wk or \$3,000/mo. negotiable. Call (650) 349-0238.

Paris/France: Fully furnished studio, 5th Arr, Latin Quarter, Notre Dame and Ile-St. Louis. \$1,400/wk. negotiable Call (650) 349-0238.

Exploration Center gets exhibits upgrade

Come see the new exhibits at the NASA Ames Exploration Center. Opened to the public since the beginning of the year, the Exploration Center has hosted over 150,000 visitors and

Now, a newly-installed interactive exhibit, lower right, allows users to manage air traffic at the fictional 'Edgarville' airport. Also, just arrived from KSC is a Mercury capsule used



inspired tens of thousands of school-children to become the next generation of space explorers. The facility boasts the largest immersive theater on the West Coast and presents panoramic views of Mars and Saturn's rings, taken during the recent missions, as well as other eye-popping movies and special effects on a curved 35 foot screen.

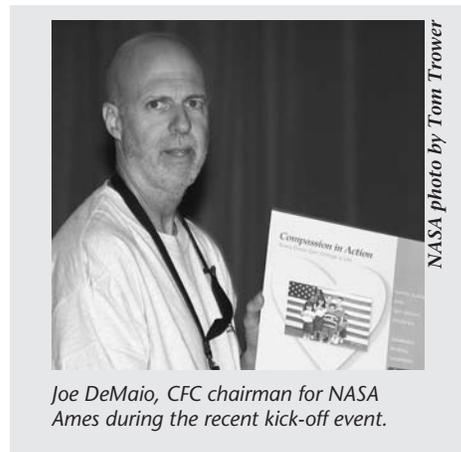
in an actual space mission, upper right. Various space suits are also on display (left and upper far right).

Exhibit hours are Tuesday - Thursday, 10 a.m. to 4 p.m. and weekends, 12 noon to 4 p.m.; closed Mondays and federal holidays. Please call ahead if you plan to bring a group of more than 15.

CFC kick off held

The kick-off for the Combined Federal Campaign 2004 took place at Ames on Oct. 14. The meeting, led by the CFC chairman for Ames, Joe DeMaio, Code ARH, right, was well attended by the team workers who will make the campaign happen.

There were speakers from three local organizations, the Leukemia Soci-



Joe DeMaio, CFC chairman for NASA Ames during the recent kick-off event.

NASA photo by Tom Trower

ety, EarthShare/Save the Bay and Sunnyvale Community Services. Each organization described how CFC helps them do their work.

There was a productive dialog between workers and campaign organizers on conducting an effective campaign.



National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035-1000

Official Business
Penalty for Private Use



FIRST CLASS MAIL
POSTAGE & FEES PAID
NASA
Permit No. G-27



The Ames Astrogram is an official publication of Ames Research Center, National Aeronautics and Space Administration.

Editor-in-Chief.....David Morse
Managing Editor.....Ann Sullivan
Editor, Layout and Design.....Astrid Terlep

You can reach the Astrogram Office at:
astrogram@mail.arc.nasa.gov or by phone at
(650) 604-3347.

 PLEASE RECYCLE
Printed on recycled and recyclable paper with vegetable-based ink.