



## NASA space technology shines new light on healing

by Tracy McMahan

Doctors at the Medical College of Wisconsin in Milwaukee have discovered the healing power of light with the help of technology developed for NASA's Space Shuttle. Using powerful light-emitting diodes, or LEDs, originally designed for commercial plant-growth research in space, scientists have found a way to help patients here on Earth.

Doctors are examining how this special lighting technology helps hard-to-heal wounds, such as diabetic skin ulcers, serious burns and severe oral sores caused by chemotherapy and radiation. The project, approved by the U.S. Food and Drug Administration and funded by a

*See Space Technology on page 6*



Photo by Doug Stoffer, NASA/Marshall Space Flight Center

### **Must be Santa**

Rhonda Stricklin, right, of Marshall's Chief Financial Officer's Office, presents wrapped gifts to Wanda Savage of Huntsville's Department of Human Resources. The gifts are for a family the Chief Financial Officer's Office adopted for the holidays.

## Rare solar eclipse visible in Huntsville Christmas Day

by Debra Valine

Looks like people living in Northern Alabama will get an extra holiday gift this year in the form of a rare partial solar eclipse on Christmas Day.

In the Huntsville area, this last solar eclipse of the 2<sup>nd</sup> millennium is expected to begin at 9:48 a.m. and end at 12:54 p.m., with peak viewing at 11:19 a.m. The last time an eclipse was visible on the East Coast on Christmas Day was in 1666, according to Kenneth Moore, assistant director of astronomy at the Virginia Living Museum in Newport News.

Experts advise using special eclipse shades for viewing.

"Never, never, never look directly at the Sun without protection!" said Mitzi Adams, a Marshall astronomer at the National Space Science and Technology Center. "And by protection, I DON'T mean sunglasses. You need specially designed mylar filters or No. 14 welder's glass to safely look at the Sun. By far though, the safest way to view the Sun, whether in eclipse or not, is by projecting its image onto a piece of white

paper or onto a sheet on the ground."

One very good resource for safe viewing techniques is from the Sky and Telescope Web pages, Adams said. "They discuss pinhole viewing, filters, binocular and telescopic projection and direct viewing — with an appropriate filter — with a telescope." That Web address is: <http://www.skypub.com/sights/eclipses/solar/001225watchesafely.html>

In the United States, people will see 20 to 60 percent of the Sun covered. The eclipse will not be viewable in Alaska or Hawaii.

An eclipse occurs during a new Moon when the Moon moves between the Earth and the Sun. Typically there are two to five eclipses each year, viewable in different parts of the world. The last eclipse to occur on Christmas Day was in 1954, and was only visible in Africa. The next Christmas Day eclipse — also viewable only in Africa — will be in 2307.

*The writer, employed by ASRI, is the Marshall Star editor.*

## A holiday season thought

**A**s we come to the end of a very successful year at Marshall Space Flight Center, it occurs to me that success is measured in several important ways.

We are successful in our mission to be leaders in space access and to use space for research and development that benefits humanity. But we are also successful in another very important aspect of life — our willingness to think of and do for others.

The holiday season helps us think about the needs of others. This season of giving was kicked off by the Combined Federal Campaign. I want to thank the nearly 80 percent of Marshall civil servants, and also the contractors, who chose to give to CFC at a record level. The money you gave will go directly to the many organizations in our community that reach out to those in need.

Several organizations across the Center have accepted donated food and toys for needy families. I was really impressed by what I saw at the Center's holiday reception Thursday and the Space Transportation Directorate holiday luncheon Friday. This just proved to me once again that we not only have a great team of people committed to carrying out our mission in Space, but also we know the importance of fulfilling a mission of caring right here in our own backyard.

These occasions prove we not only value our contractors and civil servants that work at Marshall, but we also value the people in our community.

It is a pleasure to be here, and be associated with such a great team.

I hope you all have a very happy and safe Holiday Season.

— *Art Stephenson*  
*Marshall Center Director*

## NASA administrator reminds employees to be aware of cultural, religious observances

by *Dan Goldin*  
*NASA Administrator*

**A**s we work toward creating an Agency that truly reflects the face of America, we must acknowledge cultural differences, including those involving religious observances.

The religious observances of the various cultures that comprise our country are to be respected even though they may not be nationally celebrated. We must become aware of and remain sensitive to the religious observances of our employees and make every effort to reasonably accommodate them. Cultural awareness must be a prime factor when scheduling work and planning events. Every effort should be made to plan events during the best possible time for all of our employees.

Being sensitive to the holidays of all religions is a key element of managing a diverse workforce. Therefore, I am calling upon each of you to be sensitive to the holidays of all religions when making work assignments. Let's make every effort to plan events during the best possible time for all employees to participate.

## NASA, University of Idaho to fight attacks on computers

**N**ASA and the University of Idaho in Moscow, Idaho, joined forces Dec. 15 to research ways to oppose attacks on computer systems.

The partnership allows NASA to provide a real world source of data and systems to be used in the research effort at the university. The findings will help NASA enhance its ability to respond to challenges from cyberspace.

"This project is intended to position NASA to aggressively respond to cyber attacks on the NASA information technology infrastructure and programs through rapid identification of the start of an attack and projection of the direction and targets," said Scott Santiago of Ames Research Center in Mountain View, Calif.

## Deputy director sends message to the people of Marshall

**I**want to take this opportunity to thank each and every one of you for your dedication and hard work. I would particularly like to thank you for all the support and friendship you've given me in these 36 years with NASA, especially the 34 years here at Marshall. Many of you have touched my life and that of my

family in wonderful and rewarding ways. I will carry warm thoughts of you as I move into the next great adventure in my life.

Marshall has a very proud heritage and, even more important, a brilliant future. There is excellent leadership in place at the Center, along with a management approach I have always advocated

that puts people first. You have the talent and skills this country needs to explore the frontier of space and pave the way for future generations. God bless you all for your service to this country, to NASA, and to Marshall Space Flight Center. Thank you from the bottom of my heart.

— *Sincerely, Carolyn*

# Gatesville, Texas, students prepare experiment samples for International Space Station

by Tracy McMahan

Six Gatesville, Texas, High School students and their teacher are working with NASA and university scientists to load biological samples for delivery to the International Space Station early next year.

"This opportunity opens the students' eyes to so much of the world beyond," said LaVonda Popp, who teaches chemistry, physics and biology at Gatesville. Popp accompanied her students to last week's workshop at Sci-Quest.

Marshall's Microgravity Research Program Office sponsored the workshop. Marshall is the lead center for flying space payloads that take advantage of the low-gravity environment created as the Space Station orbits Earth.

"Many of the students didn't know much about the space program, and this exciting, educational program exposes them to careers and different areas of science conducted in space," Popp said.

Gatesville is a small, rural town near Austin, Texas, and half the students attending the workshop had never traveled beyond the state of Texas, said Popp.

"It's really thrilling that even students can be part of one of the first experiments on the International Space Station," said Bobby Hill, a Gatesville freshman.

The students are learning about proteins and other biological substances that do everything from delivering medicine to helping the body carry out important functions. At the hands-on workshop, they grew crystals the way scientists produce them in Earth-based labs.

The students also loaded flight samples into small plastic tubes, which were then frozen. Later, these samples will be loaded

into the Enhanced Gaseous Nitrogen Dewar experiment, a thermos-like container that the Space Shuttle Atlantis will transport to the Space Station during the STS-98 mission in late January 2001.

"We are pleased to have the first students from Texas loading samples that will soon be on the way to the International Space Station," said Ron Porter, Biotechnology Program manager at the Marshall Center. "It's a great way for students to learn about how the Space Station can be used for biochemistry experiments."

About 100 samples — including those from Texas and around 400 other samples from scientists — will remain on the Space Station for about a month. Crystals will form, and then be brought back to Earth on another Space Shuttle flight.

Some of the crystals will be returned to the students so that they can compare them to crystals grown in their classrooms. Through a Web site, the students will monitor the results as Dr. Alex McPherson — a biochemist at the University of California, Irvine, and the lead scientist for the experiment — analyzes other crystals

grown aboard the same flight. Often, higher quality crystals can be grown in the low-gravity environment created as the Space Station circles Earth.

NASA has invited the Texas students and other students from across the country who have participated in the workshops to watch the Space Shuttle as it launches in January carrying their experiments to the Space Station.

The Gatesville students were selected by winning a statewide essay competition sponsored by the Texas Space Grant Consortium in Austin. Last year, two Texas teachers attended NASA crystal-growing workshops and trained numerous teachers across the state. Students from several Texas cities grew crystals in their classrooms.

Other sponsors of this educational activity include the University of California at Irvine; the University of Alabama in Huntsville; the Alabama Space Grant Consortium, and the Sci-Quest hands-on science museum.

*The writer, employed by ASRI, supports the Media Relations Department.*



Photo by Emmett Given, NASA/Marshall Space Flight Center

**Bobby Hill, right, a student at Gatesville High School in Texas, loads a biological sample. Margaret Baguio, a teacher with the Texas Space Grant Consortium, assisted the students.**

## Obituary

**Rickard, Carl E., 60**, of Florence, died Nov. 27. He retired from Marshall Nov. 4, 200, where he worked as a mechanical engineer in the Reusable Solid Rocket Motor of the Space Shuttle Projects Office. He is survived by his wife, Doris, two sons and a daughter.

# Happy Holidays, Marshall



Marshall employees, including Madeline Hereford and Alease Sims, bring food and toys for needy families to the Center's holiday reception.



The menu included hors d'oeuvres as well as desserts.



Center Deputy Director Carolyn Griner mingles with guests.



Pat Dunningant was one of many door prize winners.



Santa presents Center Director Art Stephenson with the first installment toward the budget for Space Launch Initiative.



Photos by Dennis Olive, NASA/Marshall Space Flight Center

Terri Dailey circulates through the record crowd bearing trays of holiday treats.



Santa and Mrs. Claus pay a visit to the Marshall Child Development Center following the holiday reception.



Center Director Art Stephenson and his direct reports sing a modified version of "The 12 Days of Christmas."



Tina Swindell, Anita Draper and Sharon Hancock perform holiday songs a cappella.



Santa, Mrs. Claus arrive by Harley Davidson with their helpers.

# Space Technology

*Continued from page 1*

NASA Small Business Innovation Research contract through the Technology Transfer Department at Marshall, includes laboratory and human trials.

“So far, what we’ve seen in patients and what we’ve seen in laboratory cell cultures, all point to one conclusion,” said Dr. Harry Whelan, professor of pediatric neurology and director of hyperbaric medicine at the Medical College of Wisconsin. “The near-infrared light emitted by these LEDs seems to be perfect for increasing energy inside cells. This means whether you’re on Earth in a hospital, working in a submarine under the sea or on your way to Mars inside a spaceship, the LEDs boost energy to the cells and accelerate healing.”

Whelan’s findings will be summarized in upcoming issues of Space Technology and Applications International Forum 2001 and in The Journal of Clinical Laser Medicine and Surgery. Other related peer-reviewed journals have published articles on Whelan’s medical research with light-emitting diodes.

Whelan’s NASA-funded research has already seen remarkable results using the light-emitting diodes to promote healing of painful mouth ulcers caused by cancer therapies such as radiation and chemotherapy. The treatment is quick and painless.

The wound-healing device is a small, 3.5-inch by 4.5-inch (89-millimeter by 114-millimeter), portable, flat array of LEDs, arranged in rows on the top of a small box. A nurse practitioner places the box of LEDs on the outside of the patient’s cheek about one minute each day. The red light penetrates to the inside of the mouth, where it seems to promote wound healing and prevent further sores in the patient’s mouth.

“Some children who probably would have had to be fed intravenously because of the severe sores in their mouths have been able to eat solid food,” said Dr.



Photo by Barry Himelhoch, Medical Center Graphics Inc.

**Daniel Ruehlow, a 15-year-old cancer patient at the Children’s Hospital in Milwaukee, receives a treatment with the light-emitting diode wound-healing device. The treatment lasts little more than a minute and is painless.**

David Margolis, an assistant professor of pediatrics at the Medical College of Wisconsin and an oncologist at Children’s Hospital of Wisconsin. Margolis continued, “Preventing oral mucositis improves the patients’ ability to eat and drink and also may reduce the risk of infections in patients with compromised immune systems.”

Whelan’s collaboration with NASA began when Ronald Ignatius, owner of Quantum Devices Inc. in Barneveld, Wisc., learned about Whelan’s brain cancer surgery technique using drugs stimulated by laser lights. Laser-light surgical probes are costly and cumbersome in the operating room because they are heavy, with refrigerator-size optical, electrical and cooling systems.

Ignatius originally designed the lights for plant growth experiments through the Wisconsin Center for Space Automation and Robotics, a NASA commercial space center at the University of Wisconsin in Madison.

“The LEDs needed to grow plants in space produced the same wavelengths of light the doctor needed to remove brain tumors,” said Ignatius. “Plus, when we developed the LEDs for NASA, they had to be lightweight to fly aboard the shuttle and

have small cooling systems. These traits make the LED surgery probes easier to use in the operating room and thousands of dollars cheaper than laser systems.”

Quantum Devices altered the surgical probe to emit longer wavelengths of red light that stimulate a photodynamic drug called Benzoporphyrin Derivative™.

Doctors at the Children’s Hospital of Wisconsin recently completed the first-ever surgery with the improved probe and medicine. The drug also has fewer side effects after surgery. The ongoing brain surgery study is described in a 1999 peer-reviewed journal article in Pediatric Neurosurgery.

The LED research project will continue for the next 18 months, with doctors studying 100 patients at two major teaching affiliates of the Medical College of Wisconsin. Researchers will continue to examine the influence of LEDs on cells grown in the laboratory, and will explore the benefits that LEDs might provide to counteract possible cell damage caused by exposure to harmful radiation and weightlessness during long space missions.

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## Throckmorton named dep. mgr. Structures, Mechanics and Thermal Department

**D**avid A. Throckmorton has been appointed deputy manager of the Structures, Mechanics and Thermal Department in Marshall's Engineering Directorate.

Throckmorton has been a NASA Langley Research Center employee since 1966. He has held a variety of positions, including assistant head of the Aerothermodynamics Branch in the Space Systems Division; and manager of Space Transportation Technology in the Aerospace Transportation Technology Office.

Most recently, he served as the manager of the Space Transportation Programs Office in the Space Access and Exploration Programs Office.

Throckmorton holds a bachelor's degree in aerospace engineering from Virginia Polytechnic Institute in Blacksburg, Va., and a master's degree in aerospace engineering from George Washington University in Washington, D.C.

He has completed numerous executive and management-level training courses and is the recipient of several awards including a NASA Exceptional Service Medal and two Langley Research Center Outstanding Leadership Awards.



Photos by Terry Leibold, NASA/Marshall Space Flight Center



### Getting acquainted

Above: Bill McMahon, left, gives NASA's new employees a tour of the Composite Lab in Bldg. 4707 as part of the New Employee Orientation held in early December.

Left: Bruce Hulcher and Ken Kittredge listen to presentations at the U.S. Space & Rocket Center.

## Celebrating the holidays, Marshall-style



Photo by Doug Stoffer, NASA/Marshall Space Flight Center

Sandy Coleman, right, the implementation manager for the National Space Science and Technology Center, joins Marshall employees, friends and university members at the center for some holiday treats Dec. 13.



Photo by Terry Leibold, NASA/Marshall Space Flight Center

Sherry McKellar, left, and other members of the Engineering Directorate's Business Office celebrate the holidays with fun, food and singing Dec. 5. Attendees brought gifts for children that were later donated to Christmas Charities.

## Employee Ads

## Miscellaneous

- ★ Microwave oven, \$55; air compressor, \$110; tiller, \$150; ceiling fan, \$15; mini-trampoline, \$20. 881-6040
- ★ Baby lifejackets, \$5 each. 837-6274 leave message
- ★ Toddler car seat, \$20; Amazing Animals and My Amazing Human Body computer CDs, \$10 each. 533-5942
- ★ Troy-Bilt chipper/vac, 5HP, self-propelled, 1993, w/accessories, rake-in tray and vacuum hose kit, \$850. 539-5058
- ★ Cherry pencil post bed, sleigh bed, dresser, tables, antique fruit picture. 233-0025
- ★ Metro-power electric wheelchair, 4-years old, \$1,700. 247-0867
- ★ Leather Lazy-Boy recliner/rocker, burgundy, big-man size, \$500. 881-5093
- ★ Brio train set, cars, track, mountain set, bridge, over 100 pieces. \$200. 881-5093.
- ★ Golf clubs, "Square Two" brand, 1,3 & 5 metal woods, 3-PW & SW w/bag \$250. 232-1171
- ★ Palm 3x, hot-sync cradle, desktop software & leather slim-line case, 1-year old, \$110 obo. 895-9843
- ★ Treadmill exerciser, \$75; Kenmore washer/dryer, \$175. 858-2276
- ★ Pine bedroom suite; king waterbed, dresser w/mirror, chest, \$350 obo. 379-3886
- ★ Utility trailer, all steel, 5'x8' bed, new 13" Goodyear tires, tailgate ramp, lights, \$350. 536-2628
- ★ Console TV, \$150 obo. 539-5570

## Vehicles

- ★ 1977 Porsche 924, 140K miles, new shocks, battery, water pump, etc., \$1,750. 828-6213
- ★ 1991 Chevy Cheyenne full-size truck, 6-cyl., automatic overdrive, new tires, 63K miles, \$4,650 firm. 256-753-2278.
- ★ 1996 Nissan Maxima SE, white/black leather, all-power, 5-speed, moon-roof, Bose, 60K miles, \$12,900. 882-7376
- ★ 1995 Jeep Grand Cherokee Laredo, 4WD, 5.2L, maroon, 79K miles, \$12,900. 233-4815
- ★ 1993 Buick Century, silver, a/c, power

locks/windows, one-owner, \$5,000. 828-6158

- ★ 1999 Dodge Ram 2500 SLT Laramie, quad-cab, 2wd, red, towing pkg., 79K miles, \$17,990. 461-0389
- ★ 1994 Nissan Sentra, 96K miles, red, 4-door, automatic, am/fm tape, a/c, \$2,895 obo. 464-0660
- ★ 1998 Lincoln Town Car Executive Series, green w/ivory leather interior, 38K miles, \$19,900 obo. 650-0810
- ★ 1993 Dodge Grand Caravan SE, one-owner, many new parts, service records available \$5,300 obo. 895-9520
- ★ 1992 Dodge Caravan van, low miles, new tires, \$4,800. 461-8182
- ★ 1997 Ford F-250 XLT pickup, 4x4, automatic, w/towing pkg. and gooseneck, 40K miles, \$16,250. 931-732-4742
- ★ 1996 Blazer LT, 4-door, 2/4WD, auto, CD, leather, all power, 76K miles, two-tone, \$10,500. 880-9025

## Lost

- ★ Buck knife in Bldg. 4400 area, October. 544-7969/337-4205 Jim Wicks

## Found

- ★ Cell phone near Bldg. 4200; Ladies necklace. Call 544-4758 to identify/claim

## Center Announcements

**Last 2000 'Marshall Star'** — This is the last "Marshall Star" for 2000. Jan. 11 will be the first issue for 2001. Please submit ads and material for publishing to the Marshall Star office in Bldg. 4200, room 101C, or to INTERCOM@msfc.nasa.gov no later than noon Jan. 8.

**Safety & Health makeup sessions** — Safety and Health training sessions are scheduled from 8 a.m.-4:30 p.m. Jan. 9 and Jan. 23. Civil servants interested in attending should send an e-mail to Pat Schultz.

**Federal Almanac** — To order the 2001 Federal Almanac, send \$10 — \$9 for Union members — to MESA, Bldg. 4471, room C-105.

**Charlie's Grill closed** — Charlie's Grill in the basement of Bldg. 4200 will be closed Friday and Tuesday.

**Smoke Stoppers** — The NASA Exchange is offering a series of eight, one-hour classes aimed at helping you quit smoking. The course is \$50 for contractors and retirees, and free to civil servants and their dependents. For more information, send an e-mail to Pat Mirandy or call 544-7570.

**Mentors/advisers workshop** — A workshop for prospective research mentors/advisers will be Jan. 24. The workshop provides information about roles, responsibilities, policy changes, timelines and processes related to higher education programs. For more information, call Pamala Heard at 544-0776. To register to attend, visit the Web at: [http://www1.msfc.nasa.gov/education/registration\\_form.html](http://www1.msfc.nasa.gov/education/registration_form.html)

**SHARP mentors** — The Education Programs Department is initiating the 2001 Summer High School Apprenticeship Research Program (SHARP). SHARP is an eight-week paid apprenticeship for high school students who reside within commuting distance to a NASA field installation. Marshall will be placing 26 students and will need mentors for each one. Call Alicia Beam at 544-2849 if you are interested in being a SHARP mentor.

**Sign language class** — The Alabama Institute for Deaf and Blind will be teaching a basic sign language course from 8:30-10:30 a.m. Mondays and Thursdays from Jan. 8 through March 15. Civil servants interested in attending should send an e-mail to Pat Schultz by Thursday.

**Photo Lab retirees** — Photo Lab retirees meet the first Tuesday each month at 9:30 a.m. at Shoney's on University Drive and Memorial Parkway. Call Carl Dow at 461-8181.

## Job Opportunity

**MSFC-ES-13-00:** Deputy manager of the Space Shuttle Projects Office. Closes Feb. 5.

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