



MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 19, 2011

Passing the test *EOC ready for real-life emergency*

By Angela Storey

The job of the Emergency Operations Center at the Marshall Space Flight Center is basic and simple: to be prepared for any emergency at Marshall. And ready to protect its people and facilities.

On April 27, when one of the largest and most powerful systems of tornadoes swept across this state, Marshall's Emergency Operations Center, or EOC, was ready. Just as it was prepared to be.

Located in the basement of Building 4202, the EOC serves as the command hub for the center's emergency preparedness and management functions. Its personnel are responsible

for proactive emergency preparedness measures, including performing emergency drills and exercises. All to be ready for an event like that of April 27, and the days that followed in which the center and the surrounding area were without power.

During the work day April 27, Marshall's Emergency Operations Center issued severe storm and tornado watches and warnings to Marshall Center employees, urging them to move to protected areas. This time, however, the severity of the weather compelled Marshall emergency personnel to mobilize and showcase their readiness.

"It was somewhat difficult during this emergency because there were several obstacles to overcome to ensure the preparedness of the center," said Carole Valenti, Marshall's Emergency Management director. "One of the first decisions

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Tornado challenges satellite damage track detection techniques

By Janet Anderson

The Short-term Prediction Research and Transition, or SPoRT, team has used satellite data from the North Alabama region to identify tornado damage from the April 27 super storm outbreak.

SPoRT team scientists work to accelerate the infusion of NASA Earth science observations, data assimilation and modeling research into regional and local National Weather Service forecasting and decision making.

NASA's Terra satellite, part of the

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Endeavour launches on its final mission



Space shuttle Endeavour roars into orbit from Kennedy Space Center's Launch Pad 39A as the vehicle embarks on its 25th and final spaceflight, the STS-134 mission.

By Sanda Martel

Space shuttle Commander Mark Kelly and his five crewmates launched aboard space shuttle Endeavour May 16 on the STS-134 mission to the International Space Station. The 16-day mission is shuttle Endeavour's final mission.

"This mission represents the power of teamwork, commitment and exploration," Kelly said shortly before liftoff.

See *Endeavour* on page 7

NASA puts Earth's nearest neighbor, 'the moon,' within reach

By Kim Newton

NASA has created a new interactive Web-based tool that incorporates observations from past and current lunar missions, creating one of the most comprehensive lunar research websites to date.

The Lunar Mapping and Modeling Project at the Marshall Space Flight Center has created an online set of capabilities and tools that will allow anyone with an Internet connection to search through, view and analyze a vast number of lunar images and other digital products. The data and tools available through the project website will allow researchers to perform in-depth analyses to support mission planning and system design for lunar exploration and science missions. It will permit detailed scientific analysis and discovery, and open additional educational and outreach opportunities.

The project website is a one-stop location for finding, retrieving and analyzing data about the moon, including the most recent lunar surface imagery, altimetry, temperature, lighting and other data, as provided by the Lunar Reconnaissance Orbiter, or LRO, and its seven onboard instruments.

The orbiter, launched by NASA in 2009, continues to gather information about the moon from its orbit some 31 miles above the lunar surface. LRO has provided a treasure trove of data – more than all previous lunar and planetary missions combined.

The Lunar Mapping and Modeling Project website also will include data obtained from past lunar programs and missions including Apollo, Lunar Orbiter, Lunar Prospector, Clementine, Kaguya (Japan) and Chandrayaan-1 (India).

"By making these data widely available to the general public, NASA seeks to provide engineers, scientists, mission planners, educators and

students with a new resource that will allow them to view and analyze a wide array of lunar images and other data products in a way not previously available to such a diverse group," said Raymond French, integration lead for the Lunar Mapping and Modeling Project Office at Marshall.

Information provided through the project website can be easily used for many purposes, including planning and analysis tasks in the areas of potential landing site evaluation and selection; design and positioning of landers or other stationary assets; design of rovers or other mobile assets; development of terrain-relative capabilities; assessment and planning of scientific surface expeditions; scientific analysis and discovery; and integration of lunar science and exploration into the development of classroom activities and education curricula.

The website provides access to rich and highly complex products from previous missions such as images; digital elevation models; gravity models; local hazard assessment maps assessing slope, surface roughness, crater and boulder distribution; and resource maps detailing such information as soil maturity and the presence and abundance of hydrogen and other elements.

The Lunar Mapping and Modeling Project website features an easy-to-use browsing tool, and provides access to two additional visualization and analysis tools: Lunar Mapper, a lightweight, Web-based geographic



The moon as captured by the Galileo spacecraft on Dec. 9, 1990, at a range of about 350,000 miles.

analysis client; and the Integrated Lunar Information Architecture for Decision Support application, known as ILIADS, a downloadable desktop geospatial information system client. Both tools offer advanced data manipulation and analysis.

The Advanced Capabilities Division of the Exploration Mission Systems Directorate at NASA Headquarters in Washington sponsored the Lunar Mapping and Modeling Project to support the agency's efforts to make lunar data easier to use and readily available to mission planners and system designers, while continuing to support science, education and public outreach efforts tied to the study of Earth's sole natural satellite.

The project is managed at the Marshall Center and is a collaborative development effort across NASA and other organizations, including Ames Research Center; Goddard Space Flight Center; the Jet Propulsion Laboratory; the United States Geological Survey in Flagstaff, Ariz.; the U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory in Hanover, N.H.; Arizona State University in Tempe; and the University of Arizona in Tucson.

For more information about the NASA Lunar Mapping and Modeling Project, visit <http://www.lmmp.nasa.gov>.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

Chris Singer named director of Marshall's Engineering Directorate

Chris Singer has been appointed director of the Marshall Space Flight Center's Engineering Directorate.

Appointed to the Senior Executive Service in April 2000, Singer previously served as deputy director of Marshall's Engineering Directorate. Named to that position in 2004, he helped lead the organization responsible for design, testing, evaluation and operation of hardware and software associated with space transportation, spacecraft systems, science instruments and payloads under development at the Marshall Center. From 2000 to 2003, he was acting director of the Marshall Center's Space Transportation Directorate.

Singer began his NASA career in 1983 as a rocket engine specialist in Marshall's Structures and Propulsion Laboratory. He became a supervisor team lead in the Liquid Propulsion Branch in 1991. In 1992, he served a one-year assignment at NASA Headquarters as senior manager for the

space shuttle main engine and external tank in the Space Shuttle Support Office. He returned to Marshall in 1994 as technical assistant to the space shuttle main engine project manager, where he supervised the development and implementation of safety improvements and upgrades to space shuttle propulsion components. In 2000, he was appointed chief engineer in the Space Transportation Directorate, and in 2002 was named the directorate's deputy director.

A native of Nashville, Tenn., Singer earned a bachelor's degree in mechanical engineering in 1983 from Christian Brothers University in Memphis, Tenn. In 2006, he received the Presidential Rank Award for Meritorious Executives – the highest honor for career federal employees. He was awarded the NASA Outstanding Leadership Medal in 2001 for his leadership, technical contributions and exceptional service as deputy director of the Space Transportation Directorate. In 1989, Singer received a Silver Snoopy Award from the Astronaut Corps for his contributions to the success of human spaceflight missions.



Chris Singer

Committed to maintaining a diverse workforce

Marshall creates Disability Awareness and Action Working Group for team members with disabilities

Submitted by the Office of Diversity & Equal Opportunity

Do you ever have trouble reading your computer screen? Do you ever have difficulty using a computer keyboard? Do you ever have problems hearing or seeing what is going on in large meetings?

There are many solutions to these problems. These solutions may be provided at no cost to you or NASA and will be kept confidential. Having the right equipment will make work easier, improve productivity and increase morale.

NASA is committed to maintaining a diverse workforce, which includes team members with disabilities.

An action-working group has been formed to advocate on behalf of individuals with disabilities and for disabled veterans at the Marshall Space Flight Center. The Disability Awareness

and Action Working Group, known as DAAWG, meets monthly to address issues concerning individuals in this target workforce group. DAAWG will focus on education, awareness, communication, networking and reasonable accommodations for team members with disabilities at Marshall.

To provide the awareness to the Marshall community, DAAWG will use all available media resources. Already planned for open, ongoing communication is the use of ExplorNet, media boards and the Marshall Star. Subgroups will be developed to establish education programs, communication avenues and networking opportunities.

During October, which is National Disability Employment Month, educational and awareness activities will be held. In the area of reasonable

accommodation, DAAWG will provide recommendations to eliminate barriers, whether physical or other kinds of limitations that may hinder productivity and advancement in the work environment. DAAWG also will advocate for the employment of people with disabilities, nurturing the inclusion of people with disabilities into the work environment. DAAWG will demonstrate advocacy for individuals to inform Marshall management and the workforce about the needs of employees with disabilities.

If you find that your physical capabilities have changed since you were hired and that you might benefit from assistance, take a moment and call Phyllis Olinger, equal employment manager in the Office of Diversity & Equal Opportunity, at 544-0022.

NASA's Fermi spots 'superflares' in crab nebula

By Frank Reddy

The famous Crab Nebula supernova remnant has erupted in an enormous flare five times more powerful than any flare previously seen from the object. On April 12, NASA's Fermi Gamma-ray Space Telescope first detected the outburst, which lasted six days.

The nebula is the wreckage of an exploded star that emitted light, which reached Earth in the year 1054. It is located 6,500 light-years away in the constellation Taurus. At the heart of an expanding gas cloud lies what is left of the original star's core, a superdense neutron star that spins 30 times a second. With each rotation, the star swings intense beams of radiation toward Earth, creating the pulsed emission characteristic of spinning neutron stars, also known as pulsars.

Apart from these pulses, astrophysicists believed the Crab Nebula was a virtually constant source of high-energy radiation. But in January, scientists associated with several orbiting observatories, including NASA's Fermi, Swift and Rossi X-ray Timing Explorer, reported long-term brightness changes at X-ray energies.

"The Crab Nebula hosts high-energy variability that we're only now fully appreciating," said Rolf Buehler, a member of the Fermi Large Area Telescope, or LAT, team at the Kavli Institute for Particle Astrophysics and Cosmology, a facility jointly located at the U.S. Department of Energy's SLAC National Accelerator Laboratory and Stanford University in California.

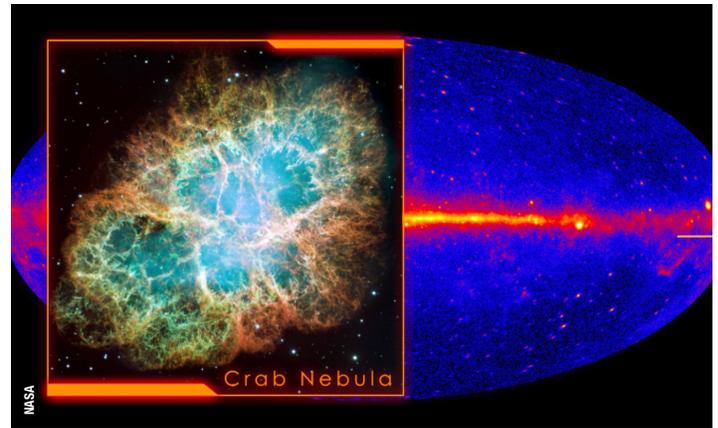
Since 2009, Fermi and the Italian Space Agency's AGILE, or Astrorivelatore Gama a Immagini Leggero, satellite have detected several short-lived gamma-ray flares at energies greater than 100 million electron volts, or eV, hundreds of times higher than the nebula's observed X-ray variations. For comparison, visible light has energies between 2 and 3 eV.

On April 12, Fermi's LAT, and later AGILE, detected a flare that grew about 30 times more energetic than the nebula's normal gamma-ray output and about five times more powerful than previous outbursts. On April 16, an even brighter flare erupted, but within a couple of days, the unusual activity completely faded out.

"These superflares are the most intense outbursts we've seen to date, and they are all extremely puzzling events," said Alice Harding at NASA's Goddard Space Flight Center in Greenbelt, Md. "We think they are caused by sudden rearrangements of the magnetic field not far from the neutron star, but exactly where that's happening remains a mystery."

The Crab's high-energy emissions are thought to be the result of physical processes that tap into the neutron star's rapid spin. Theorists generally agree the flares must arise within about one-third of a light-year from the neutron star, but efforts to locate them more precisely have proven unsuccessful so far.

Since September 2010, NASA's Chandra X-ray Observatory



A Hubble visible light image of the Crab Nebula inset against a full-sky gamma-ray map, showing the location of the nebula.

routinely has monitored the nebula in an effort to identify X-ray emission associated with the outbursts. When Fermi scientists alerted astronomers to the onset of a new flare, Martin Weisskopf and Allyn Tennant at the Marshall Space Flight Center triggered a set of pre-planned observations using Chandra.

"Thanks to the Fermi alert, we were fortunate that our planned observations actually occurred when the flares were brightest in gamma rays," said Weisskopf. "Despite Chandra's excellent resolution, we detected no obvious changes in the X-ray structures in the nebula and surrounding the pulsar that could be clearly associated with the flare."

Scientists think the flares occur as the intense magnetic field near the pulsar undergoes sudden restructuring. Such changes can accelerate particles like electrons to velocities near the speed of light. As these high-speed electrons interact with the magnetic field, they emit gamma rays.

To account for the observed emission, scientists say the electrons must have energies 100 times greater than can be achieved in any particle accelerator on Earth. This makes them the highest-energy electrons known to be associated with any galactic source. Based on the rise and fall of gamma rays during the April outbursts, scientists estimate that the size of the emitting region must be comparable in size to the solar system.

NASA's Fermi is an astrophysics and particle physics partnership managed by Goddard and developed in collaboration with the Department of Energy, with important contributions from academic institutions and partners in France, Germany, Italy, Japan, Sweden and the United States.

The Marshall Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

For more information, images and video, visit <http://www.nasa.gov/fermi>.

Reddy is a writer at the Goddard Space Center in Greenbelt, Md.

This week marks National Small Business Week

This week marks National Small Business Week. Every year since 1963, the U.S. president has proclaimed this week to recognize the contributions of small businesses to the economic well being of America. The U.S. Small Business Administration recognizes this special impact made by outstanding entrepreneurs and small business owners.

This year, National Small Business

Week will honor the estimated 27.2 million small businesses in America. Small businesses are major contributors to the strength of the American economy. More than half of Americans either own or work for a small business. They also create 60-80 percent of new jobs in the country. Small businesses drive innovation, create 21st century jobs and increase U.S. competitiveness.

At the Marshall Space Flight Center, small businesses play a key role in

supporting the center's mission, and in doing so, employ hundreds in North Alabama. In FY 2010, small businesses received direct and subcontracting obligations amounting to approximately \$675 million, the highest level ever at the center, according to David Brock, Marshall small business specialist in the Office of Procurement.

For more information, visit <http://www.nationalsmallbusinessweek.com/>.

Tornado *Continued from page 1*

Earth Observing System of satellites, captured images of the damage path. An instrument aboard Terra, called the Advanced Spaceborne Thermal Emission and Reflection Radiometer, or ASTER, was used to discern vegetation contrasts over the region.

"This is the first time ASTER data has been applied to such a massive outbreak of storms," said Gary Jedlovec, atmospheric scientist at the Marshall Space Flight Center. "The usefulness of satellite information in providing improved accuracy along with damage assessment in severe weather events continues to evolve."

The tornado track signature observed by ASTER is seen as a disruption in the vegetation or other reflective surfaces over a region caused by tornado winds. Uprooted trees quickly stop the process of photosynthesis and change color – this is easily detected by satellite.

However, detecting damage in areas outside of heavy forestland is challenging.

In Madison and Limestone counties, much of the area scarred by the tornadoes are agricultural in nature. Fields are either pasture land or row crops – therefore the effect of tornado winds is minimal and the mark on satellite imagery is suppressed.

While this indicates a limitation to the use of this particular image analysis for tornado track detection over primarily agricultural land use, the SPoRT team is exploring the use of temperature channels from ASTER to better identify damage marks on Earth's surface.

Terra/ASTER is a joint activity between NASA's Science



Tornado damage in Harvest, Ala., as seen by NASA's Terra satellite.

Mission Directorate Earth Science Division and Japan's Ministry of Economy, Trade and Industry. Terra is one of 14 NASA satellites that looks at the Earth to study and understand changes in the Earth system and provides societal benefits.

The NASA image is created by the SPoRT project at Marshall, using data provided courtesy of NASA Goddard Space Flight Center in Greenbelt, Md., the Land Processes Distributed Active Archive Center in Reston, Va., and the Earth Remote Sensing Data Analysis Center, the Ministry of Economy, Trade and Industry, along with the Japan Research Observation System Organization, all located in Japan.

Anderson is a public affairs officer in the Office of Strategic Analysis & Communications.

Marshall Star goes online only beginning June 2; Daily Planet to cease publication

Due to budget constraints, the Marshall Star will only be available online beginning June 2. The last printed issue will be May 26.

To continue reading the Star, simply visit <http://marshallstar.msfc.nasa.gov/>. A link will be sent to the Marshall Space Flight Center workforce every Wednesday

when the new issue is posted. Articles also will be available on ExplorNet, the center's new internal social media tool created to increase collaboration, communicate in real-time throughout the Marshall community and find expertise.

The Star will no longer be mailed to Marshall retirees or to other NASA centers. Classified advertisements also will cease in the Star. However, Marshall team members can post their ads on ExplorNet.

In addition, the Daily Planet will not be available after May 31. To view the latest NASA news, visit www.nasa.gov.

Emergency *Continued from page 1*

made was to activate selected members of the Center Continuity of Operations Management Team, or CCMT."

The team is comprised of center representatives whose coordinated efforts ensure information gathering and resource allocations are done efficiently. Additionally, this group's expertise is relied upon for recommendations provided to the center director.

Once it was understood that the power outage could last for several days, Valenti, along with the Alternate Emergency Management Director, Gary Humphrey, engaged the Facilities Management Office to determine how much power the center required to resume normal activity. Although the EOC is prepared to monitor emergencies, the recent storms affecting the city, its surrounding area and the center were particularly challenging due to communication failures.

"Once we were affected by the power outage, we no longer had communication services with computers, Internet or business phones," Valenti added. "We had to determine if we could or would be opening."

To assist with this decision, mission essential personnel with Marshall's Facilities Management Office, the

Office of Human Capital, the Office of the Chief Information Officer and the Protective Services Office joined forces to set a systematic plan in motion.

Critical mission areas were attended to first, relying on generators to continue the normal schedule. Phones, computers and card readers remained disabled in the remaining buildings until all power was fully restored. Once completed, all center employees returned to work.

If not for the NASA Information Support Center, updating employees on the center's status and even communicating with mission-essential personnel could have been an issue. The support center, which operates around the clock, seven days a week, kept the lines of communication open using the agency's new Emergency Notification System – in which emergency communications can be sent quickly whenever necessary. The system also was instrumental in providing a way for the Office of Human Capital to activate its Accountability Team, which is responsible for ensuring that all Marshall personnel are accounted for and their status is known. Using the system as the conduit for dissemination, the Office of Human Capital created a red/yellow/green response to locate personnel and find out if they were okay

or needed support for recovery. They were able to account for 100 percent of the Marshall Center personnel including civil servants and contractors.

"Although the EOC proactively prepares for emergencies with training, this time the center learned from an actual event," said Humphrey. "We will be organizing a 'Pause and Learn' to understand the problems encountered and recommend solutions to the center leadership."

Humphrey added that the assessment process will include consultation with various resources to mitigate risk, and ensure the center's ability to handle any future emergency situations.

Center Operations Director Ann McNair applauded the Marshall team for its excellent commitment in returning the center to a safe and functioning work environment.

"Endeavors to bring the center back online were a superb team effort coordinated through our EOC under the leadership of Carole Valenti and Gary Humphrey. I want to thank them for keeping us organized, focused and, very importantly, aligned with our Army partners."

Storey is a public affairs officer in the Office of Strategic Analysis & Communications.

"It is in the DNA of our great country to reach for the stars and explore. We must not stop. To all the millions watching today including our spouses, children, family and friends, we thank you for your support."

"ET-122 gave a fantastic performance," said Bill Gerstenmaier, NASA associate administrator for Space Operations, in a news conference following Endeavour's launch. "The main engines and solid rocket boosters performed flawlessly which is a good testament to all of the ground testing we do."

All three space shuttle propulsion elements – the external tank, space shuttle main engines and solid rocket boosters – are managed by the Marshall Space Flight Center.

The crew will deliver the Alpha Magnetic Spectrometer-2, or AMS, and critical supplies to the space station, including two communications antennas, a high-pressure gas tank and additional parts for the Dextre robot. AMS is a particle physics detector designed to search for various types of unusual cosmic matter. The crew also will transfer Endeavour's orbiter boom sensor system to the space station, where it could assist spacewalkers as an extension for the station's robotic arm.

"Today's final launch of Endeavour is a testament to American ingenuity and leadership in human spaceflight," NASA Administrator Charles Bolden said. "As we look toward a bright future with the International Space Station as our anchor and new destinations in deep space on the horizon, we salute the astronauts and ground crews who have ensured the

orbiter's successful missions. The presence of Congresswoman Gabrielle Giffords at the launch inspired us all, just as America's space program has done for the past 50 years."

Giffords, the wife of Commander Kelly, was shot and injured in Tucson, Ariz., Jan. 8.

Kelly's crewmates are Pilot Greg H. Johnson and Mission Specialists Mike Fincke, Drew Feustel, Greg Chamitoff and

Roberto Vittori of the European Space Agency. This is the first shuttle flight for Fincke and Vittori. Vittori will be the last international astronaut to fly aboard a space shuttle.

Endeavour docked with the space station May 18 at 5:14 a.m. CDT and hatches between the two spacecraft were opened at 6:38 a.m. The mission includes four spacewalks. After

undocking for the return to Earth later this month, Kelly and Johnson will ease the shuttle back toward the space station to test new sensor technologies that could facilitate the docking of future space vehicles to the orbiting complex.

The shuttle's first landing opportunity at Kennedy Space Center, Fla., is scheduled for June 1 at 1:32 a.m. CDT. STS-134 is the 134th shuttle flight, the 25th flight for Endeavour and the 36th shuttle mission dedicated to space station assembly and maintenance.

For more information about the STS-134 mission, visit <http://www.nasa.gov/shuttle>.

Martel, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis and Communications.

"It is in the DNA of our great country to reach for the stars and explore. We must not stop. To all the millions watching today including our spouses, children, family and friends, we thank you for your support."

— Mark Kelly
STS-134 commander

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Marshall Star Ad Form." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, May 26, is 4:30 p.m. Thursday, May 19.

Miscellaneous

Four tickets, Alabama Hammers game, floor level, on wall, May 21, \$25 per ticket. 256-682-9838

Four tickets, Steve Martin, An Evening of Bluegrass and Banjo, Row D, May 29. 256-797-3780

Small oak table and chairs, \$50; kitchen table and chairs, \$150. 256-658-8241

AKC Labs, females, "English" blockheads, vet checked. RLKNIGHT1981@bellsouth.net or 931-425-0830

Heavy brass floor lamp, new shade, \$50. 256-683-3398

Muscovy ducklings, 4 weeks old, shelter raised, \$10 each. 256-486-4400

Intex 18' easy set above ground pool, accessories, additional larger pump, floats, \$450. 256-337-3500

Leather reclining sofa and loveseat, \$1,200 obo; 10-speed cross country bike, \$100. 256-653-1127

Vehicles

2006 Mercury Grand Marquis GS, 41,200 miles, \$9,600. 256-461-8314

2002 Nissan Pathfinder, green, tan leather, 78,600 miles, \$9,900. 256-468-0785

1999 Lexus SC300, \$6,250. 256-665-5899

1998 GMC pickup truck LWB, white, 200k miles, 6 cylinder, \$4,000. 256-468-9377

Wanted

10' trampoline mat. 256-603-1273

Shuttle Buddies to meet May 23

The Shuttle Buddies will meet at 8:30 a.m. May 23 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757.

Asian Pacific American Heritage Month lunch and learn to be held May 24

In celebration of Asian Pacific American Heritage Month, the Marshall Space Flight Center will host a lunch and learn at 11 a.m. May 24 in Building 4200, Room P-110. All Marshall team members are invited to attend.

The guest speaker will be Dr. Ernest H. Wu, chief executive officer of ERC Inc. The theme is "Leadership, Diversity, Empowerment and Beyond."

Each May, Marshall recognizes the contributions of people of Asian and Pacific Islander heritage benefiting NASA and the nation. The annual recognition month formally began in 1990 and became U.S. law two years later.

For more information about Asian Pacific American Heritage Month activities, call Willie Love at 544-0088.

Obituaries

James W. Moore, 80, of Huntsville died Feb. 11. He retired from the Marshall Center in 1990 as an electrical engineer. He is survived by his wife, Ceacy Moore.

William Aloysius Karigan, 83, of Owens Cross Roads died March 17. He retired from the Marshall Center in 1989 as an electrical engineer. He is survived by his wife, Erika Maria Sorrells.

Leo William Jex, 91, of Guntersville died March 29. He retired from the Marshall Center in 1980 as a personnel staffing and employee relations specialist. He is survived by his wife, Patricia Kay Hillson Jex.

Charles Gillespie, 88, of Huntsville died March 31. He retired from the

Marshall Center in 1979 as a chief equipment specialist.

Raymond Spink, 74, of Huntsville died April 19. He retired from the Marshall Center in 1991 as an aerospace engineer. He is survived by his wife, Tempie Spink.

Virginia Hill, 92, of Marietta, Ga., died April 22. She retired from the Marshall Center in 1987 as a secretary.

William E. Hammon, 85, of Decatur died April 30. He retired from the Marshall Center in 1991 as an electronics technician. He is survived by his wife, Marie Turney Hammon.

Robert Rhea Jayroe Jr., 71, of Huntsville died April 28. He retired

from the Marshall Center in 1999 as a division chief. He is survived by his wife, Mary Ann Stout Jayroe.

David Haislip, 74, of Arab died April 30. He retired from the Marshall Center in 2005 as a reliability and quality assurance engineer. He is survived by his wife, Annette Snow Haislip.

Bobby Harold Raney, 77, of Toney died May 4. He retired from the Marshall Center in 1989 as an aerospace engineering technician. He is survived by his wife, Latain Raney.

Joel Don Lawrence, 87, of Hartselle died May 15. He retired from the Marshall Center in 1974 as an electronics technician. He is survived by his wife, Jean Lawrence.

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