



2010



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EDUCATION

ANNUAL REPORT

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DIRECTOR'S LETTER

America's global competitiveness requires us to better educate our young people in math and science and to attract more of our best and brightest students into technological careers. NASA Johnson Space Center (JSC) is committed to supporting science, technology, engineering, and mathematics (STEM) education because the future of our nation depends on our youth of today. We live in a "flat world" in which data are instantaneously transferred across oceans and the flow of business continues without sleep. A more integrated global economy offers both new challenges and opportunities to the United States and its work force. To maintain its position as the world's leading innovator, the United States must invest in our next generation of inquisitive minds, inventive thinkers, and problem solvers. Innovation leads to new products and processes that sustain our industrial base and depends on a solid understanding of math, science, and engineering.

We have the opportunity to share the excitement of human space flight to inspire students, educators, parents, and community members in the STEM disciplines. We're targeting a larger audience to reach even more students in 2011 through Summer of Innovation and other educational efforts. From our middle school educator programs to our higher education internships--and all our dedicated volunteers in between--JSC reaches a wide range of the education system with the goal of increasing careers in the STEM fields. Every child can learn, and we believe the excitement of space exploration can be the catalyst to launch such careers.

Sincerely,



Michael L. Coats
Director, Johnson Space Center



NASA EDUCATION

NASA'S JOHNSON SPACE CENTER IN HOUSTON, TEXAS,

STRIVES TO IMPROVE STEM EDUCATION WHILE INCREASING INTEREST AND AWARENESS IN ALL NASA CAREERS. JSC IS DEDICATED TO INSPIRING, ENGAGING, EDUCATING, AND EMPLOYING THE NEXT GENERATION OF EXPLORERS AND INNOVATORS BY OFFERING PROGRAMS FOR STUDENTS AND EDUCATORS, SHARING CLASSROOM RESOURCES, AND COLLABORATING ON NUMEROUS PARTNERSHIPS WITH OTHER EDUCATIONAL ENTITIES.

The NASA journeys into air and space have deepened humankind's understanding of the universe, advanced technology breakthroughs, and enhanced air travel safety and security, and have expanded the frontiers of scientific research. These accomplishments share a common genesis: education. As the United States begins the second century of flight, the nation must maintain its commitment to excellence in STEM education to ensure that the next generation of Americans can accept the full measure of their roles and responsibilities in shaping the future. NASA will continue the agency's tradition of investing in the nation's education programs and supporting the country's educators, who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will be the work force of tomorrow.

NASA continues to pursue three major education goals:

- Strengthening NASA and the Nation's future workforce
- Attracting and retaining students in STEM disciplines
- Engaging Americans in NASA's mission

STUDENT EDUCATIONAL OPPORTUNITIES

JSC offers various types of student educational opportunities throughout the year—including on-site programs as well as research and digital learning programs—for students from kindergarten through the university level.

STUDENT EMPLOYMENT OPPORTUNITIES

JSC provides high school and college students the opportunity to gain real-life experience alongside NASA engineers, scientists, and business professionals. This hands-on work experience helps to develop qualified and diverse graduates who will meet future work force needs and really helps students launch their careers.

EDUCATOR OPPORTUNITIES

JSC offers programs for educators. Opportunities include on-site workshops, traveling clinics, and digital learning programs aimed at helping teachers implement NASA's unique content into their science, math, and technology instructional materials.



JSC EDUCATION PROJECTS 2010 | JSC STRIVES TO REACH STUDENTS, EDUCATORS, AND THE

GENERAL PUBLIC THROUGH A VARIETY OF PROJECTS. THESE PROJECTS REACH OUR LOCAL COMMUNITY AS WELL AS OUR

EIGHT-STATE REGION, WITH SOME PROJECTS EXTENDING THROUGHOUT THE ENTIRE COUNTRY. THE ACTIVITIES FOUND WITHIN

THESE PROJECTS FOCUS ON STEM-RELATED TOPICS AND INCLUDE PROFESSIONAL DEVELOPMENT FOR EDUCATORS, HANDS-

ON ACTIVITIES FOR STUDENTS, UNIQUE NASA EXPERIENCES, STUDENT INTERNSHIP AND EMPLOYMENT OPPORTUNITIES, AND

ON-LINE LEARNING. A BRIEF OVERVIEW IS PROVIDED OF EACH PROJECT MANAGED OR OPERATED FROM JSC.

ELEMENTARY, SECONDARY AND e-EDUCATION

Aerospace Education Services Project: Offers professional development efforts and educator training, and identifies NASA resources to the formal and informal education communities in all 50 states and the U.S. territories.

Digital Learning Network: Inspires students to pursue STEM disciplines while learning more about planet Earth and human space exploration through interactive programming via videoconferencing and Webcasts with JSC educators, scientists, engineers, and astronauts.

Education Outreach Program: Promotes interest in STEM disciplines by having JSC volunteers participate in various outreach opportunities for students in our local community.

Educator Resource Center: Demonstrates and facilitates the use of NASA educational technologies, and provides training to educators using NASA curriculum materials.

Texas High School Aerospace Scholars: Creates an interactive on-line learning experience that encourages high school juniors to study STEM-related fields, highlighted by a 6-day internship at JSC where students work with NASA engineers and scientists to develop a human mission to Mars.

High School Students United with NASA to Create Hardware: Works with middle school and high school students to fabricate training, flight hardware, and soft goods for the International Space Station. NASA supplies the mentor, documentation, and raw material to provide students the opportunity to work on real-world projects.

Human Research Program Education and Outreach:

Targets educational communities, the general public, policy makers, and the media using formal and informal venues to share NASA's space research and exploration.

Informal Education: Partners with museums, science centers, and informal educational groups, such as scouts, after-school groups and camp programs in our eight-state region. These projects and activities seek to build internal and external strategic partnerships that promote STEM literacy and awareness through both formal and informal educational settings.

Interdisciplinary National Science Program

Incorporating Research Education Experiences: Links a national student pipeline program of elementary and secondary programs to higher education by encouraging 9th through 12th grade students to pursue STEM education and careers. This project offers an on-line learning community as well as summer internships.

Learning Technologies: Provides, by acting as an education technology incubator, educators with professional development experiences and students with learning tools using virtual-world platforms such as Second Life Grid™ and NASA-developed, realistic multiplayer games such as Moonbase Alpha and the upcoming Astronaut: Moon, Mars and Beyond.

NASA Explorer Schools: Gives teachers access to a selection of the best NASA educational content and focused support materials to engage students in activities designed around NASA's mission and current research,

thus fulfilling its designed intent of providing a primary access point into classrooms.

NASA High School Aerospace Scholars: Partners JSC with multiple states, building on the success of the Texas High School Aerospace Scholars project and replicating the model with a unique on-line course and summer workshop as inspiration to increase the number of high school students entering STEM degrees and careers.

JSC Robotics: Teams with the University of Houston to bring K-12 robotics education to the greater Houston area through the Coordination of Robotics Education program. This program reaches a broad audience by providing schools with high-quality robotics programming in which to participate.

Teaching From Space: Manages NASA's Education Flight Projects, a national K-12 project, and facilitates and funds opportunities for educators and students that use NASA-unique content, facilities, and people.

HIGHER EDUCATION AND STUDENT PROGRAMS

Career Exploration Program: Acts as a career catalyst for local high school and college students by providing yearlong experiential internships at JSC while the students are enrolled full-time in their degree programs. Students work under the guidance of a NASA mentor to develop professional skill sets and provide technical and administrative support to JSC organizations.

Texas Community College Aerospace Scholars: Encourages community college students to explore the possibilities of careers in STEM fields while engaging first hand in engineering activities.

Graduate Student Researchers Program: An agency-wide fellowship program for graduate study leading to master's or doctoral degrees in STEM fields that are related to NASA research and development.

Habitat Demonstrations Unit Project: Provides the opportunity for university students to competitively respond to the yearly identified design challenge of the Desert Research and Technologies Studies. This is a multicenter team of NASA architects, scientists, and engineers working together to develop sustainable living and work environments for the next-generation space missions.

ISS National Laboratory Education Project: Uses the unique educational venue of the International Space Station (ISS) and its microgravity environment to become the focal point for STEM education, and serves as a resource that enables educational activities in the classroom and aboard the space station.

Minority University Research and Education Program: Increases agency responsiveness to federal mandates related to minority institutions through competitive award programs, faculty fellowships, and student intern activities.

Motivating Undergraduates in Science and Technology: Awards scholarships and internships to undergraduates pursuing degrees in STEM disciplines, and focuses on engaging students from underserved and underrepresented groups to enter STEM fields.

National Community College Aerospace Scholars:

Encourages community college students from across the nation to explore the possibilities of STEM careers while engaging in activities to experience engineering first hand; modeled after the success of the Texas Community Aerospace Scholars.

National Space Biomedical Research Institute: Addresses national science and health education needs through the development, production, dissemination, and evaluation of school curricular materials, on-line science education resources, and teacher professional development.

Pre-Service Teacher Institute: Reaches elementary preservice teachers with an intensive 2-week summer residential session designed to increase their skills to teach mathematics and science to K-8 students, while incorporating technology into the curriculum for Early Childhood and Elementary Education majors.

Reduced Gravity Education Flight Program: Provides undergraduate students and educators with unique academic experiences to successfully propose, design, fabricate, fly, and evaluate reduced-gravity experiments over the course of 4 to 6 months.

Space Grant Interns: Coordinates and funds NASA undergraduate internship opportunities through private industry partners and 52 state consortiums.

Steckler Space Grant: Awards grants of increasing value to institutions addressing innovative, meaningful, and enduring research and technology development activities relating to space colonization and space settlement.

Student Temporary Employment Program: Provides hands-on, career-related work experiences for graduate business students by placing them in mentor-directed positions at JSC for summer, spring, or fall semesters.

Systems Engineering Education Discovery: Uses an existing network of programs and tools to lead the agency in the development and growth of a new generation of systems engineers who enter the work force better prepared to immediately contribute.

Texas Aerospace Scholars Internship: Attracts outstanding students to an internship opportunity at JSC; these students have previously participated in the Texas High School or Community College Aerospace Scholars projects and are pursuing undergraduate degrees in a STEM-related degree field.

Undergraduate Student Research Program: Gives students the ultimate work force preparatory experience for careers in STEM-related disciplines by offering 10- to 15-week, hands-on mentored internships on site at a NASA center. The program is NASA's largest, nationwide undergraduate internship program, and it is offered year-round at 12 NASA centers and facilities.

University Research Center: Increases research content consistent with NASA's vision for aeronautics and space exploration capability among the nation's Minority Institutions through a competitive, cooperative agreement.

JSC EDUCATION IMPACT 2010

JSC STRIVES TO REACH

THE MOST DIVERSE AND BRIGHTEST MINDS ACROSS THE COUNTRY WITH ITS EDUCATION PROJECTS. THE IMPACT CREATED ON A LOCAL, STATE, REGIONAL, NATIONAL, AND INTERNATIONAL LEVEL IS VISIBLE. THE MAP REPRESENTS THE PLACES WHERE INDIVIDUALS OR GROUPS INTERACTED WITH A JSC-MANAGED EDUCATION PROJECT IN 2010, AND THE FLAGS DEPICT PARTICIPATION BY INTERNATIONAL GROUPS.





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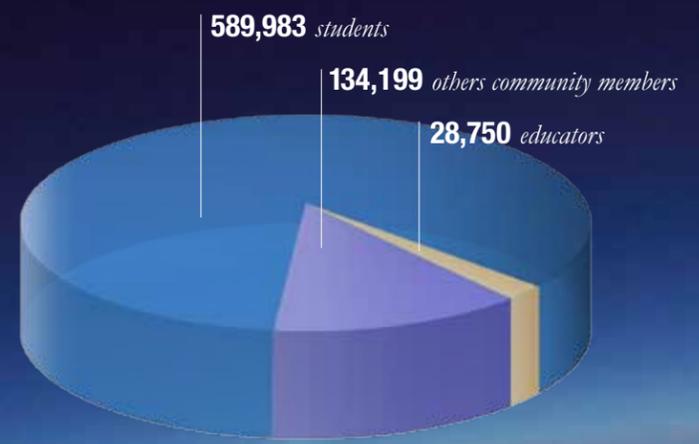
JSC EDUCATION IMPACT 2010 | JSC'S IMPACT TO EDUCATION CAN BE SEEN THROUGH THE

NUMBER OF STUDENTS, EDUCATORS, AND OTHER COMMUNITY MEMBERS WHO ARE REACHED THROUGH NUMEROUS PROJECTS.

JSC REACHED MORE THAN 589,000 STUDENTS, 28,000 EDUCATORS, AND 130,000 OTHER COMMUNITY MEMBERS IN 2010.

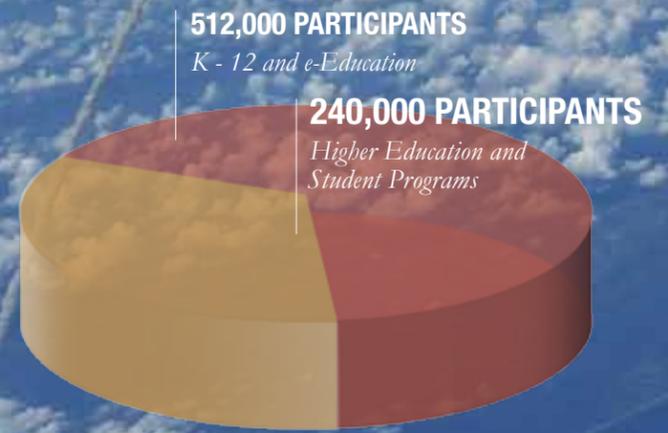
THROUGH JSC EFFORTS, MORE THAN 750,000 PEOPLE WERE BROUGHT IN CONTACT WITH NASA'S CONTINUING MISSION OF

SPACE EXPLORATION AND WILL CONTINUE TO CONNECT WITH MORE STUDENTS, EDUCATORS, AND OTHERS EACH DAY.



MORE THAN HALF A MILLION INDIVIDUALS REACHED BY JSC EDUCATION ACTIVITY IN 2010

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JSC EDUCATION PROVIDED 28 K - 12 AND e-EDUCATION AND 16 HIGHER EDUCATION AND STUDENT PROGRAMS OPPORTUNITIES IN 2010

JSC EDUCATION HIGHLIGHTS 2010

JSC COMPLETED MANY

ACTIVITIES THROUGHOUT 2010 AND REACHED NEW HEIGHTS

WITH ITS EDUCATION PROJECTS. WHETHER CELEBRATING

PROJECT MILESTONES, DEVELOPING NEW TECHNOLOGY,

CONDUCTING GROUNDBREAKING RESEARCH, OR INTERACT-

ING WITH THOUSANDS OF PEOPLE DURING UNIQUE EVENTS,

JSC ACCOMPLISHED ENORMOUS EDUCATION ACHIEVE-

MENTS IN 2010. THE BEST AND BRIGHTEST MOMENTS OF

THE YEAR ARE SPOTLIGHTED BELOW.

ELEMENTARY, SECONDARY AND e-EDUCATION

Digital Learning Network: NASA brought the excitement of space into classrooms by inviting middle and high school students to videoconferences conducted underwater on the NASA Extreme Environment Mission Operations 14 oceanic mission. Students interacted live with NASA aquanauts to understand the scientific and mathematic principles behind underwater analog training that apply to life in space. Through this and other opportunities, JSC hosted 800 digital learning events in 2010.

Education Outreach: More than 1,000 JSC employees and their children participated in education events and tours during Bring Our Children to Work Day to celebrate employee contributions and spark student interest in STEM careers. Education Outreach also hosted a volunteer appreciation event at which JSC volunteers were recognized for their involvement with local schools.

Human Research Program Education and Outreach:

A new partnership was formed with The Boys and Girls Clubs of South Texas to provide a series of bilingual educational packages focused on inquiry-based learning and basic science process skills.

Space Exploration Educator Conference: The conference at Space Center Houston attracted more than 500 educators from around the world who use space and exploration in the classroom to inspire their students. The presentations by NASA education specialists, scientists, and engineers translate directly to hands-on activities in the classroom and help motivate students to study STEM fields. The conference has brought more than 10,000 teachers to JSC, sharing the excitement of bringing space to the classroom and NASA's work and research in space.



Summer of Innovation: JSC partnered with local Houston area organizations to infuse NASA education content into summer STEM learning programs as part of the agency's Summer of Innovation initiative. The partnerships provided professional development and access to NASA personnel and Summer of Innovation content to more than 1,000 middle school students and approximately 100 educators. Five thousand additional students attended "Voyage Back to School" and the Hispanic Engineering Science and Technology conference as part of the Summer of Innovation celebrations.

Teaching from Space: Students from throughout the U.S. and as far away as Poland, Brazil, and Egypt engaged in the

excitement of real-time space operations during three Earth Knowledge Acquired by Middle School Students missions managed by Teaching from Space and Sally Ride Science. Middle school students, as part of this project, take pictures of the Earth from a digital camera aboard the space station. Almost 22,000 students participated in 2010.

HIGHER EDUCATION AND STUDENT PROGRAMS

Career Exploration Program: The program provides project-based internships for students interested in STEM and business degrees. Students come from 16 high schools, 65% of which have a minority population of greater than 50%, and from 14 colleges, spanning a total of 15 congressional districts. Students are placed in 52 diverse organizations across JSC in support of STEM- and business-focused projects. Students were awarded \$366,000 in university scholarships last year.

Graduate Student Researchers Program: Participants hosted, for the first time, a panel for undergraduate students to talk about graduate school applications, grant proposals, and research opportunities. Students engaged and networked with awardees in different parts of their academic careers, from first-year graduate students to defending doctoral candidates.

National Community College Aerospace Scholars: JSC initiated the National Community College Aerospace Scholars pilot project, which, by bringing 167 students to NASA centers, aims to motivate community college students across the nation to study STEM disciplines and continue their education at 4-year institutions. Many NCAS alumni are returning to NASA centers as interns and have begun studying at 4-year schools.

Reduced Gravity Education Flight Program: The Program, which is celebrating its 15th year delivering research opportunities to students and educators through parabolic flight, has brought the hands-on research platform of microgravity to more than 3,000 students representing nearly 300 academic institutions. Many alumni have transitioned into NASA co-op and internship programs and then to full-time NASA employment, building on the nation's technical work force.

Student Employment Programs Office: The higher education office significantly added to the JSC work force by placing more than 300 interns, equaling the work of 100 full-time employees, in engineering, science, and administrative positions. More than 2,200 students—reflecting diversity in college majors, gender, and ethnicity—from nearly 600 universities applied for JSC internships.

Hispanic Engineering, Science, and

Technology Conference: This program held in Edinburg, TX is a partnership with the University of Texas-Pan American and Congressman Rubén Hinojosa's office. NASA space and exploration exhibits and hands-on activities exposed and inspired almost 4,000 underserved minority middle school students to become scientists, mathematicians and engineers. 50,000 people from across the Rio Grande Valley participated.

ISS National Labs: Through Kids In Micro-g—an experiment design contest for 5th through 8th graders—10 student-designed microgravity demonstration experiments from eight different schools flew on the space station.

High school students won a Web page design contest in Texas by articulating, to the public, the benefits of NASA's human space flight efforts. A Microsoft Website featured their engaging design.

Undergraduate Student Research Program:

NASA's largest internship program for undergraduates in STEM fields was recognized by a NASA Group Achievement Award for Excellence in Management. The Undergraduate Student Research Program has become a successful pipeline for STEM students, as 75 alumni have accepted full-time positions either with NASA, the aerospace work force, or within the STEM work force. In 2010, 4,645 applications from undergraduate students across the nation were received.



FOR MORE INFORMATION, VISIT

<http://education.jsc.nasa.gov>