



Innovation in Action



2010 NASA Education Highlights



Innovation in Action

“As you may know by now, education is a passion of mine. It is the foundation for great accomplishments now and for our future. And we at NASA have always been in a unique position to inspire excellence from the next generation.”

—Charles F. Bolden, NASA Administrator

Read about the innovative ways NASA is creating new activities that spark the interest and imagination of people from all segments of society.

Contents

- 1 NASA Associate Administrator for Education Message
- 2 NASA Education Overview
- 4 Education Highlights
 - NASA Supports the President’s Educate to Innovate Campaign with Summer of Innovation
 - NASA Joins USA Science & Engineering Festival in Washington
 - NASA Helps National Lab Day Lift-Off
 - Educator and Astronaut Operates Robotic Arm in Space
 - STS-133 Education Innovation Summit Highlights Partnerships
 - NASA and the LEGO Group Partner To Inspire Children To Build and Explore the Future
 - NASA and Mary J. Blige Encourage Science Careers for Women
 - NASA Funds Initiative to Develop “One Stop” Internship Shopping
 - Stellar Students Selected as NASA Ambassadors
 - Annual NASA Student Rocketry Challenge Concludes with Smoke, Thunder, and Accolades
 - NASA Summer Student’s Research Earns High Recognition
 - NASA/NIA Help Teach Educators How To Teach Science and Technology
 - NASA Awards Education Research Grants to Minority Universities
 - NASA Grants Increase STEM Learning for Minority Students
 - NASA Kicks Off Virtual Education Program for College Students
 - NASA and FIRST Help Teens Showcase Design and Engineering Skills
 - NASA Selects High School Students for INSPIRE Education Program
 - NASA Provides Opportunities for Students To Soar to New Heights
 - NASA Explorer Schools Symposium Showcases Student Research
 - NASA’s New Museum Grant Allies Will Make the Universe Accessible
 - NASA and Univision Collaborate To Engage Hispanic Students
 - NASA Takes Gamers on a Lunar Adventure with New Online Video Game
 - NASA’S Digital Learning Network Teachers Earn Prestigious Award
- 22 Appendix A: NASA Education Goals and Framework
- 23 Appendix B: NASA Education Strategic Framework
- 24 Appendix C: NASA Education Categories of Involvement
- 25 Appendix D: NASA Education K–12 Service Areas
- 26 Appendix E: Connecting with NASA Education
- 28 For More Information



“Just as energy is the basis of life itself, and ideas the source of innovation, so is innovation the vital spark of all human change, improvement and progress.”

—Ted Levitt, Economist

June 2011

A Message from the Associate Administrator for Education



This past year marked an amazing time for NASA in education. In April, educator astronaut Dottie Metcalf-Lindenburger launched into space on her first flight, while NASA engaged students with robotics in honor of her role in the STS-131 mission. During the summer, NASA unveiled a unique and exciting new national project, the Summer of Innovation (SOI). The Agency continued its commitment to engaging students and educators Nationwide through the National Space Grant College and Fellowship Program. And in addition to all of this, in early October I was selected to become the new Associate Administrator for Education. I am honored to work with this NASA team, and I look forward to much success in our efforts to inspire and prepare students, engage teachers, and involve lifelong learners with NASA's mission.

My own investment in this journey is personal. I owe everything to parents who were classroom teachers, and while growing up I witnessed their amazing power in every aspect of my life. This spirit is what brought me to NASA Headquarters from Johnson Space Center in my role as an astronaut.

NASA's compelling scientific and technical missions; founding legislation; core values of integrity, safety, excellence, and teamwork; and inherent mission to inspire students and inform the public are what make us unique and unparalleled. As someone who flew on two Space Shuttle missions to the International Space Station, participated in numerous technical teams, and delivered NASA's message to countless audiences, I have experienced the full range of the magnificence and uniqueness of this Agency.

It's clearer more than ever that education is, and has always been, a fundamental and constant part of NASA's incredible mission. From its very beginning, this Agency has been held to the critical task of ensuring that Americans are aware of our activities to improve their lives and expand their horizons. This is who we are.

Our Nation's youth, educators, communities, institutions, and organizations are waiting. Let's work together to fulfill the promise of our founding legislation, continue this vital STEM movement, and lay the foundation for future greatness—for NASA and for the country. Within each stakeholder, partner, leader, teacher, student, and NASA employee are the tools to make this a reality. The future is in all of our hands.

Leland D. Melvin
NASA Associate Administrator for Education

NASA Education Overview

NASA is taking a leading role in the effort to inspire interest in STEM—as few other organizations can—through its unique mission, workforce, facilities, research, and innovations. NASA is continuing to pursue three major education goals: strengthening NASA’s and the Nation’s future workforce, attracting and retaining students in STEM disciplines, and engaging Americans in NASA’s mission.

NASA Education Programs

Higher Education focuses on strengthening the research capabilities of the Nation’s colleges and universities as well as providing opportunities that attract and prepare increasing numbers of students for NASA-related careers. The research conducted by these institutions contributes to the research needs of NASA’s Mission Directorates. The student projects serve as a major link in the pipeline for addressing NASA’s Human Capital Strategies and the President’s Management Agenda. The projects help to “build, sustain, and effectively deploy the skilled, knowledgeable, diverse, and high-performing workforce needed to meet the current and emerging needs of government and its citizens.”



Minority University Research and Education engages underrepresented populations through a wide variety of initiatives. Multiyear grants are awarded to assist minority institutions, faculty, and students in research pertinent to NASA missions. The program focuses on recruiting and retaining underrepresented and underserved students in STEM disciplines through completion of undergraduate or graduate degrees in support of their entry into the scientific and technical workforce.



Elementary and Secondary Education projects provide K–12 educators with tools, experiences, and opportunities to further their education. Students participate in unique NASA learning experiences that enhance their knowledge of STEM and inspire the pursuit of STEM careers. The program supports the role of educational institutions, providing the framework to bring together students, families, and educators for educational improvement.



Informal Education inspires learning by educating students, educators, and the general public on specific STEM content areas, resulting in the expansion of the Nation’s future STEM workforce. Projects within the program produce supplemental education materials that are standards-based and support life-long learning in the STEM fields. Self-directed learners and education professionals are engaged through NASA-themed, hands-on activities.





The National Aeronautics and Space Administration (NASA) Office of Education administers national education efforts that draw on content from across the Agency. The Office of Education is responsible for ensuring compliance with external requirements and laws and NASA-wide processes, procedures, standards, audits, and accounting related to education. It also provides the leadership for coordinating and integrating NASA's Strategic Education Framework, implementation approach, and policies.

NASA Centers are responsible for institutional assets and the execution of components of the Agency's numerous and varied research and development programs across the Nation. Center Education Offices implement NASA education projects and activities for the Mission Directorates and the Office of Education, as well as planning and implementing education programs that are unique to, and funded by, their Centers.

Ames Research Center (ARC) specializes in research geared towards creating new knowledge and new technologies that span the spectrum of NASA interests.

Dryden Flight Research Center (DFRC) is the lead for flight research and continues to innovate in aeronautics and space technology. The newest, the fastest, the highest—all have made their debut in the vast, clear desert skies.

Glenn Research Center (GRC) develops and transfers critical technologies that address national priorities through research, technology development, and systems development for safe and reliable aeronautics, aerospace, and space applications.

Goddard Space Flight Center (GSFC) has a mission to expand knowledge of Earth and its environment, the solar system, and the universe through observations from space.

The Jet Propulsion Laboratory (JPL), managed by the California Institute of Technology (Caltech), is NASA's lead Center for robotic exploration of the solar system.

Johnson Space Center (JSC) continues to lead NASA's efforts in Human Space Exploration from the early Gemini, Apollo, and Skylab projects to today's Space Shuttle and International Space Station programs.

Kennedy Space Center (KSC) is America's gateway to the universe—leading the world in preparing and launching missions around Earth and beyond.

Langley Research Center (LaRC) continues to forge new frontiers in aviation and space research for aerospace, atmospheric sciences, and technology commercialization to improve the way the citizens of the world live.

Marshall Space Flight Center (MSFC) is bringing people to space and bringing space to people. MSFC is the world leader in the access to space and use of space for research and development to benefit humanity.

Stennis Space Center (SSC) is responsible for NASA's rocket propulsion testing and for partnering with industry to develop and implement remote sensing technology.

NASA Mission Directorates each cover a major area of the Agency's research and development efforts. The Mission Directorates and other NASA Headquarters organizations that fund education efforts are responsible for embedding education components into their research and development programs and flight missions, administering the discipline-/content-specific activities for which they provide funding and resources, and ensuring meaningful collaboration between the NASA science/engineering community and the education community.

The Aeronautics Research Mission Directorate (ARMD) conducts long-term, cutting-edge research in the core aeronautics disciplines across all flight regimes (subsonic, supersonic, and hypersonic) that will lead to the development of revolutionary ideas, concepts, approaches, technologies, and capabilities that have broad applicability to the aeronautics community.

The Exploration Systems Mission Directorate (ESMD) is developing the next generation of spacecraft, including capabilities and technologies that enable sustained and affordable human and robotic exploration in support of U.S. space exploration policy.

The Science Mission Directorate (SMD) invests in the continued development of a workforce able to pursue Earth and space science research from space, partners with institutions and professional societies in increasing public understanding of science and technology, and informs the teaching and learning of STEM subjects in the classroom.

The Space Operations Mission Directorate (SOMD) provides the Agency with leadership and management of NASA space operations related to human exploration in and beyond low-Earth orbit and seeks to provide educational projects, products, and activities to inspire the next generation of explorers to take the next steps in U.S. space exploration policy.

Please see Appendices for more information about NASA Education.



NASA Supports the President's Educate to Innovate Campaign with Summer of Innovation

In January 2010, NASA launched an initiative to use its out-of-this-world missions and technology programs to boost summer learning, particularly for underrepresented and underperforming students across the Nation. NASA's Summer of Innovation supports President Obama's Educate to Innovate campaign for excellence in STEM education.

In April, NASA announced that it is partnering with the Space Grant Consortia of Idaho, Massachusetts, New Mexico, and Wyoming in the Summer of Innovation initiative. NASA awarded four cooperative agreements that total approximately \$5.6 million. Local programs were required to develop ways to keep students and teachers engaged during the school year and to track student participants' performance. Awardees were encouraged to leverage the unique capabilities and resources of program partners to ensure a sustainable effort following the period of performance.

Through the Summer of Innovation program, NASA engaged thousands of middle school teachers and students in stimulating math- and science-based education programs. NASA's goal is to increase the number of future scientists, mathematicians, and engineers, with an emphasis on broadening participation of low-income and minority students.

The Summer of Innovation is conducted in a multifaceted approach that allows NASA to assess the viability, scalability, and success of the pilot programs. NASA used the Agency's

National Space Grant College and Fellowship Program to implement the Summer of Innovation pilot. The Space Grant national network consists of 52 consortia in all 50 states, the District of Columbia, and the Commonwealth of Puerto Rico. The network includes 850 affiliates from universities, colleges, industry, museums, science centers, and state and local agencies supporting and enhancing science and engineering education, research, and public outreach efforts for NASA's aeronautics and space projects.

National Launch at the Jet Propulsion Laboratory

NASA Administrator Charles Bolden kicked off the Summer of Innovation during a dynamic and exciting event at the NASA Jet Propulsion Laboratory in June.

Two hundred fifty middle school students participated in the kickoff festivities, met six current NASA astronauts, interacted with NASA scientists and engineers, participated in several hands-on educational activities, and visited the facility where the most recent Mars rover was built. Potential partners also met with NASA to discuss how they could get involved.

NASA Teams with Four States for Pilot Project

The existing Space Grant state-based network supported the Summer of Innovation pilot through direct professional development for STEM educators and direct summer STEM learning experiences for students.

- **Wyoming Space Grant:** "Powering STEM Education in Wyoming with Wind Energy"



- **New Mexico Space Grant:** “Launch and Learn”
- **Idaho Space Grant:** “NASA Education and STEM Program for Underrepresented Populations”
- **Massachusetts Space Grant:** “NASA’s Robotic, Earth and Space Science, Astrophysics and Engineering Missions”

Digital Learning Network (DLN) Webcasts

These 45- to 60-minute programs allowed educators and students to learn about Earth and the universe beyond. NASA experts are featured, and Webcasts include Summer of Innovation content. DLN is part of NASA’s Learning Environments and Research Network.

Interactive Web Site

The Summer of Innovation Web site served as the entry point for all information, news, and content for students, parents, educators, programs, stakeholders, partners, and management.

Call for Participation

NASA extended a call Nationwide for STEM Stakeholders to participate in the NASA Summer of Innovation and become STEM collaborators. Through the Summer of Innovation Web site, families, educators, and organizations responding to the national call registered and submitted events and activities, shared their stories and achievements, and received a certificate of participation.

A Wide Net Cast for Partners

NASA invited potential partners to participate in the SOI project. Through an announcement of opportunity, the Agency sought unfunded partnerships with organizations to help achieve its Summer of Innovation goals, reach wider audiences, and build national interest in STEM education. Potential partnership activities were varied.

Grants for Science Education

NASA awarded about \$1 million in grants to public school districts, state-based education leadership, and not-for-profit

education organizations to support academic excellence in STEM education. The Summer of Innovation Capacity Building Awards were shared among institutions that showed student participation in summer learning experiences helped academic performances in the following school year. The Summer of Innovation Capacity Building effort also looked for programs with the potential to be a model for middle school education.

Each funding proposal leveraged NASA content in STEM education to build successful programs with a special interest in reaching underserved students and strengthening the bridge between out-of-school and in-school learning programs. There were 16 proposals selected for funding representing the District of Columbia and the following 13 states: California, Connecticut, Florida, Georgia (two), Maryland, Massachusetts, Nebraska, New Mexico, Oregon, Texas, Virginia (two), Washington, and Wisconsin.

Pilot Program Culminates with a Special Day for Students

One hundred students who participated in NASA’s Summer of Innovation program celebrated the program’s accomplishments with a day of special activities at NASA’s Glenn Research Center (GRC) in Cleveland on Oct. 15. The students, from Michael R. White Elementary School in Cleveland and several schools and student organizations in Grand Rapids, MI, participated in a STEM career roundtable discussion with GRC researchers and scientists and attended a briefing with veteran astronaut Mike Foreman. They received a tour of different GRC facilities, and the day concluded with a visit to the Great Lakes Science Center to view the OMNIMAX film Hubble.

As part of the Summer of Innovation NASA Center-based activities, GRC provided more than 1,200 middle school students and 30 teachers from Ohio, Florida, Georgia, Michigan, New York, and the District of Columbia with intensive and interactive STEM educational experiences. GRC’s SOI activities included collaborations and partnerships with NASA’s Science, Engineering, Mathematics and Aerospace Academy (SEMAA) sites, school districts, universities, and nonprofit organizations.



NASA Joins USA Science & Engineering Festival In Washington

NASA joined more than 500 science organizations in late October to inspire the next generation of scientists and engineers during the first national science and engineering festival to be held in the Nation's capital.

The USA Science & Engineering Festival, which began October 10 with activities in local schools, ended October 24 with a 2-day expo on the National Mall and surrounding areas. The event also marked the culmination of NASA's new Summer of Innovation pilot education initiative, aimed at engaging middle school students in STEM activities during the summer break. The program reached more than 75,000 middle school students during its inaugural year.

NASA booths at the expo featured hands-on activities, demonstrations, and exhibits. Children and adults learned about the Agency's many scientific missions. Students also learned how to become involved in 2011 Summer of Innovation events.

"This is such a dynamic way to reach students and the general public and get them excited about what NASA is doing," said Leland Melvin, NASA Associate Administrator for Education. "Hands-on experiences and interaction with the NASA team brings exploration and discovery to life. The Summer of Innovation pilot program, which began in June, used the same approach to engage middle school students across the Nation in STEM activities. I look forward to an even larger program in 2011."

NASA Helps National Lab Day Lift-Off

NASA demonstrated its commitment to STEM education and hands-on learning through activities supporting the first National Lab Day, a grassroots initiative aimed at bringing STEM hands-on activities to students across the country.

To kick off the week of the first annual National Lab Day on May 12, several cabinet and senior administration officials joined in to promote the "Educate to Innovate" campaign for Excellence in STEM. NASA education staff supported two of these high-profile National Lab Day events in the District of Columbia.

- On Tuesday, May 11, NASA Administrator Charles Bolden spoke to fifth-graders at Langdon Education Campus, who were studying the solar system, about working in space. He had the opportunity to share with them his experience of living and working in space as a NASA astronaut prior to becoming the NASA Administrator. He had an energetic discussion with students on how Newton's laws are present in everyday life. He also participated in a demonstration of a hands-on rocketry experiment.
- On Wednesday, May 12, Dr. John Holdren, Director of the Office of Science and Technology Policy (OSTP), worked with 40 physics students at Benjamin Banneker High School. After describing what it's like to be President Obama's science and technology adviser, Dr. Holdren took several engaging questions from the student audience. Following the Q&A, Dr. Holdren joined the students in literally getting their hands dirty



in an educational activity set up by NASA. Students created a simulated asteroid surface using a mixture of soil, flour, and other ingredients. Then, using golf balls and a protractor, they observed how changes in the angle of a projectile's impact affected the area and volume of the resulting craters.

- In addition, on Wednesday, May 12, Arne Duncan, Secretary of U.S. Department of Education, joined third-graders at the Martin Luther King, Jr. Elementary School for an interactive session about science and engineering in their classroom. Students presented their designs of “shock absorbers” that any spacecraft would need for landing on the Moon or Mars. The engineering activity led to a discussion about energy and friction as students assembled and tested model cars on various surfaces.

Although many activities are focused on the official day of May 12, 2010, National Lab Day is more than just 1 day. It is a Nationwide collaborative movement that gets volunteers, university students, scientists, and engineers to work together with educators. Prior to its support of the events in May, NASA also hosted a series of weekly live Webcasts during April through the Agency's Digital Learning Network. The series aimed to help teachers promote hands-on science education in their classrooms. NASA's Digital Learning Network allows the next generation of explorers to connect with scientists, engineers, and researchers without leaving the classroom. Through

interactive videoconferencing available across the Agency at all 10 NASA Field Centers, the network provides distance-learning events designed to educate through demonstrations and real-time interactions with NASA experts.

NASA embraced National Lab Day and scheduled activities at schools throughout the week supported by volunteers from its Field Centers across the Nation and from its headquarters here in Washington, DC. For instance, Kennedy Space Center in Florida hosted an educational event for students from local area high schools who learned about NASA and the benefits of STEM fields related to our world and beyond.

Bolden remarked positively about National Lab Day in an entry on the Office of Science and Technology Policy blog after the Langdon Education Campus event on May 11. He said, “There is a crisis in the United States that stems from the gap between the Nation's growing need for scientists, engineers, and other technically skilled workers, and our supply. This crisis in education, if not resolved, will contribute to future declines in qualified employees to meet demands in critical career fields that affect U.S. global competitiveness and the national economy. However, seeing the engagement and enthusiasm of those fifth-grade students, I am hopeful that given the opportunity, our youth shall be inspired and motivated to consider STEM careers.”



Educator and Astronaut Operates Robotic Arm in Space

Dottie Metcalf-Lindenburger launched to space during her first spaceflight aboard the STS-131 mission. Metcalf-Lindenburger was the last of the three schoolteachers selected as mission specialists in the 2004 Educator Astronaut Class to fly on the Space Shuttle. Ricky Arnold and Joseph Acaba flew on the STS-119 Shuttle mission in March 2009.

The educational activities on the STS-131 Shuttle mission to the International Space Station focused on robotics and careers in STEM.

Without robotics, major accomplishments of building the Station, repairing satellites in space, and exploring other worlds would not be possible. Metcalf-Lindenburger operated the Space Shuttle's robotic arm and a 50-foot Orbiter Boom Sensing System to inspect the Shuttle for any damage that might have occurred during launch or in space. A digital camera and laser system on the boom's end provide three-dimensional imagery used by analysts to assess the health of the Shuttle's heat shield.

Already, robotic arms have made it possible for NASA to accomplish amazing feats, and Metcalf-Lindenburger predicted that robotic devices will continue to be developed and used as NASA conducts future missions. Robots on other surfaces may be used to collect and analyze samples or help with the construction of an outpost.

Today's students will be the ones building the robots of the future, and some students already have a head start. Children as young as age 6 are participating in student robotics competitions. As one of NASA's educator astronauts, it is important to Metcalf-Lindenburger that students understand the potential importance of robotics.

Robotics will be important not only to the future of space exploration but in all types of fields, Metcalf-Lindenburger said. "You see it being used in auto manufacturing and in medicine, so I think we'll continue to see robotics used more and more in society. Students need to be aware of how robotics can be used for different things."

For educators, Metcalf-Lindenburger said robotics can be a fun way to engage students in science, technology, engineering, and mathematics. "This is a way to say, 'This is important to study math and science because you may be working with these things, and you may be designing these things. You will probably be influenced by robots at some time in your life.'"

STS-133 Education Innovation Summit Highlights Partnerships

The STS-133 Pre-Launch Innovation Summit was held October 31–November 1 in Orlando, FL, at the Regal Sun Resort. Associate Administrator for Education Leland Melvin engaged 129 stakeholders from industry, academia, nonprofit organizations, government, and other areas in the event that featured panel speakers and roundtable discussions.



This summit provided a venue to share perspectives on partnerships and discussion that included potential actions for partnerships and examples of successful interagency and public-private partnership activities.

Ideas for inspiring the next generation, leading a committed Nation, and creating transformative partnerships were discussed by an extremely distinguished series of speakers that included NASA Administrator Charlie Bolden, former astronaut Mae Jemison, actress and singer Nichelle Nichols, and Change the Equation CEO Dr. Linda Rosen.

Attendees were able to make connections and develop collaborations that are continuing to benefit students and teachers across the country.

NASA and the LEGO Group Partner To Inspire Children To Build and Explore the Future

A LEGO Space Shuttle that headed to orbit marked the November signing of a Space Act Agreement between NASA and the LEGO Group to spark children's interest in STEM.

To commemorate this new relationship, the small LEGO Shuttle launched with the crew of the Space Shuttle Discovery on its final STS-133 mission, which launched Tuesday, February 24, 2011, from NASA's Kennedy Space Center in Florida.

The partnership marks the beginning of a 3-year agreement that will use the inspiration of NASA's space exploration missions and the appeal of the popular LEGO bricks to spur children's interest in STEM. The theme of the partnership is "Building and Exploring Our Future."

The LEGO Group will release four NASA-inspired products in their LEGO CITY line throughout 2011. The space-themed products will vary in terms of complexity, engaging audiences from young children to adult LEGO fans. Each product release will contain NASA-inspired education materials.

"Partnering with the LEGO Group is a perfect fit. We have taken the excitement of NASA's missions and coupled that with kids' love of creating things with the iconic LEGO bricks," said Leland Melvin, Associate Administrator for Education. "These projects not only foster creativity but also instill in the young builders a real sense of the engineering and design principles that NASA uses every day. Fun learning activities like these can help inspire kids to become the next generation of explorers."

As part of the Space Act Agreement, NASA sent special LEGO sets to the International Space Station aboard Shuttle Endeavour's STS-134 mission in May 2011.

As part of NASA and the LEGO Group's partnership kickoff, a 40-by-70-foot activity tent was set up on November 2 at the Shuttle launch viewing site on the NASA Causeway in Cape Canaveral, FL. Children of all ages were invited to get creative and build their vision of the future with LEGO bricks.



NASA and Mary J. Blige Encourage Science Careers for Women

NASA is collaborating with award-winning recording artist Mary J. Blige to encourage young women to pursue exciting experiences and career choices by studying STEM.

A public service announcement featuring Associate Administrator for Education Leland Melvin and Blige debuted on NASA TV and the Agency's Web site.

NASA's Summer of Innovation project and Blige's Foundation for the Advancement of Women Now (FFAWN) have much in common. Both show students the many possibilities available if they follow their dreams and reach for the stars.

"Working with FFAWN is a rare opportunity to help spread the STEM message into communities not always readily accessible to us," Melvin said. "Mary's presence can help NASA make the STEM message more appealing to these communities and increase the pipeline of underrepresented students going into these disciplines."

Working with the NASA Science, Engineering, Mathematics and Aerospace Academy project at York College of the City University of New York (CUNY), the joint effort is providing on-the-job training for FFAWN high school participants. High school girls in the program will be prepared to deliver NASA SOI content to middle school students this summer at the New York City Housing Authority Van Dyke Community Center and the Harlem Children's Zone Promise Academy.

The FFAWN participants also will have the opportunity to support the NASA Academy fall academic session at CUNY as student aides for grades one through nine later this year.

NASA Funds Initiative to Develop "One- Stop" Internship Shopping

Undergraduate and graduate students who want to apply for a NASA internship or fellowship now have access to all of NASA's opportunities at one Web site. In April 2010, NASA announced that it had awarded cooperative agreements to five organizations to help attract students to NASA opportunities and provide an easily navigable process from start to finish.

The awards fund a NASA-wide recruitment, application, selection, placement, and career development system to engage students in STEM, research, aerospace education, and space exploration.

The objective of the One-Stop Shopping Initiative is to provide an Agency-wide integrated system. The goal is to have a central destination for NASA science and engineering mentors to announce their internship and fellowship opportunities. The effort will consolidate announcements and information currently found on multiple NASA Web sites. The initiative also will formalize the transition of student participants in NASA programs into the workforce, including within NASA, the aerospace industry, and academia.



The Ohio Aerospace Institute in Cleveland has partnered with NASA for business management. NASA selected four additional organizations to implement recruitment, retention, and career development strategies that broaden the diversity of institutions and individuals who apply for NASA's internships and fellowships. The organizations chosen to compose the Broker Facilitator Corps are the Institute for Broadening Participation of Damariscotta, ME; the United Negro College Fund Special Program of Falls Church, VA; the Hispanic College Fund Inc. of Washington, DC; and the American Indian Higher Education Consortium of Alexandria, VA. The total value of all awards is approximately \$9.7 million during a 5-year funding period.

Stellar Students Selected as NASA Ambassadors

In January 2010, NASA announced the selection of 105 of its best and brightest interns and fellows for the NASA Student Ambassadors Virtual Community. The Agency uses the project to engage undergraduate and graduate students in NASA STEM, research, and interactive opportunities. The selected students represent 33 states and 81 universities from across the Nation.

NASA managers and mentors nominated the recipients from the hundreds of interns and fellows engaged in research and education opportunities across the Agency. The NASA Student Ambassadors initiative further recognizes exceptional

students. Members of the NASA Student Ambassadors Virtual Community interact with the Agency while sharing information, making professional connections, and collaborating with peers. They also represent NASA in a variety of venues and help the Agency inspire and engage future interns and fellows.

The community's Web site provides participants with access to tools needed to serve as a NASA Student Ambassador. The site provides strategic communication opportunities, the latest NASA news, science and technology updates, blogs, and announcements. It contains member profiles, forums, polls, NASA contact information, links to Agency mission-related communications research, and career resources.

"The virtual community Web site is an outreach vehicle to the Nation's students as well as a way to engage exceptional Gen-Y NASA students," said Mabel Matthews, lead for the community and manager of Higher Education at NASA Headquarters. "This activity is a leading effort to help NASA attract, engage, educate, and employ the next generation."

With this and the Agency's other college and university programs, NASA will identify and develop the critical skills and capabilities needed to achieve its mission. This program is tied directly to the Agency's major education goal of strengthening the future STEM workforce for NASA and the Nation.



Annual NASA Student Rocketry Challenge Concludes with Smoke, Thunder, and Accolades

The smoke has dissipated, the thunder has fallen silent, and the North Alabama launch site has emptied of the hundreds who filled it April 17–18 during the 2009–2010 NASA Student Launch Projects rocketry challenge.

More than 300 students on 31 teams—representing middle schools, high schools, colleges, and universities in 18 states—vied to see whose rocket could come closest to the 1-mile altitude goal and safely return an onboard science payload to Earth. Ten preliminary awards were given, and the grand prize—\$5,000 from ATK Aerospace Systems in Magna, UT—was awarded in May after a final postflight analysis and review were completed.

Teams designed and built their rockets and experiments during the school year, maintained Web sites to document the experience, and visited schools and organizations in their communities to share their enthusiasm for rocketry and inspire younger students to work hard and pursue their goals.

The rocketeers were cheered on by more than 500 flight enthusiasts, who crowded the launch-site viewing area at Bragg Farms in Toney, AL, and by an estimated 30,000 Internet viewers. The latter group—which included audiences as far away as Brazil, Japan, and New Zealand—watched live launch coverage on Ustream, a one-stop shop for streaming video, Twitter, and Facebook updates.

The streaming Web coverage was a new component of the event, which is organized each year by NASA's Marshall Space Flight Center in Huntsville, AL.

Marshall's Academic Affairs Office, part of the Office of Human Capital, manages the rocketry challenge. The project is sponsored by NASA's Exploration Systems Mission Directorate, Space Operations Mission Directorate, and the Education Flight Projects Office in the Office of Education, all at NASA Headquarters in Washington. ATK provided corporate sponsorship. The National Association of Rocketry provided technical review and launch support. Bragg Farms has hosted the launch challenge since 2008.

NASA held the first student launch event in 2001 to inspire young people to pursue careers in technical fields—science, technology, engineering, and mathematics. In response to the growing popularity, NASA expanded the event in 2006, creating the Student Launch Initiative for middle schools and high schools and the University Student Launch Initiative for colleges and universities.

NASA Summer Student's Research Earns High Recognition

During a summer internship program at NASA's Langley Research Center, Alex Matus got more than just work experience—he got a prestigious award.

Matus, who attends Texas A&M University, spent the summer as a Langley Aerospace Summer Research Scholar, where he worked with atmospheric scientist John Murray in the Science Directorate studying the impact of volcanic ash on aviation.

After a volcanic eruption in Alaska last year halted hundreds of flights, Matus decided to dedicate his summer to understanding how to better track volcanic ash in the future.

His research paper on "The Impacts on Air Traffic of Volcanic Ash from the 2009 Mt. Redoubt Eruption" provided invaluable results for the science community, earning Matus an award in the first American Meteorological Society Best Student Paper competition.



“I feel truly honored to receive this award,” said Matus, who plans to pursue a doctoral degree in atmospheric sciences and hopes to eventually work at a national research institution such as NASA.

To understand the trajectory of ash after an explosion, Matus used datasets from the Ozone Monitoring Instrument (OMI) and the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO).

After spending the summer fusing the two datasets, Matus found that the volcano erupted to over 60,000 feet in altitude, and the ash followed the prevailing winds. At lower altitudes, the ash went to the northeast toward Canada, and at high altitudes, the ash dispersed to the southeast toward Washington state.

In addition to demonstrating the benefits of combining two datasets, Matus also concluded that the flow of ash in two different directions created a challenging scenario for accurately assessing the risks of flying and safely managing aircraft traffic.

“In the future, scientists will be able to use Matus’s research to help improve techniques to detect and characterize volcanic ash,” said Murray, Matus’s mentor at NASA Langley Research Center. “In addition, Federal agencies such as the [Federal Aviation Administration] will be able to use his research to issue better advisories and warnings.”

For his research contributions, the AMS presented Matus with a certificate, a monetary reward, and a notice of his selection for best student paper in an issue of the *Bulletin of the American Meteorological Society*.

NASA/NIA Help Teach Educators How To Teach Science and Technology

Forty new and future educators were in school themselves during the summer of 2010, learning how to excite youngsters about STEM.

Thirty university students preparing for their college classwork student teaching and 10 new Hampton Roads elementary and middle school teachers were part of the 2-week NASA Langley

Research Center Pre-Service Teacher Institute that took place at the National Institute of Aerospace (NIA) in Hampton, VA.

“We hope to excite teachers about STEM subjects and how those subjects can be taught in an engaging manner,” said Thom Pinelli, University Affairs Officer for NASA Langley’s Education Team. “That way they can integrate the material into their standards-based lesson plans and in turn excite the students about science, technology, engineering, and math. It’s NASA’s hope that more students will choose STEM careers and work with us to explore the universe, improve aviation, and study Earth and atmospheric science.”

The 2010 Pre-Service Teacher Institute attracted students from Virginia, North Carolina, Washington, and New Mexico, plus a novice teacher from Japan. They were selected from a pool of applicants based on their exemplary junior-/senior-level university status and their ability to attend the full 2-week program and complete all the preassigned work. Four NIA Educators in Residence, including Project Manager Becky Jaramillo, recipient of the 2004 Presidential Award for Excellence in Science Teaching, gave them hands-on experiences.

The students and teachers used 21st-century tools to strengthen their understanding of STEM topics and encouraged them to think and act like engineers and scientists. One of the things they focused on, with the help of NASA experts, was the science of climate change. Each participant received a technology toolkit to create digital documentaries, verify the effects of ultraviolet light, collect repetitive thermal data, explore ice cores, and understand the engineering challenges of putting a satellite into space. The ideas and tools were designed to be used by teachers in classrooms across the country.

“It is a privilege to work with future teachers who are looking for ways to make their classrooms more exciting for today’s students,” said Jaramillo. “I love to watch their enthusiasm grow as they create a vodcast for the first time or discover the excitement of being a citizen scientist.”



NASA Awards Education Research Grants to Minority Universities

NASA has awarded education grants to five minority-serving institutions to develop innovative projects in support of higher education teaching and learning in science, technology, engineering, and mathematics disciplines.

NASA's Minority University Research and Education Programs Small Programs project is designed to enhance students' academic experiences and encourage underserved and underrepresented groups to pursue STEM careers, which are critical to NASA's missions.

Grants were awarded to the following colleges, universities, and partnerships:

- Navajo Technical College in Crownpoint, NM.
- Florida Agricultural and Mechanical University in Tallahassee, FL.
- New Mexico State University in Las Cruces, NM.
- North Carolina Agricultural and Technical State University in Greensboro, NC.
- Sistema Universitario Ana G. Mendez Inc. in Caguas, PR.

The five projects will receive funding ranging from \$90,800 to \$345,850. The projects are eligible for renewal for 2 years, based on project performance and funding availability. NASA's Kennedy Space Center in Florida manages the project for the Agency.

NASA Grants Increase STEM Learning for Minority Students

NASA awarded grants to nine academic institutions and their partners that serve large numbers of minority and underrepresented students to strengthen offerings in STEM. The grants total approximately \$1.15 million through the Agency's Curriculum Improvement Partnership Award for the Integration of Research (CIPAIR) project.

Seven institutions and their partners were selected to receive funding ranging from approximately \$145,000 to \$150,000 per year for up to 3 years, based on performance and availability of funds. Two organizations were selected to receive planning grants. The grants were slated to be used to increase the quantity and quality of STEM curricula. The institutions and partners selected are as follows:

- Fayetteville State University in North Carolina and Southeastern Community College in Whiteville, NC (Planning Grant).
- LaGuardia Community College in Long Island, NY, and Medgar Evers College in Brooklyn, NY (Planning Grant).
- Atlanta Metropolitan College in Georgia.
- New York City College of Technology in Brooklyn, NY, and Hostos Community College in the Bronx, NY.



- San Mateo/Canada Community College in San Francisco and San Francisco State University in California.
- Santa Monica Community College and the University of California, Los Angeles, in California.
- Spelman College in Atlanta, GA, and Gadsen Community College in Gadsen, AL.
- United Tribes Technical College in Bismarck, ND.
- Virginia State University in Petersburg, VA, and Louisburg Community College in Louisburg, NC.

Selections were based on proposal reviews by scientists and educators from private industry, academia, the National Science Foundation, and NASA. The formal award, financial arrangements, and grant administration are made through the NASA Shared Services Center. CIPAIR is managed by the Agency's Jet Propulsion Laboratory in Pasadena, CA.

These awards provide funding that continues NASA's commitment to achieving a broad-based, competitive aerospace research and technology development capability among the Nation's minority-serving institutions. NASA continues to invest in projects that will build, sustain, and provide a skilled, knowledgeable, and diverse workforce to meet the emerging needs of the Agency and the Nation.

NASA Kicks Off Virtual Education Program for College Students

NASA is providing college students from across the country with the opportunity to participate in virtual interactive educational sessions focusing on NASA technical challenges and competitions. In May, the Agency's new Minority Innovation Challenges Institute, or MICI, kicked off a series of year-round sessions with a virtual conference.

The sessions teach students how to apply and participate in various competitions, such as the Agency's Centennial Challenges Program, the NASA University Student Launch Initiative, and the Great Moonbuggy Race. The online program is free.

The MICI is designed to inspire minority undergraduate students to pursue advanced degrees and careers in science, technology, engineering, and math disciplines critical to NASA's future missions.

"The Minority Innovation Challenges Institute will be a great asset to NASA, as we strive to build the pipeline of future scientists, technologists, engineers, and mathematicians," said Carl Person, NASA's Minority University Research and Education Programs Manager. "It will help us educate and inspire more underrepresented and underserved students, not only to participate in NASA challenges and competitions, but also to pursue advanced STEM degrees and NASA-related careers."

MICI is managed for NASA by Florida Agricultural and Mechanical University in Tallahassee, FL, through the Agency's Minority University Research and Education Programs Small Programs project.



NASA and FIRST Help Teens Showcase Design and Engineering Skills

NASA is providing up to \$20 million over the next 5 years to support a national program to inspire student interest in STEM with a focus on robotic technology. The funding is part of a cooperative agreement with the foundation For Inspiration and Recognition of Science and Technology (FIRST), a nonprofit organization in Manchester, NH. FIRST provides students with the opportunity to engage with government, industry, and university experts for hands-on, realistic exposure to engineering and technical professions.

The centerpiece of the program is the annual FIRST Robotics Competition. During more than 45 regional competitions, teams of high school students have 6 weeks to build a robot using an identical kit of parts. The regional competitions culminate with an international championship in April.

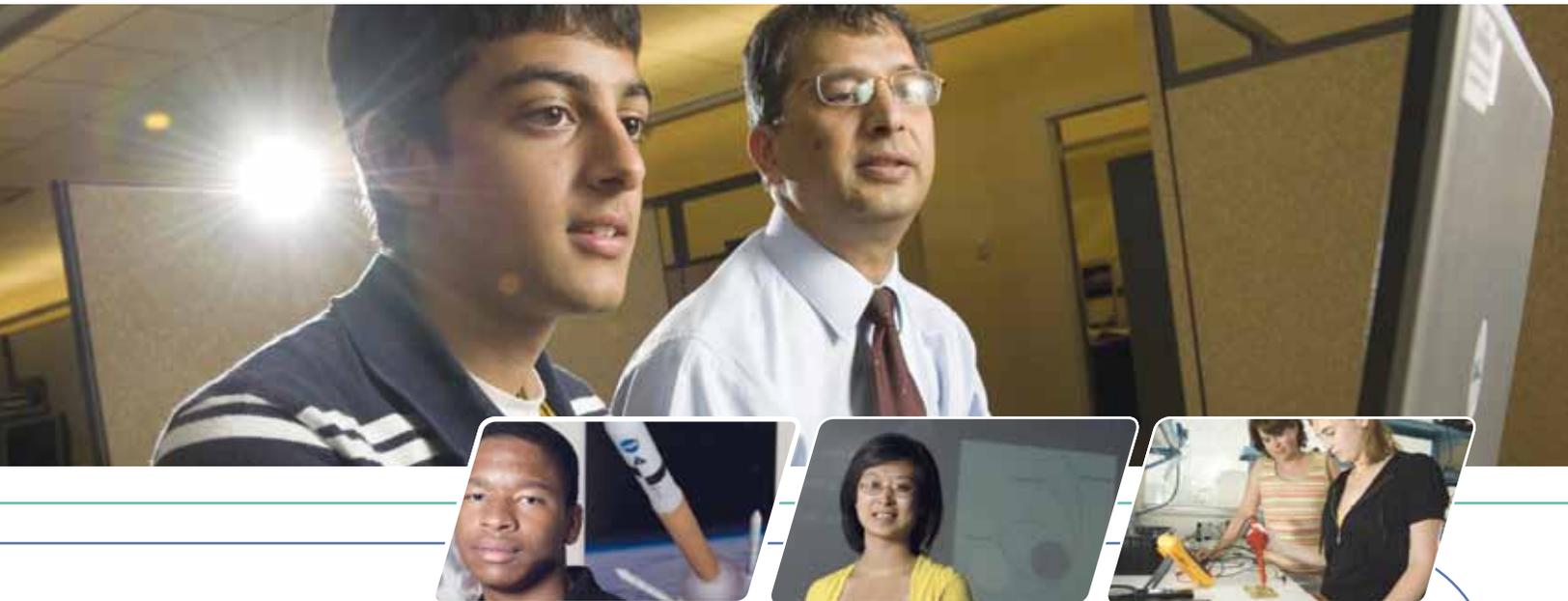
The competition is structured like an athletic event. Teams compete in an area the size of a small basketball court. The robots must have offensive and defensive capabilities. Each team's robot works to accomplish a task while preventing its opponent from doing the same. The robots must be sturdy because of frequent contact between the machines.

"This is the largest NASA-funded student program geared toward robotics activities," said NASA Administrator Charles Bolden. "For the next 5 years, approximately 25,000 students across the country will not only learn from our Nation's best and brightest, but also compete and have fun at the same time."

NASA's Robotics Alliance Project (RAP) solicited proposals from nonprofit and educational institutions to design and administer a robotics outreach competition. RAP, which is sponsored by NASA's Science Mission Directorate and managed from NASA's Ames Research Center in Moffett Field, CA, competitively selected FIRST from the candidates.

NASA is the largest organization involved with FIRST and has participated since 1995. In 1999, NASA and FIRST signed a Memorandum of Agreement to cooperatively expand the availability of technology development, education, and inspiration programs to students throughout the country. U.S. entrepreneur Dean Kamen founded FIRST in 1989 to encourage youth to become leaders in science and technology.

Just one example of NASA's involvement is the FIRST Buckeye Regional Robotics Competition, sponsored by the Glenn Research Center (GRC). More than 1,500 high school students from Ohio, Florida, Indiana, Maryland, New York, Pennsylvania, and Wisconsin competed in the ninth annual FIRST Buckeye Regional for regional awards and an opportunity to advance to the FIRST Championship competition.



This year, 60 teams faced off in a new robotics game called “Breakaway,” which includes two groups of three teams competing on a 27-by-54-foot field with bumps, attempting to earn points by collecting soccer balls in goals. Additional bonus points are earned for each robot suspended in air and not touching the field at the end of the match.

The Buckeye Regional is sponsored by GRC along with corporations and academic and nonprofit organizations throughout Ohio. It is one of 43 regional competitions across the United States, Canada, and Israel that led up to the 2010 FIRST Championship at the Georgia Dome in Atlanta, April 15–17.

NASA’s support of FIRST is one way the Agency is engaging students in STEM disciplines critical to NASA’s space exploration missions.

NASA Selects High School Students for INSPIRE Education Program

NASA has selected 1,895 high school students to participate in the Agency’s Interdisciplinary National Science Project Incorporating Research and Education Experience, or INSPIRE. The INSPIRE project is designed to encourage students in grades 9 through 12 to pursue careers in science, technology, engineering, and mathematics.

The selectees are from 47 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. They were chosen based on their academic achievement and demonstrated interest in pursuing a STEM education.

The students were given access to an online learning community that allows them to interact with their peers and NASA engineers and scientists. The community also provides appropriate grade-level educational activities, discussion boards, and chat rooms to learn about NASA career opportunities. The students may also be selected to participate in 2011 summer workshops or internships at NASA facilities and participating universities.

The INSPIRE project is part of NASA’s education efforts to engage and retain students in disciplines critical to the Agency’s missions.



NASA Provides Opportunities for Students To Soar to New Heights

Students in grades K–12 in the Indianapolis area will soon be able to explore the world of math and science using the latest computer technology.

NASA's Glenn Research Center in Cleveland, in partnership with Martin University in Indianapolis, dedicated a new Science, Engineering, Mathematics and Aerospace Academy at the university in August. The program features an Aerospace Education Laboratory (AEL): a state-of-the-art, electronically enhanced computerized classroom.

To an audience that included leadership from partners and contractors, Associate Administrator for Education Leland Melvin presented "My Life Story" during the dedication ceremony.

"The young people who participate in this program will be the engineers, researchers, and computer experts of tomorrow," said Mike Foreman, Chief of External Programs at NASA Glenn Research Center, which manages SEMAA. "The goal of this program is to inspire them to excel in the areas of math, science, and technology, so they may reach their full potential."

SEMAA is an innovative, national project designed to increase participation and retention of underrepresented youth in the fields of science, technology, engineering, and mathematics.

The Aerospace Education Laboratory puts cutting-edge technology at the fingertips of NASA SEMAA middle and high school students. Each of the 10 computerized research stations provides students with real-world challenges relative to both aeronautics and microgravity scenarios. The AEL at Martin

University is part of a Nationwide network of similar programs cosponsored by NASA that were built and equipped with a combination of local and NASA funds.

SEMAA was a vision of former Congressman Louis Stokes of Cleveland and was designed to foster understanding and enthusiasm for math and science in school-age children. Established as a joint venture between NASA GRC and Cuyahoga Community College, the project has grown from a single site to a national organization that is supported by an established network of partners and dedicated to improving the academic success of children Nationwide.

Since its inception in 1993, SEMAA has reached more than 630,000 students, parents/caregivers, and educators. SEMAA sites are located in 18 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Together with more than 150 STEM partners, the program continues its work to engage, educate, and inspire the next generation of explorers.

NASA Explorer Schools Symposium Showcases Student Research

Students shared their research findings at a NASA Explorer Schools symposium May 5–8 at the Agency's Kennedy Space Center (KSC) in Florida. Future leaders in STEM presented their work to fellow students, educators, and NASA scientists and engineers.

The competitively selected group of 70 students represented 35 NASA Explorer Schools (NES). The NES project is designed to improve teaching and bolster interest in STEM disciplines in the



fourth through ninth grades, especially in traditionally underserved rural or urban parts of the country. The 3-year partnerships bring educators, students, and families into sustained involvement with NASA's research, discoveries, and missions.

"NASA's mission of research and discovery is a powerful context for learning," said Rob LaSalvia, NES Project Manager. "Each year students amaze us with presentations that mirror the work of our scientists and engineers."

The students were required to complete an original investigation focused on existing NASA missions or research interests. Participants presented their work to experts at virtual regional symposia held January through March at NASA Centers using the Agency's Digital Learning Network.

In addition to presenting their work at the national symposium, participants also learned more about NASA's research and exploration activities. Students toured a variety of operational facilities at KSC, including the complex where Space Shuttles were launched. Hands-on activities will be tied to ongoing and future NASA missions.

Since the inception of the Explorer Schools project in 2003, NASA has established partnerships with 200 school teams from diverse communities in all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.

NASA's New Museum Grant Allies Will Make the Universe Accessible

In January 2010, NASA announced awards for science museums and planetariums. Interactive museum exhibits about climate change, Earth science, and missions beyond Earth are among the projects NASA selected to receive Agency funding. Nine informal education providers from Alaska to New York were selected to share \$6.2 million in grants through NASA's Competitive Program for Science Museums and Planetariums.

Participating organizations included museums, science centers, Challenger Centers, and other institutions of informal education. Selected projects partner with NASA's Museum Alliance, an

Internet-based, Nationwide network of more than 400 science centers, planetariums, museums, aquariums, zoos, observatory visitor centers, NASA visitor centers, nature centers, and park visitor centers.

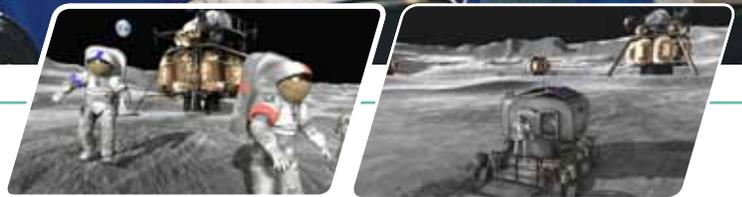
Projects in the program engage learners of all ages as well as educators who work in formal or informal science education. The projects provide NASA-inspired space, science, technology, engineering, or mathematics educational opportunities, including planetarium shows and exhibits.

In conjunction with NASA's Museum Alliance, the grants focus on NASA-themed space exploration, aeronautics, space science, Earth science, microgravity, or a combination of themes. Some projects include partnerships with elementary and secondary schools, colleges, and universities.

The projects are located in Alaska, Colorado, Florida, Illinois, New York, North Carolina, Oregon, and South Dakota. The nine grants have a maximum 5-year period of performance and range in value from approximately \$120,000 to \$1.15 million. Selected projects work with the NASA Shared Services Center in Mississippi to complete the business review necessary before a NASA award is issued.

Proposals were selected through a merit-based, external peer-review process. NASA's Office of Education and Mission Directorates collaborated to solicit and review the grant applications. This integrated approach distinguishes NASA's investment in informal education. NASA received 67 proposals from 32 states and the District of Columbia.

Congress initially funded the Competitive Program for Science Museums and Planetariums grants in 2008. The first group of projects began in fall 2009 in California, Colorado, Florida, Illinois, Iowa, Minnesota, Michigan, Montana, New York, North Carolina, Vermont, and Washington. Congress has appropriated funds to continue this program in 2010, and NASA anticipates selecting additional proposals to fund from those submitted in 2009.



NASA and Univision Collaborate To Engage Hispanic Students

NASA and Univision Communications Inc. have teamed up to launch an on-air and online initiative to help engage Hispanic students in STEM education.

NASA is committed to preparing the next generation of scientists, engineers, and technologists. Univision is a leading Spanish-language media company with television, radio, online, and interactive assets focused on improving graduation rates and preparing Hispanic students for college.

In early October, Univision began airing a series of Spanish-language educational video segments produced by NASA and titled *NASA and You (NASA y Tu)*. Featuring Hispanic employees from NASA as role models, the 30-second videos present new perspectives on education and STEM careers. Among the featured NASA staff members are astronaut José Hernández, who discusses his life and his journey to become an astronaut, and Margaret Dominguez, an optics engineer, who discusses the engineering challenges of incorporating a mirror as large as a tennis court into small spacecraft.

The segments air on Saturday mornings during Univision's programming block for children, *Planeta U*. The segments are part of the company's comprehensive, multiplatform, 3-year national education initiative called Es El Momento (The Moment Is Now).

Through Es El Momento, Univision is working to improve academic achievement among kindergarten through 12th-grade Hispanic students. It is focused specifically on increasing high school graduation rates and college readiness and completion while engaging Hispanic parents and the broader Hispanic community in these efforts.

NASA Takes Gamers on a Lunar Adventure with New Online Video Game

NASA has given gamers a taste of lunar adventure with release of Moonbase Alpha, an exciting new, free online video game.

The game has single- and multiplayer options that allow participants to step into the role of an exploration team member in a futuristic 3D lunar settlement. Players must work to restore critical systems and oxygen flow after a meteor strike cripples a solar array and life-support equipment. Available resources include an interactive command center, lunar rover, mobile robotic repair units, and a fully stocked equipment shed.

The game is a proof of concept to show how NASA content can be combined with a cutting-edge game engine to inspire, engage, and educate students on Agency technologies, job opportunities, and the future of space exploration. Moonbase Alpha is rated "E" for everyone.



It is the first game in NASA's Learning Technologies project. The project supports the delivery of NASA content through interactive technologies such as virtual worlds, games, and software applications to enhance science, technology, engineering, and mathematics education.

Moonbase Alpha is a precursor to a planned NASA-based massively multiplayer online game (MMOG) project. The project is being designed to have content and missions that require players to gain and demonstrate STEM knowledge to succeed.

NASA released the game on Valve's Steam network. The Agency will use the Steamworks suite of services for server browsing, leaderboards, statistics, and more. Steam has more than 25 million accounts and has released more than 1,100 games. It was built on Epic Games' Unreal Engine 3. The Army Game Studio developed the game with support from Virtual Heroes, a division of Applied Research Associates in Research Triangle Park, NC. This collaboration between NASA and the Army's Aviation Missile Research Development and Engineering Center is an example of Government agencies working together to improve education in the STEM fields.

NASA'S Digital Learning Network Teachers Earn Prestigious Award

The United States Distance Learning Association recognized NASA's Digital Learning Network (DLN) for its superior instructors by presenting the program with the Silver Award for Distance Learning Teaching.

Seventeen Agency instructors from across NASA's 10 Field Centers were recognized for their performance. The DLN enables students, the next generation of explorers, to connect with scientists, engineers, and researchers without leaving the classroom. The program uses interactive videoconferencing to provide distance-learning events to educate students through demonstrations and real-time interaction with NASA experts at various locations across the Agency.

"It is such an honor for NASA to be recognized for the teaching talent that our DLN coordinators possess," said Jim Stofan, Deputy Associate Administrator for Education Program Integration. "We have always known they are top quality and dedicated educators, and now so does the world of distance learning through this recognition."

The United States Distance Learning Association, based in Boston, created the awards to acknowledge major accomplishments in distance learning. The awards honor professionals and their programs that have achieved extraordinary results through the use of online, videoconferencing, and satellite technologies.

NASA Education Goals and Framework

In 2006 and beyond, NASA will continue to pursue three major education goals:



Strengthening NASA and the Nation's future workforce

NASA will identify and develop the critical skills and capabilities needed in aeronautics, Earth and space science, and space operations to ensure achievement of U.S. space exploration policy. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.



Attracting and retaining students in STEM disciplines

NASA will pursue the minds, imaginations, and career ambitions of America's youth. The Agency will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines critical to NASA's future in aeronautics, Earth and space science, and space operations and for participation in engineering, scientific, and technical missions.



Engaging Americans in NASA's mission

NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on interactive educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

The Guiding Education Strategic Framework

The Education Strategic Coordination Framework is an Agency portfolio approach to education that builds upon the above education goals that were identified in the Agency 2006 Strategic Plan. It aligns NASA's total education portfolio with the strategic plan; provides a coordination structure; and creates an Agency-wide strategic planning, implementation, and evaluation framework for the Agency's investments in education.

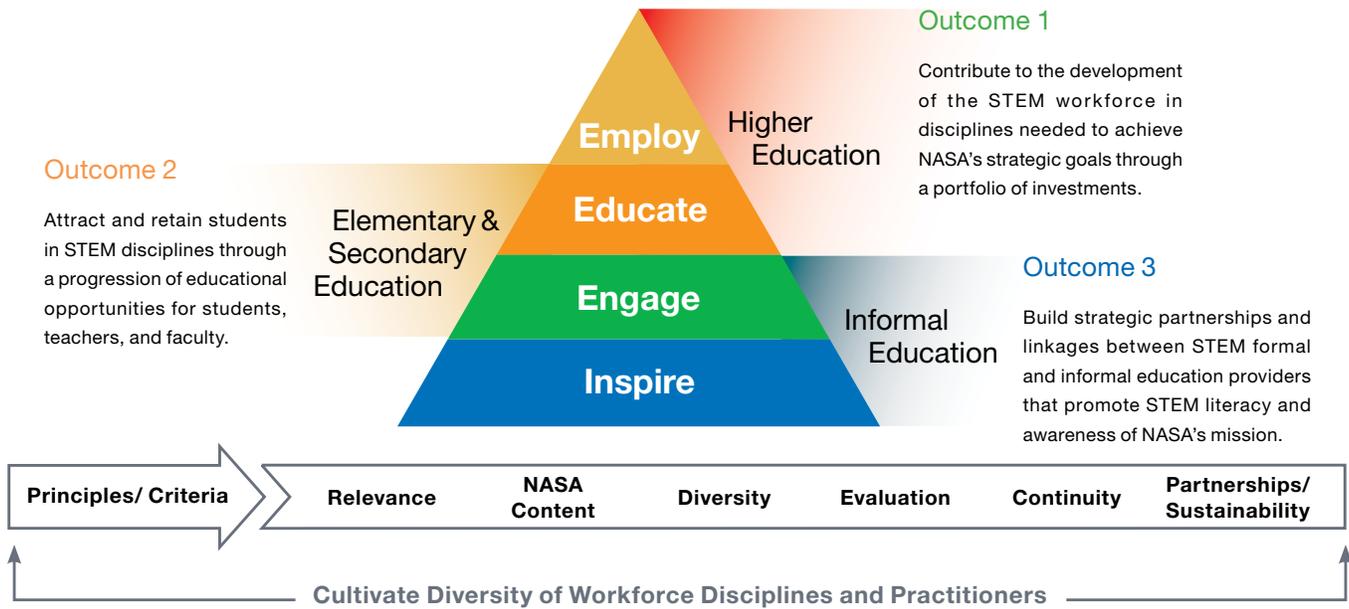
NASA delivers this comprehensive portfolio through its Office of Education, Mission Directorates, and Field Centers, and contributes to our Nation's efforts in achieving excellence in STEM education.

The Education Strategic Framework chart depicted in Appendix B provides a conceptual basis for examining, guiding, and coordinating the NASA education portfolio. It is a strategic management tool that allows the Agency to monitor participant movement through education activities, with each category leading to the next. Education programs and projects draw from the category below them as a key source for participants, and they connect participants to the category above them, providing a more experienced and focused group, and creating a measurable pipeline.

More information about the NASA Education Strategic Framework can be found at <http://education.nasa.gov/about/strategy/>.

NASA Education Strategic Framework

A Clearly Defined and Coordinated Portfolio Approach



Overarching Philosophy (Cultivate Diversity): The cultivation of diversity is both a management philosophy and core value for all NASA education efforts. Diversity of the skills and talents needed in our future workforce is critical to our success. Potential at both the individual and organizational levels will be maximized by fostering awareness, understanding, and respect for individual differences. The knowledge, expertise, and unique background and life experiences—including ethnicity, gender, race, religion, and cultural identity—of each individual strengthen the Agency.

Relevance: To effectively strengthen the Nation’s STEM workforce, NASA must implement activities that are useful to the education community and that enhance its ability to engage students in the STEM pipeline.

Content: Education investments use NASA content, people, or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and mathematics.

Diversity: NASA strives to ensure that underrepresented and underserved students participate in NASA research and education programs to encourage more of these students to pursue STEM careers. Programs and projects are representative of American demographics; engage underrepresented and underserved minorities, women, and persons with disabilities; and reflect an atmosphere of equity, balance, and inclusiveness. NASA will continue to focus on enhancing the capabilities of Minority Serving Institutions to contribute to the research needs of the Agency.

Evaluation: Education investments document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and of annual performance goals. Evaluation methodology is based on reputable models and techniques appropriate to the content and scale of the targeted activity, product, or program.

Continuity: Projects and activities draw from audiences who have already demonstrated interest in NASA and connect participants to the next level of engagement. A blend of projects and activities encourages continued student affiliation with NASA throughout their academic careers.

Partnerships/Sustainability: Education investments leverage and achieve sustainability through their intrinsic design and the involvement of appropriate local, regional, and/or national partners in their design, development, or dissemination. As appropriate, key aspects of projects and activities are replicable, scalable, and demonstrate potential for continuation beyond the period of direct NASA funding.

NASA Education Categories of Involvement

Four Categories of Involvement

Inspire

Activities focused on promoting awareness of NASA's mission among the public, primarily through informal education and outreach activities. This category is heavily supported by the outreach activities of other NASA organizations, such as the Office of Public Affairs. Inspire-level efforts are broad, with the goal of reaching a large number of people. This category forms the base of an education structure that becomes more focused at progressively higher levels of the framework pyramid.

Engage

Education activities that in some manner incorporate participant interaction with NASA content for the purpose of developing a deeper understanding. Participants are strategically identified and targeted.

Educate

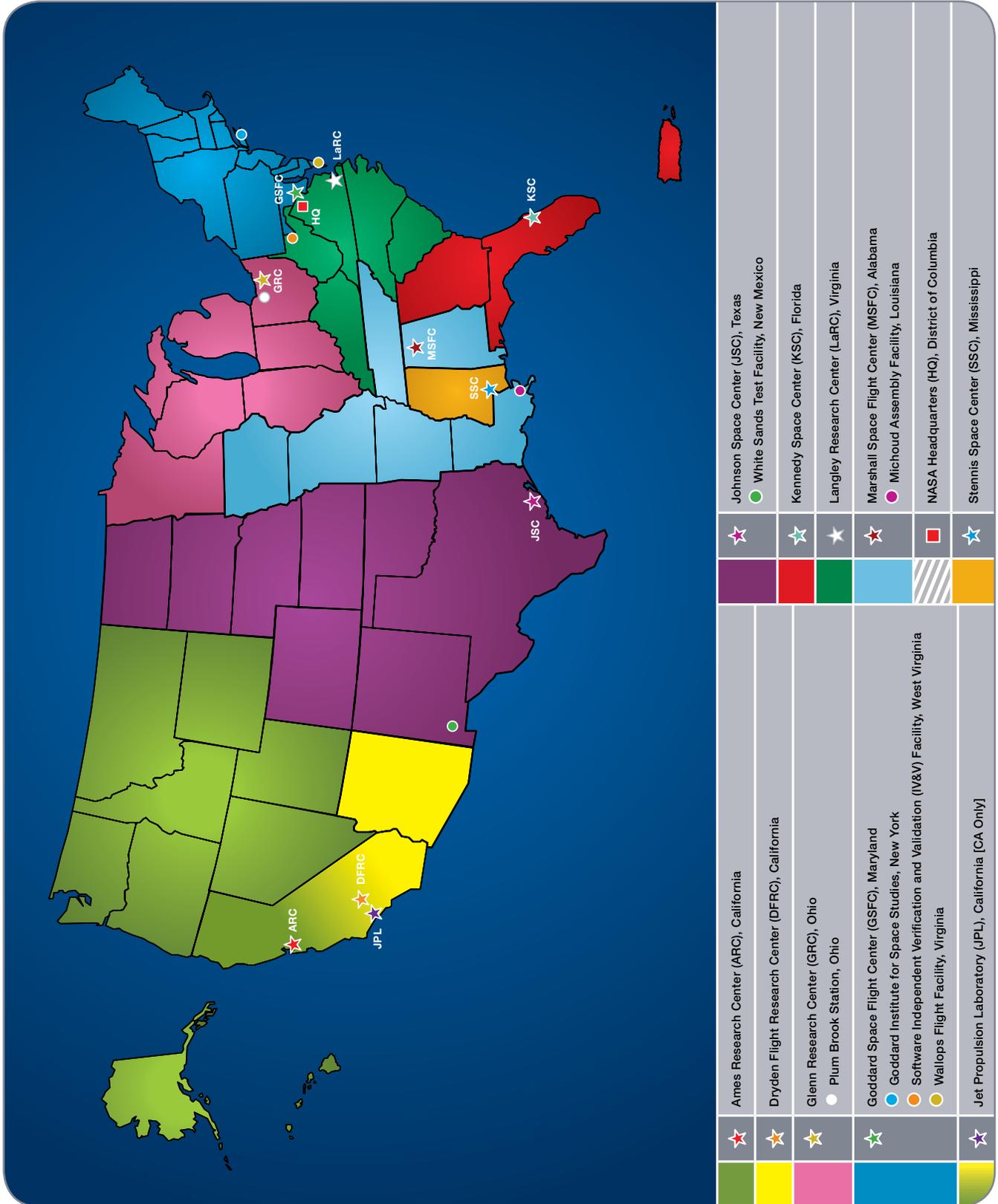
Focused education support that promotes learning among targeted populations. Education activities focus on student learners or pre- and in-service educators and are designed to develop and/or enhance specific STEM knowledge and skills using NASA resources. These activities promote new knowledge acquisition and strengthen an individual's skills. NASA's elementary and secondary education efforts are supplementary to formal classroom instruction. NASA's higher education efforts may include development of specific university curricula in support of the NASA mission and student-built instruments.

Employ

Targeted development of individuals who prepare for employment in disciplines needed to achieve NASA's mission and strategic goals. Through internships, fellowships, and other professional training, individuals become participants in the U.S. Space Exploration Policy and NASA science and aeronautics research. At the apex, they have acquired sufficient mastery of knowledge for employment with NASA, academia, industry, or within STEM fields of teaching.



NASA Education K-12 Service Areas



Connecting with NASA Education

How do I contact NASA Education?

NASA Education points of contact for networking can be found online at

<http://www.nasa.gov/offices/education/contacts/index.html>.

How do I participate in NASA education programs?

Visit the education Web site of the NASA Center in your region for information about local programs and activities. The list can be found online at *<http://www.nasa.gov/offices/education/centers/index.html>*.

To find out information about current opportunities Nationwide, students should visit *<http://www.nasa.gov/audience/forstudents/current-ops-index.html>* and educators should visit *<http://www.nasa.gov/audience/foreducators/current-ops-index.html>*.

How do I get NASA education materials?

Companies and Nonprofit Organizations

- Please contact the NASA Education Office in your region. The points of contact can be found at *<http://www.nasa.gov/offices/education/contacts/cdirect.html>*.

Educators, Schools, and Families

Please utilize the following resources:

- The NASA Educator Resource Center in your region: *http://www.nasa.gov/offices/education/programs/national/ercn/home/ERCN_Field_Center_Listing.html*.
- Regional Educator Resource Centers in your state: *http://www.nasa.gov/offices/education/programs/national/ercn/home/ERCN_State_Listing.html*.
- NASA Central Operations of Resources for Educators: *<http://core.nasa.gov>*.
- NASA online education materials: *<http://www.nasa.gov/education/materials>*.

Visitors to NASA Headquarters

- The Headquarters Library is open to the public and has an information center with a variety of free education and outreach materials.



NASA Education EXPRESS Mailing List

Sign up to receive e-mail announcements about NASA products, activities, workshops, events, and opportunities to bring NASA educational resources into your classroom: <http://www.nasa.gov/education/express>.

Other Ways To Connect with NASA

- **NASA Careers:** <http://www.nasa.gov/about/career/index.html>. Review job listings, post a resume, and even apply for a NASA job online.
- **Business Opportunities:** <http://www.nasa.gov/about/business/index.html>. Find services related to NASA contracts, small business programs, partnerships, and submitting an idea or proposal to NASA.
- **Research Opportunities:** <http://www.nasa.gov/about/research/index.html>. NASA offices and Field Centers offer a wide variety of opportunities for researchers.

For More Information

For more information, please visit www.nasa.gov.

The NASA Web Site is the single point of entry to NASA public content and the most popular Government site on the Web. It serves as the gateway for information regarding content, programs, and services offered by NASA for the general public and, specifically, for the education community.

Visit www.nasa.gov to find out more information about NASA's mission, research, and activities; NASA Education strategy and programs; and NASA Mission Directorates and Field Centers.





“Learning and innovation go hand in hand. The arrogance of success is to think that what you did yesterday will be sufficient for tomorrow.”

—William G. Pollard, Physicist





“Let’s work together to fulfill the promise of our founding legislation, continue this vital STEM movement, and lay the foundation for future greatness—for NASA and for the country.”

—Leland Melvin, NASA Associate Administrator for Education





“Our future is on the line. The nation that out-educates us today is going to out-compete us tomorrow. To continue to cede our leadership in education is to cede our position in the world.”

—Barack Obama, the 44th President of the United States

10



inspire **engage** educate employ ...
the next generation
of explorers and innovators.