EDUCATION HIGHLIGHTS

Johnson Space Center, External Relations Office
STEM Engagement (SE) provides opportunities for participatory and experiential learning activities in formal and informal settings to connect learners to NASA-unique resources. The SE model facilitates the execution of public education events, experiential learning opportunities, and STEM challenges to engage the public in NASA’s missions while placing appropriate emphasis on meeting national needs.

NASA Internships, Fellowships, and Scholarships (NIFS) launch a new era of learning, innovation and achievement. NASA inspires students to pursue STEM careers by providing these internships, fellowships and scholarships to leverage unique mission activities and increase the capabilities, diversity, and size of the nation’s next-generation workforce needed to enable future NASA discoveries.
Educator Professional Development (EPD) offers professional development to K-12 and pre-service educators. EPD integrates NASA missions, education resources and NASA-unique facilities to provide high-quality STEM content and hands-on learning experiences. EPD includes Face-to-Face Institutes, Partner-Delivered Face-to-Face, Online EPD, and Community-Requested EPD. Educators return to their classrooms equipped with real-world experiences to teach and engage their students in STEM areas.

Institutional Engagement (IE) enables formal and informal institutions to strengthen their capacity to perform STEM research and develop sustained STEM capabilities in topical areas of interest to NASA. IE focuses on competitive awards to sustain an institution’s ability to deliver NASA content.
The Johnson Space Center’s Office of Education offers opportunities to reach students, both inside and outside formal K-16 education. Johnson Education provides experiential learning opportunities and STEM challenges to engage the public in NASA’s mission. STEM Engagement activities are designed to increase students’ interest and involvement in STEM, improve their ability to participate in STEM studies and careers, and enhance their understanding of the value of STEM in their lives.

NASA Community College Aerospace Scholars (NCAS)

Who participated in 2016?

72% of students came from Minority Serving Institutions.
192 community colleges // 37 states
754 online students
541 onsite students // 8 NASA centers

Pipeline Success Stories

1. NCAS Alum offered full time Human Factors Engineering position
2. NCAS Alum in JSC’s Pathways Internship Program
26. NCAS Alum completed summer internships (11 at JSC)

JSC piloted a 3D modeling and rapid prototyping element of the engineering design competition in which students designed a part to integrate with their EV3 Lego Robotics kits. The pilot allowed students to introduce a unique component to their rovers and allowed them to design, print, test, and redesign for enhanced functionality within the 4-day competition. Office of Education tapped into the 3D lab expertise onsite at JSC to provide real-world examples of 3D printing for space exploration and feedback on student designs.

GET INVOLVED

To learn more about the STEM Engagement (SE), or to get involved with SE, go to education.jsc.nasa.gov.
STEM on Station reached over 120,000 students and 5,000 educators through a variety of space station-related activities: STEM on Station website, ISS interactive events, STEM challenges, STEM flight projects, Public Education Activities, Ground-based events, promotion plans, and hands-on kits.

HAS on Station reached over 120,000 students and 5,000 educators through a variety of space station-related activities: STEM on Station website, ISS interactive events, STEM challenges, STEM flight projects, Public Education Activities, Ground-based events, promotion plans, and hands-on kits.

STEM ENGAGEMENT SUCCESS STORY

Ben Peters, an alumnus of the Texas High School Aerospace Scholars, is now a full-time employee at Johnson Space Center after graduating from UT Austin with a bachelor’s degree in aerospace engineering in 2014. Peters began his journey to NASA while still a student at Seven Lakes High School in Katy, Texas. He later funneled through JSC’s Pathways Program and is now working on developing advanced space suits that may one day be used on places like the moon or Mars. Peters said of his past HAS experience: “At HAS, I loved getting to tour all of the NASA facilities, especially mission control and space mockup facility. I also loved meeting all kinds of NASA employees (and astronauts) and learned what it takes to work for the space program! I was proud of our team’s accomplishments during the week and I made many friends I’m still in touch with.”
Internships, led by Johnson Space Center for the agency, are competitive awards to support educational work or enhanced research opportunities that provide NASA-related experiences for educators as well as high school, undergraduate, and graduate students gaining authentic and degree-relevant, real-world experience while contributing to the operation of a NASA facility, or the advancement of NASA's missions. NASA internships consist of at least 400 contact hours (320 for H.S. students or teachers) of mentored, degree-relevant work activity. Part-time internships consist of a minimum of 10 contact hours per week.

Representing 348 institutions, across 48 states, Washington DC, and Puerto Rico. Offering 15,636 combined weeks or 300.7 years worth of hands-on experiences. Placed a record 849 interns in the summer across the agency.

It is absolutely thrilling to be a part of a groundbreaking project where the things you are attempting have not been done before. It is an excellent experience not only for the pride in an accomplishment that worked, but also learning how to gracefully handle (and allow for) setbacks and things going not as expected.

— Amanda Allen (Santa Barbara City College, Fall 15, JPL)
Jimmy Lazo was enrolled at Houston Community College when he noticed a poster advertising NASA Community College Aerospace Scholars, or NCAS. After completing the online portion and visiting NASA Johnson, Jimmy was driven to participate in the Microgravity Neutral Buoyancy Experiment Design Team program, or Micro-g NExT. These were all steps on his NASA journey that resulted in two internships at Johnson; one in fall 2015 and another in summer 2016. Following graduation with a degree in electrical engineering from the University of Texas at Tyler, Jimmy hopes to return to NASA – this time, permanently.

“Before my internship, I didn’t have many structured, long-term career goals or a roadmap on how to make structured career goals or path. Now I’m happy to announce to my family, friends, and self that I have more desire and knowledge to do this these than ever before.”

– Travis Ketchum Alvarez (Summer 16)
In 2016, an emerging trend in Educator Professional Development or EPD activities was the empowerment of education audiences to own their experience. By inviting user choice in how to engage in the training opportunities, participant engagement in EPD activities grew. Increased options for services through videoconferencing, webinars, workshops, institutes, and digital badging welcomed educator preferences that were highlighted and met. Providing the ability for educators and other partners in the education community to tailor training experiences to their perceived needs supports NASA’s goal for improving STEM teaching.

In 2016, the EPD team won the External Relations Office Baton Award for developing the Astro Camp Facilitator Guide that stimulated action by others to advance human space flight.

**Teachers & Grade Levels Served:**

- **5108 Teachers Served**
- **311 Pre-Service Educators**
- **1638 Middle School Educators**
- **1163 High School Educators**
- **1255 Elementary School Educators**
- **577 Informal Educators**
- **164 Faculty Members**

**Support to Other Education Activities**

Beyond its signature activities, the EPD team provided training support and videoconferencing to the following hosts which enhanced their capabilities to improve STEM instruction.

- 100Kin10
- National Science Teachers Association
- High School Robotic Assistive Device
- Pasadena ISD
- Rice University
- Congresswoman Sheila Jackson Lee’s Toys for Kids
- Texas Region 4 Math Conference
- STEM on Station
- Astro Camp
Digital Learning Network (DLN)
From virtual connections with NASA scientists and engineers, and educational workshops with pre-service and in-service teachers, to covering robotics competitions for students and broadcasting the events out to the NASA streaming services, the Digital Learning Network digitally expanded NASA Education’s lines of business by tailoring its services to specific activity needs.

Educator Professional Development Collaborative (EPDC)
The EPDC expanded capabilities for teachers, institutes, and other programs by increasing professional development opportunities and freedom for educators to choose their own path of professional growth through digital badging and thematic, regularly scheduled EPD webinars.

Educator Professional Development Institutes (EPDI)
Educators from around the nation attended this grade level specific training on integrating NASA education resources into daily classroom lessons. In addition to earning 50 continuing professional education hours, they designed outreach plans for sharing the knowledge. They chose methods that would be most effective in their local communities.

Educator Resource Center (ERC)
The ERC continued fielding questions from educators who sought resources for their individualized classrooms and programs. The ERC provided 344 customized replies that cited related materials and supported educators in using the NASA’s A-Z List of Education Resources and NASA’s Wavelength database tools.

Network of States (NoS)
The new NoS activity establishes a network for partners who deliver professional development using NASA mission content and education resources. This year, JSC identified 8 partners from the state of Texas who defined their level of engagement, identified mutual benefits, and designed an institute suitable to targets for their own teacher trainers.

MUREP Educator Institutes (MEI)
MEI grew capabilities for pre-service teachers and faculty through faculty-selected participants, coupled faculty and student experiences, and cross-institution engagement in classroom lessons/experiences during the summer institutes held at NASA Centers. Digital badging offerings and EPD webinars provided the freedom of choice in personal development experiences.

Space Exploration Educators Conference (SEEC)
SEEC continued to grow capabilities for teachers to be effective in teaching space education and involving students in STEM learning opportunities by providing over 100 sessions of professional development activities taught by NASA personnel.

Get Involved
To learn more about NASA Education’s Educator Professional Development (EPD), or to get involved with EPD, go to education.jsc.nasa.gov.
In 2016, the Johnson Space Center’s IE team focused on building and sustaining the capacity of colleges and universities across the US. Through partnerships with MUREP* and HEOMD**, 35 universities (46% Minority Serving Institutions) engaged more than 200 undergraduates in unique experiential learning opportunities spanning a variety of NASA mission-relevant areas including spacewalk hardware, immunology studies, and spacecraft propulsion.

*MUREP = NASA Minority University Research and Education Project  **HEOMD = NASA Human Exploration Operations Mission Directorate

Micro-g Neutral Buoyancy Experiment Design Teams (Micro-g NExT)

Undergraduate students were invited to test prototypes in JSC’s Neutral Buoyancy Laboratory. These prototypes were designed as potential solutions for future spacewalk tools!

24 teams totaling 130 students from 23 colleges in 16 states participated!

Micro-g NExT officially contributed to a NASA analog mission!

Astronaut Reid Wiseman collected geology samples during NEEMO 21 with a Micro-g NExT tool designed by the Los Medanos College team.

As a freshman student still unsure of his future, Micro-g NExT gave me great confidence on the path I want to take. Micro-g NExT made me feel like a true engineer and the very thought that I was designing something for a potential NASA mission made it that much better.

– Micro-g NExT Student Participant

GET INVOLVED

To learn more about NASA Education’s Institutional Engagement (IE), or to get involved with IE, go to education.jsc.nasa.gov.
MUREP for American Indian and Alaskan Native STEM Engagement (MAIANSE)
JSC partners with Southwestern Indian Polytechnic Institute (SIPI), a Tribal College, on creating Intelligent Cooperative Multi-agent Robotic Systems (ICMARS) Robotics. Through this project, SIPI and New Mexico State University successfully are able to connect Native American students with JSC engineers through 10-week summer internship opportunities.

MUREP OTHER OPPORTUNITIES (MOO)
JSC manages six awards with institutions to innovatively create and implement STEM activities with a goal of increasing the number of historically underserved students studying STEM fields relevant to NASA’s diverse exploration mission.

Model for Resource Reuse and Active Learning in Interdisciplinary STREAM - University of Texas at El Paso (UTEP)
The students at the UTEP are focusing on STEM engagement that includes Reason and Art, also known as STREAM. They plan to repurpose and integrate NASA STEM resources (curriculum, lessons, challenges, content, etc.) and transform it using engaging multimedia storyboards to create a cohesive and unified curriculum.

Creating Engaged STEM Pathways for Hawaii Underrepresented Students from High School to College Degree Completion (HESTEMP) - University of Hawaii, Honolulu
The University of Hawaii and NASA Ames Research Center have a project focused approach to the development and implementation of three NASA-prioritized key projects: atmospheric aerosols, ocean color and small satellite technology. Additionally, they are developing STEM-centered activities to create and establish sustainable educational pathways for Hawaii’s underrepresented and underserved high school and community college students pursuing advanced degrees in STEM.

Inspiring Tomorrows Leaders in Science and Engineering (ITL) - Lawson State Community College
ITL involves early exposure to STEM programs for high school students, NASA relevant course work for 1st and 2nd year college students, space-related research projects, and summer internship experiences that will increase the readiness of students to complete four-year STEM degrees.

Pathways in Mathematics Education and Remote Sensing (PIMERS) - Elizabeth City State University
PIMERS is a joint effort between Elizabeth City State University and NASA Langley Research Center in Mathematics Education and Remote Sensing. PIMERS will make NASA-relevant experiences available to African American and female students from middle school to graduate school level.

NASA Early Opportunities Program for Underrepresented Minorities in Earth and Space Sciences - Howard University
The educational effort between Howard University and the University of Maryland Baltimore County targets underrepresented minority and women STEM students, exposing them to an early career pathway in NASA-related research in astrophysics, solar system exploration, heliophysics, and earth sciences.

New Horizons in Space Additive Manufacturing and STEM Education - New York City College of Technology (CUNY)
New York City College of Technology seeks to improve the preparation of its growing population of underrepresented students in the engineering program and to improve retention and graduation rates through a productive research-centered partnership with NASA Langley Research Center, North Carolina State University (NCSU), and Goddard Space Flight Center (GSFC) Office of Education New York City Research Initiative program.

STUDENT SUCCESS STORY
After graduating high school and beginning to pursue her degree in Mechanical Engineering at The University of South Florida, Kaitlin Lostroscio became involved in yet another NASA Education program, Micro-g NEXT, first as a participant and then as a volunteer. As a participant, Kaitlin and her team of peers chose to design and test a rock chip sampling device. The following year, she returned as a Test Week Assistant to support and advise participating teams. It’s this opportunity that led her to an engineering internship within the Software, Robotics, and Simulation Division at JSC.
Ways to connect with us...

JSC Education uses NASA’s unique capabilities to advance STEM education and Human Space Exploration.

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