2017
EDUCATION HIGHLIGHTS
Johnson Space Center
External Relations Office
www.nasa.gov
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)
only offers professional development to K-12, informal, 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 training, Online EPD,
and Community-Requested EPD. Educators return to their
classrooms equipped with real-world experiences to teach and
engage their students in STEM content 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.
Support to Special Education Activities

The EPD team provided educator training support and video conferencing capabilities for the following events beyond its signature activities.

NASA BEST Educators

Houston Museum of Natural Science’s Educator Event

STEM on Station

NASA Community College Aerospace Scholars

Superbowl LI

Congresswoman Sheila Jackson Lee’s Toys for Kids

TASA Chevron

Total Solar Eclipse

Audience & Grade Level Served Through EPD Activities*

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<thead>
<tr>
<th>Audience &amp; Grade Level Served</th>
<th>931</th>
<th>1119</th>
<th>951</th>
<th>121</th>
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<td>Faculty</td>
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*Not including Digital Learning Network; see backside for DLN metrics.

The trend of Fiscal Year 2017 was for the Educator Professional Development (EPD) team to support major events. Mother nature supplied EPD with a highly profiled Total Solar Eclipse, the anticipated *Hidden Figures* movie was released, NASA’s Cassini Spacecraft took a dive through Saturn’s rings, and Houston hosted Super Bowl LI. The team successfully aligned NASA Education resources to these significant events, including NASA’s BEST Educator Guide, and amplified those messages through educator training and videoconferencing.

Direct Participants reached by EPD Team:

- 4,441 educators
- 10,388 students
- 81,295 general public

To learn more about NASA Education’s Educator Professional Development, or to get involved with STEM engagement, go to education.jsc.nasa.gov.
Digital Learning Network (DLN)

Videoconferences hosted by the DLN supported virtual appearances of astronauts, created virtual field trips to NASA's unique facilities, presented topics from NASA's subject matter experts, and conducted live interactive special events in support of NASA's missions.

- Over 46,000 directly reached
- 225 events hosted

Educator Professional Development Collaborative (EPDC)

EPDC’s charge is to improve STEM instruction through real-time and self-directed options in face-to-face and online training platforms. Educators grow professionally by earning digital badges, by participating in aerospace-themed webinars and lessons on STEM education pedagogy, and by attending live hands-on workshops.

- JSC Specialists reached 2,400 STEM Educators
- Pre-K thru College Educators were reached

Microgravity University for Educators (MgUE)

This year approximately 900 students under the instruction of 60 educators, from 14 states and Puerto Rico, collaborated on a solution to problems with satellite release. The student-derived experiments were tested in a microgravity environment on the Precision Air Bearing Floor at Johnson Space Center.

- Over 60,000 reached indirectly
- 27 million reached through social media

MUREP Educator Institutes (MEI)

MEI provided pre-service educators and faculty sponsors with workshops, NASA facility tours, and presentations on NASA's missions and its education resources. This year emphasized human spaceflight exploration, the 2017 Total Solar Eclipse, and historical references depicted in the *Hidden Figures* movie.

- 92 Educators & Faculty participated at JSC
- 34 contact hours provided

Network of States (NoS)

JSC hosted a Train-the-Trainer institute for educators from across the state of Texas. They learned about NASA Education resources and NASA missions. Prior to the visit, educators participated in online meetings and webinars. Each participant was required to conduct four hours of professional development for at least 25 peer educators during the school year.

- 44 Texas Master Educators
- 5 Day workshop

Space Exploration Educators Conference (SEEC)

The 23rd annual conference provided professional development to educators of students from grades K-16. SEEC offered sessions for educators and administrators designed to amplify the integration of space and STEM in many different learning environments.

- 463 Educators attended
- 3 Day conference
In 2017, the Johnson Space Center’s IE team focused on increasing and sustaining the capacity of research and specialized programs for colleges and universities across the US. Through partnerships with NASA’s Minority University Research and Education Project (MUREP) and NASA’s Human Exploration Operations Mission Directorate (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 spacesuit hardware, immunology studies, and spacecraft propulsion.

I was able to attain my goals of learning more practical applications (versus text book theory) of mechanical design.... Participating in Micro-g NExT was an essential step in my pursuit to work for NASA. — Micro-g NExT Student Participant

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

Undergraduate students tested prototypes in JSC’s Neutral Buoyancy Laboratory (the world’s largest swimming pool). These tools addressed needs for geology sampling devices and anchoring devices that could one day be used for future manned exploration missions.

GET INVOLVED

http://girlstart.org/our-programs/girls-in-stem-info

WEX — Local Texas caves are used as analog environments for student experiments and technology challenges.
https://go.nasa.gov/2p0VgA0

Micro-g NExT hosted its first-ever Facebook Live event! Viewers got a glimpse of the students’ experience during Micro-g NExT testing in the Neutral Buoyancy Laboratory. It has been viewed over 217,000 times.
MUREP Institutional Research Opportunity (MIRO)

JSC partners with Langston University, a Historically Black College & University, to establish the Langston University NASA Research in Biology Center (LUNARBC) to promote research and education in biology topics closely tied to NASA’s Space Life Sciences research. Students are selected for a 10-week internship at JSC to continue the research conducted at LUNARBC.

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.

MUREP for American Indian and Alaskan Native STEM Engagement (MAIANSE)

The long-range goal is to increase the number of Native American students who pursue careers in IT and STEM disciplines and the short-term goal is to document improvement in IT skills and STEM understanding of the students who are participating. A key element is building Mars-like terrain and small rovers, and creating a curriculum for predominantly Native American serving high schools.

Model for Resource Reuse and Active Learning in Interdisciplinary STREAM - University of Texas at El Paso (UTEP) students are focusing on STEM engagement that includes Reason and Art, known as STREAM. They are repurposing and integrating NASA STEM resources and transforming it using engaging multimedia storyboards to create curriculum.

Creating Engaged STEM Pathways for Hawaii Underrepresented Students from High School to College Degree Completion (HESTEMP) - University of Hawaii, Honolulu and NASA Ames Research Center have 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.

Inspiriting Tomorrows Leaders in Science and Engineering (ITL) - Lawson State Community College’s ITL encourages early exposure to STEM programs for high school students, and work for 1st and 2nd year college students, space-related research projects, and summer internship experiences.

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

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NASA Early Opportunities Program for Underrepresented Minorities in Earth and Space Sciences - Howard University and the University of Maryland Baltimore County target 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) 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 HIGHLIGHTS

Micro-g NExT participants continue to obtain internships at NASA and fulltime employment in STEM!

Patrick Pischulti
Micro-g NExT participant who earned a NASA internship at JSC designing testing platforms for NBL testing of Micro-g NExT spacewalking devices.

Zachary Fester
Micro-g NExT participant who earned a NASA internship and NASA Pathways internship at JSC.

Kelly DeRees
Micro-g NExT participant who earned a NASA internship at JSC working on the design for future flight vehicle waste systems.
NASA Interns contributed to NASA’s missions while participating in the Agency Internship Program. Students were placed at all NASA centers, facilities, and NASA headquarters.

### Students Selected From Diverse Populations:

- **51%** were underrepresented in STEM
- **34%** of selected interns were female
- **15%** reported Hispanic or Latino ethnicity
- **11%** were racially underrepresented in STEM

### Students Selected From Diverse Geographic Locations:

- **50** states + D.C. and Puerto Rico
- **4** other countries (Canada, Guam, New South Wales & United Kingdom)

### Internship Program Continues To Increase Each Year:

- **1395** interns selected for agency program in FY17
- **94%** growth in agency internship program since FY14

NIFS launched several social media channels and an interactive internship opportunity map to engage undergraduates interested in interning for NASA. Activity on the four social media channels resulted in almost **4.5 million impressions**!
Britney Fang developed a startup script that creates a connection between spacecraft data and makes it available to a flight control data display. The display enables the flight control team to monitor vehicle performance. Britney’s script reduces the time it takes for the flight controller to configure the display upon startup. It is estimated the time saved as a result of her work is 2,000 hours within just the first year. She also automated the planning integration between ISS and the Commercial Crew partner, reducing the amount of time it takes a planner to prepare data for exchange with ISS by 20%. Britney’s work products are currently being used in Boeing Commercial Crew simulations and will also be used for the Commercial Crew missions during flight.

My perspective and goals shifted immensely after this internship... This internship has opened my eyes to not only the bounds of what my working life could be, but also the inner workings of NASA, its mission, its projects, and where I could see myself making a lasting impact on humanity.

— Robert Ashcom, EV (Spring 2017)
The Office of Education offers opportunities to reach students, both inside and outside of 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.

GET INVOLVED

High School Aerospace Scholars
http://has.aerospacescholars.org/

NASA Community College Aerospace Scholars
http://ncas.aerospacescholars.org/

STEM on Station
http://www.nasa.gov/stemonstation

NCAS experimented with a cutting-edge technology solution to increase the number of MSI students participating in the program. Text messaging allowed staff to reach hundreds with personalized interactions through their phones.

NCAS also created a role for the most talented NCAS alumni to come back as peer leaders and role models in paid positions as NCAS Student Assistants.
My experience through HAS helped me grasp the importance of a strong technical foundation and the ability to adapt communication for various audiences. With these skills you have the confidence to make recommendations and prioritize tasks that help ensure crew safety and vehicle control. — Ben Morales
Sign up to receive email announcements about NASA products, activities, workshops, events and opportunities to bring NASA educational resources into your classroom.

http://www.nasa.gov/education/express