

AUGUST 19, 2017 – FEBRUARY 28, 2024

# FINAL PERFORMANCE REPORT



**NASA STEM Pathway Activities –  
Consortium for Education**

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# Mission Accomplished!

From 2017 to 2023, Oklahoma State University (OSU) and our consortium of partners, the 13 institutions within the Texas A&M University system, Langston University, OSU Center for Sovereign Nations, Northern Oklahoma College, the Oklahoma 4-H Foundation, and the Technology for Learning Consortium, worked as the NASA STEM Pathways – Consortium for Education (NSPACE) to deliver a nationwide approach to NASA’s strategic goals for the Office of STEM Engagement. Throughout the cooperative agreement, we have created unique opportunities for students, worked to build a diverse future STEM workforce, and strengthened public understanding of NASA’s mission and work.

In 2023-2024, OSU continued to support these efforts by providing continuity in innovative online delivery through maintaining the learning management system and other educational technology software for the new NASA Science, Technology, Engineering, and Mathematics (NSTEM) contract. Collaborating with the NSTEM contract has given us the opportunity to continue supporting NASA STEM Engagement as our NSPACE cooperative agreement comes to a close.

This final progress report provides an overview of the entire NSPACE cooperative agreement beginning August 19, 2017 and ending February 28, 2024. Our team led numerous OSTEM activities, online courses and events, and onsite experiences to benefit K-20 students and educators. By developing original STEM engagement resources, leveraging the unique aspects of NASA facilities, and sparking interest in STEM in students with diverse backgrounds, we expanded NASA’s reach and met the Office of STEM Engagement’s strategic goals.

View our [previous annual performance reports](#) on the OSU NSPACE website.

During our final two years of the NSPACE cooperative agreement, we continued to navigate a hybrid work environment while bringing onsite experiences back to NASA centers. We used innovation, creativity, research, and best practices to combine our newer virtual events with one-of-a-kind opportunities to experience a NASA center. Through over 150 virtual and onsite experiences at NASA centers and partner institutions, we have engaged over 750,000 participants. We have designed, developed, and delivered 25 innovative activities for K-20 students and over 130 NASA-unique lessons for K-12 educators and students. Our personnel and partners have been supported professionally through three intense professional development summits and a continual online community of practice. In turn, they have shared our research-based practices in scholarly publications and at over 35 different heimdalconferences through presentations, exhibits, virtual reality field trips.

The OSU-NASA Education partnership began in 1968 sending the *Space Mobile* out to schools across the nation. Now, 55 years later, as we bring NSPACE to a close, we are proud and grateful to have played a vital role in inspiring, engaging, educating, and employing the Artemis generation.



**Dr. Stansberry**  
 Professor, Learning, Design, and Technology  
 Principal Investigator, NASA STEM Pathway Activities – Consortium for Education (NSPACE)  
 Founder, Emerging Technologies and Creativity Research Lab



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**Aeronaut-X** provides unique opportunities to stimulate STEM engagement and learning experiences for students and educators. Discover how NASA's technological breakthroughs of today transforms tomorrow's future with Aeronaut-X. AX STEM activities focus on cutting-edge aeronautics content that encourage our future aviation explorers to take a deep dive into the world of a new generation of flight.

**Beginning Engineering, Science, and Technology (BEST)** introduced the principles of engineering to audiences through hands-on, NASA-themed activities applying the engineering design process to solve problems and generate solutions.

**Bell Museum** located at the University of Minnesota aimed to strengthen interest and engagement in STEM in a diverse set of students, their caregivers, and the public by developing a full-dome planetarium production focused on the human factors of long-duration space flight.

**NASA's Commercial Crew Program (CCP)** kept educators and Artemis Generation students engaged in the historic return of human spaceflight to American soil through a variety of STEM Toolkits, Reddit Ask Me Anything AMA opportunities, and The Astro-Not-Yets storybook series.

**High School Aerospace Scholars (HAS)** is an authentic STEM learning experience for Texas high school juniors to engage with NASA's missions and become the next generation of explorers. HAS is a year-long commitment for participants, starting in the fall with a four-month online learning experience related to space exploration, Earth science, technology, and aeronautics. Students passing the online learning experience receive an invitation to Moonshot, a five-day gamified virtual summer experience mentored by NASA scientists and engineers. During the summer experience, students work in teams to plan an Artemis-themed mission to the Moon and Mars. Top teams from the virtual summer experience are invited to attend a two-day residential experience at NASA's Johnson Space Center in Houston.

**Houston Independent School District Aerospace Academies (HISD)** activity supports five schools in HISD which received grants from the U.S. Department of Education to become STEM magnet schools involving programs focusing on aerospace engineering. The HISD Aerospace Academies activity provides content, resources, and instructional coaching to aid educators in training the Artemis Generation of space explorers.

**High schools United with NASA to Create Hardware (HUNCH)** partnered students, NASA, and industry through real products to meet NASA needs and standards. Students participated in precision machining, industrial sewing, design-and-prototyping, culinary science, and video challenges under the guidance of NASA and industry mentors.

**Microgravity Neutral Buoyancy Experiment Design Teams (Micro-g NExT)** is an authentic, mission-driven NASA STEM experience. This collaboration between NASA's Exploration Systems Development Mission Directorate and Office of STEM Engagement integrates undergraduate students into the technology and hardware development paths of NASA missions in support of human space exploration. Undergraduate students gain an overall experience including hands-on engineering design, test operations, public outreach, and an opportunity to develop innovative technologies contributing to NASA's missions. The end-to-end real-world engineering design process encompassed by the Micro-g NExT experience prepares the Artemis Generation for the return to the Moon and a future career in the STEM workforce.

**Microgravity University for Educators (MgUE)** challenged student and educator teams to solve technical problems by designing, building, and testing prototypes in a simulated microgravity environment – the Precision Air Bearing Floor.

**Minority University Research and Education Project (MUREP)** engages underrepresented populations through a wide variety of initiatives. Multiyear grants are awarded to assist Minority Institution faculty and students in research of pertinent missions.

**MUREP Institutional Research Opportunity (MIRO)** was established to strengthen and develop the research capacity and infrastructure of Minority Serving Institutions in areas of strategic importance and value to NASA's mission and national priorities. Overall, MIRO awards aim to promote STEM literacy and to enhance and sustain the capability of institutions to perform NASA-related research and education, which directly supports NASA's four mission directorates—Aeronautics Research, Human Exploration and Space Operations, Science and Space Technology.

**MUREP Innovation Tech Transfer Idea Competition (MITTIC)** is a virtual NASA intellectual property spinoff challenge to develop new ideas from within the Artemis Generation for commercialization and entrepreneurship through the delivery of a concept paper and a "Space Tank" lightning pitch competition for student teams enrolled at Minority Serving Institutions. The winning team presents their concept to NASA and various tech companies in Silicon Valley while also qualifying for NASA internships and earning funds up to \$15,000 for their institution.

**MUREP Other Opportunities (MOO)** engaged and inspired the Artemis generation through strengthening curriculum and curricular pathways in STEM.

**MUREP Sustainability Initiative (MSI)** supported capacity building, increasing long-term sustainability at Minority Serving Institutions by creating awareness of opportunities including grants and cooperative agreements and significantly increasing contracting opportunities.

**MUREP Space Technology Artemis Research (M-STAR) Grant** strengthens and develops the research capacity and infrastructure of U.S. Minority Serving Institutions in areas of strategic importance and value to NASA's mission and national priorities. The main goals are to promote literacy in STEM and to enhance the capability of institutions to participate in NASA's Space Technology Mission Directorate opportunities.

**NASA Community College Aerospace Scholars (NCAS)** is a STEM engagement activity for community college students seeking to transfer to a 4-year institution or go directly to the labor force. NCAS uses NASA's unique expertise, research, facilities, and other resources to engage students in authentic and experiential learning experiences. Three consecutive mission opportunities are offered alongside an opportunity to apply for a paid internship. NCAS also partners with Minority Serving Institutions, enabling them to engage students in similar experiences that are scaled to the institutions' STEM networks.

**NASA Spacesuit User Interface Technologies for Students (NASA SUITS)** design challenge engages undergraduate and graduate student teams to design and create spacesuit information displays in augmented reality environments. The NASA SUITS challenge requirements support NASA's Artemis missions through research and development of human autonomy for future spacewalks on the Moon and Mars. Teams receive invitations to test and evaluate prototypes with engineers while using mission-unique facilities and assets at NASA's Johnson Space Center in Houston.

**Next Gen STEM Earth (NGS Earth)** connects students and educators to NASA's Office of STEM Engagement using station and Earth Science resources to inspire, engage, and educate a diverse group of students and educators. Formerly known as STEM on Station, Earth continues to provide a comprehensive website of resources, In-flight Education Downlinks, lessons taught from station, space station payload opportunities, and hands-on STEM activities both in low-Earth orbit and on the ground using high-profile partnerships to amplify NASA's missions and unique assets.

**Next Gen STEM NASA Sparking Participation in Authentic Real-World Experiences (NGS NASA SPARX)** is an opportunity for pre-college youth and educators to engage with NASA's missions. NASA SPARX uses evidence-based education practices to connect NASA with a traditional education event and broaden student participation, especially in underrepresented communities. Using NASA-based themes and educational resources, participants learn about NASA and STEM while creating projects to showcase their learning. Participants select the level of complexity and rigor they wish to enter based on their capabilities and interests.

**Network of States (NoS)** provided systemic, long-term support for NASA Centers and their communities by building strong regional networks for partner-delivered NASA educator professional development.

**Student Opportunities in Airborne Research (SOAR)** challenged high school and undergraduate students to design and test experiments related to atmospheric and ground mapping, cosmic dust collection, thermal management and control systems, rocket launch support, and test bed operations for future airborne or space-borne systems.

**STEM on Station (SoS)** advanced the nation's STEM education and workforce pipeline through a comprehensive website of resources, conversations with astronauts in space, lessons taught from the space station, space station payload development opportunities, and hands-on STEM activities developed through high-profile partnerships leveraging NASA's mission and unique assets.

**Space Grant** is a national network of colleges and universities. These institutions are working to expand opportunities for Americans to understand and participate in NASA's aeronautics and space projects by supporting and enhancing science and engineering education, research and public outreach efforts.

**STEM in Deep Space (SDS)** connected students and educators to deep space exploration missions including Gateway, the Moon, and Mars using NASA-unique facilities, subject matter experts, and resources to inspire students to pursue STEM.

**WEAR STEM Challenge** was an engineering design challenge where NASA presented problems about wearable technologies to middle and high school students, seeking contributions to deep-space exploration missions.

**NASA Virtual Science and Engineering Expo** was a nationwide challenge for educators and pre-college students to connect with NASA's ongoing missions.

**Year of Education on Station (YES)** leveraged the opportunity of astronauts and former classroom teachers Joe Acaba and Ricky Arnold on back-to-back missions to the International Space Station to engage students and educators in NASA-unique STEM activities and highlighting the space station as an educational platform.

Activity names in teal are Year Six activities.  
Activities in orange occurred in previous years  
of the NSPACE agreement.



# NSPACE Cooperative Agreement

The goals of the NSPACE cooperative agreement were to deliver a nationwide approach to NASA's goals to improve STEM instruction; increase and sustain youth and public engagement in STEM; enhance the STEM experience of undergraduate students; better serve groups historically underrepresented in STEM fields; and design education for tomorrow's STEM workforce.

## 750K+

participants served through the course of the NSPACE agreement

## 150+

virtual and onsite experiences hosted at 10 NASA centers and partner institutions

## 130+

NASA-unique lessons developed for K-12 educators and students

## 35+

conferences supported through presentations, exhibits, and virtual reality field trips

## 25

NASA-unique activities facilitated, including launching six new activities

## 3

Professional Development Summits for team members



## NSPACE TIMELINE

2017

- NSPACE begins with 11 activities
- SUITS launches
- SOAR launches
- Year of Education on Station

2018

- CCP launches
- HISD launches
- MITTIC launches
- MSI added
- SDS launches
- SOAR sunsets
- Year of Education on Station

2019

- HAS celebrates 20 years
- Micro-g NExT celebrates 5 years
- NoS sunsets
- Supported Apollo 50th celebrations

2020

- In-person experiences go virtual
- Bell Museum added
- MSI sunsets
- Space Grant added

2021

- MSI sunsets
- NGS NASA SPARX launches
- SoS and CCP become NGS Earth

2022

- Return to onsite events
- MIRO celebrates 30 years

# NSPACE Year 1 at a Glance

AUGUST 19, 2017 – MAY 31, 2018



## 63K

educators reached



## 182K

students reached



## 45

states + Washington, D.C., Puerto Rico, U.S. Virgin Islands represented



## 12

activities implemented

BEST • HAS • HUNCH • Micro-g NExT • MgUE • MOO • MIRO • NCAS • NASA SUITS • NoS • SoS & YES • SOAR



The NCAS team conducted 11 onsite experiences at eight NASA centers, reaching 453 students.

SoS's In-flight Education Downlinks with astronauts reached

## 40,000+

educators and

## 150,000+

students.

NSPACE implemented BEST at six NASA centers.



## 9

 MgUE teams visited Johnson Space Center to test their prototypes on the Precision Air Bearing Floor.

Micro-g NExT participants represented 22 colleges and universities in 16 states, four Minority Serving Institutions, and one community college.

## 43%

of SOAR participants were from Minority Serving Institutions.



∞ YEAR ONE



MOO team established **13** new partnerships supporting sustainability of programs.

The HAS team worked with 683 students, representing 83 Texas counties, enrolled in the 16-week, online course.



NASA SUITS launched first mission-driven coding challenge, developing a new partnership with EVA Office.

# NSPACE Year 2 at a Glance

JUNE 1, 2018 – MAY 31, 2019



## 19K

educators reached



## 155K

students reached



## 18%

increase in full-time NSPACE employees



## 16

activities implemented

BEST • CCP • HAS • HUNCH • Micro-g NExT • MgUE • MIRO  
MITTIC • MOO • MSI • NCAS • NASA SUITS • NoS  
SDS • SoS & YES • SOAR

## 433%

increase in downlink events from an average year at the conclusion of YES.



SoS team reached **9,000+** educators through ISTE, CAST, SEEC and NSTA conferences.

Launched partnership with five HISD Aerospace Academies.



**1,741** educators and students participated in NASA's BEST activities in nine states.

**5,000+** educators received CCP information and resources at three national conferences.



**6,249** students impacted through MIRO awardee outreach events and activities.



Launched MITTIC with 70 students and faculty from 10 Minority Serving Institutions.

Micro-g NExT introduced two new challenges for students to complete: Extra Vehicular Activity Camera Attachment Mechanism and Mini-Arm End Effector.



**46** NoS educators hosted at NASA's Johnson Space Center for week-long onsite train-the-trainer workshops.

# NSPACE Year 3 at a Glance

JUNE 1, 2019 – MAY 31, 2020



**GLOBAL PANDEMIC** led to NSPACE team developing new ways to reach participants



**155K** participants reached



**49** states and territories represented



**13** activities implemented

CCP • HAS • HISD • HUNCH • Micro-g NExT • MIRO  
MITTIC • MOO • MSI • NCAS • NASA SUITS • SoS • WEAR



Zip tie cutter from Lone Star College-Cy Fair Micro-g NExT team used in two spacewalks.

**43%** of participating MITTIC institutions were Historically Black Colleges and Universities and **54%** were Hispanic-Serving Institutions.

**10** new MIRO awardee institutions, doubling the number of active awardees.

**1,243** NCAS students from 274 community colleges in 42 states invited to 20 onsite events at all 10 NASA centers.



WEAR teams performed outreach to **16,000+** students and **26,000+** community members.

**41K+** views of the six CCP 360 degree virtual reality field trips.



**17** NASA-paid MOO internships in summer 2019.

HUNCH delivered 600 spacewalk wire ties, 177 design developments for flight, 131 softgoods, 25 lockers, 2 prototypes for flight, and 1 culinary item.



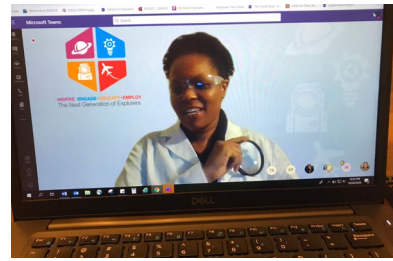
**3,657** classrooms livestreamed the Astro Socks Design Challenge Showcase and Microsoft Education Downlink.

# NSPACE Year 4 at a Glance

JUNE 1, 2020 – MAY 31, 2021



**9**  
new positions  
in NSPACE



**4**  
activities  
created virtual  
curriculum

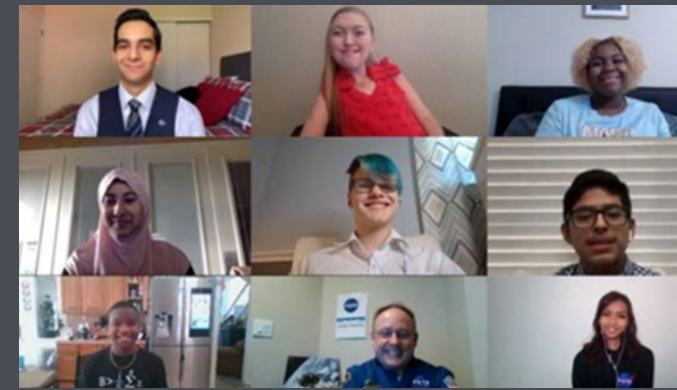


**8**  
awards received  
from NASA



**14**  
activities  
implemented

Bell Museum • CCP • HAS • HISD • HUNCH  
Micro-g NExT • MIRO • MITTIC • MOO • NCAS  
NASA SUITS • Space Grant • SoS • SDS



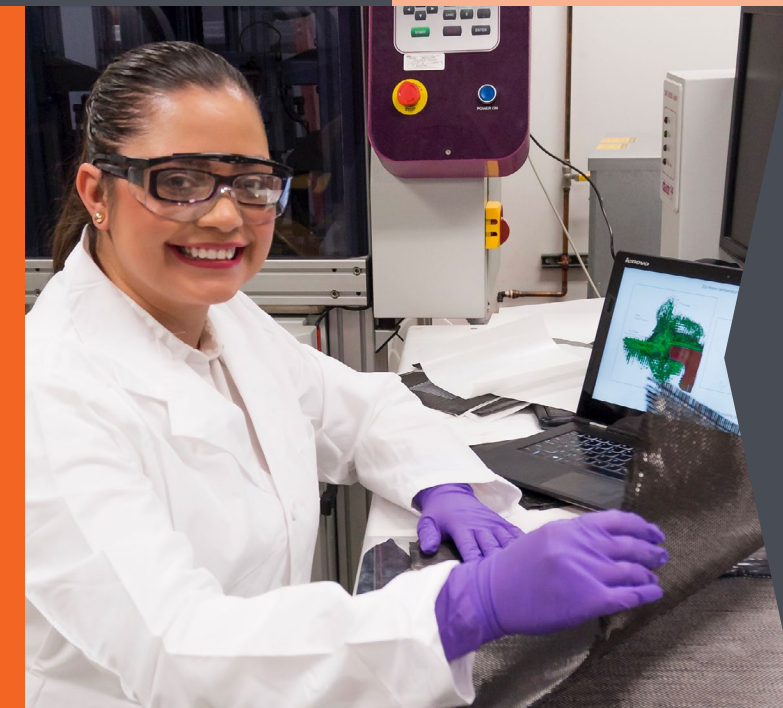
HAS reached 85 new high schools.

**350,000+**  
students  
reached  
through SoS's  
13 education  
downlinks in  
partnership  
with national  
organizations.

**3,700+**  
direct and  
indirect  
MOO  
participants.



Montana, Idaho,  
Kentucky, and  
Oklahoma  
Space Grant  
Consortia  
traveled to  
Chile with their  
students to  
record gravity  
waves produced  
by a complete  
solar eclipse.



**4** patents,  
10 new  
courses,  
and 17  
revised  
courses  
developed  
from MIRO  
research.

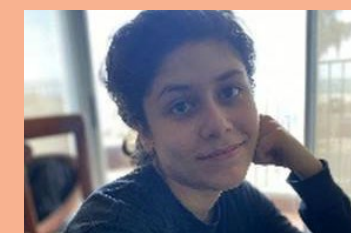
**300%**

increase in **first-time participating institutions** progressing to Phase 2 of the Micro-g NExT challenge.



**130**  
students  
participated  
live in SDS  
culminating  
event.

Since 2003, HUNCH students delivered more than 20,000 individual parts and components fabricated, and over 1,340 flight products to NASA.



**42%** of MITTIC participants were first-generation college students.



# NSPACE Year 5 at a Glance

JUNE 1, 2021 – MAY 31, 2022



## 168K

participants from 50 states and territories



## 2

team awards received from NASA



## 3

new tools to enhance virtual connections (Communique, STEM Gateway, Mursion)



## 12

activities implemented

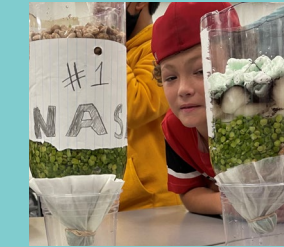
HAS • HISD • Micro-g NExT • MUREP • MIRO  
MITTIC • NCAS • NASA SUITS • NGS Earth  
NGS NASA SPARX • Space Grant



NGS Earth website views increased by approximately 500,000.

## 36,000+

students participated in NASA SPARX.



40% of HAS students were female.

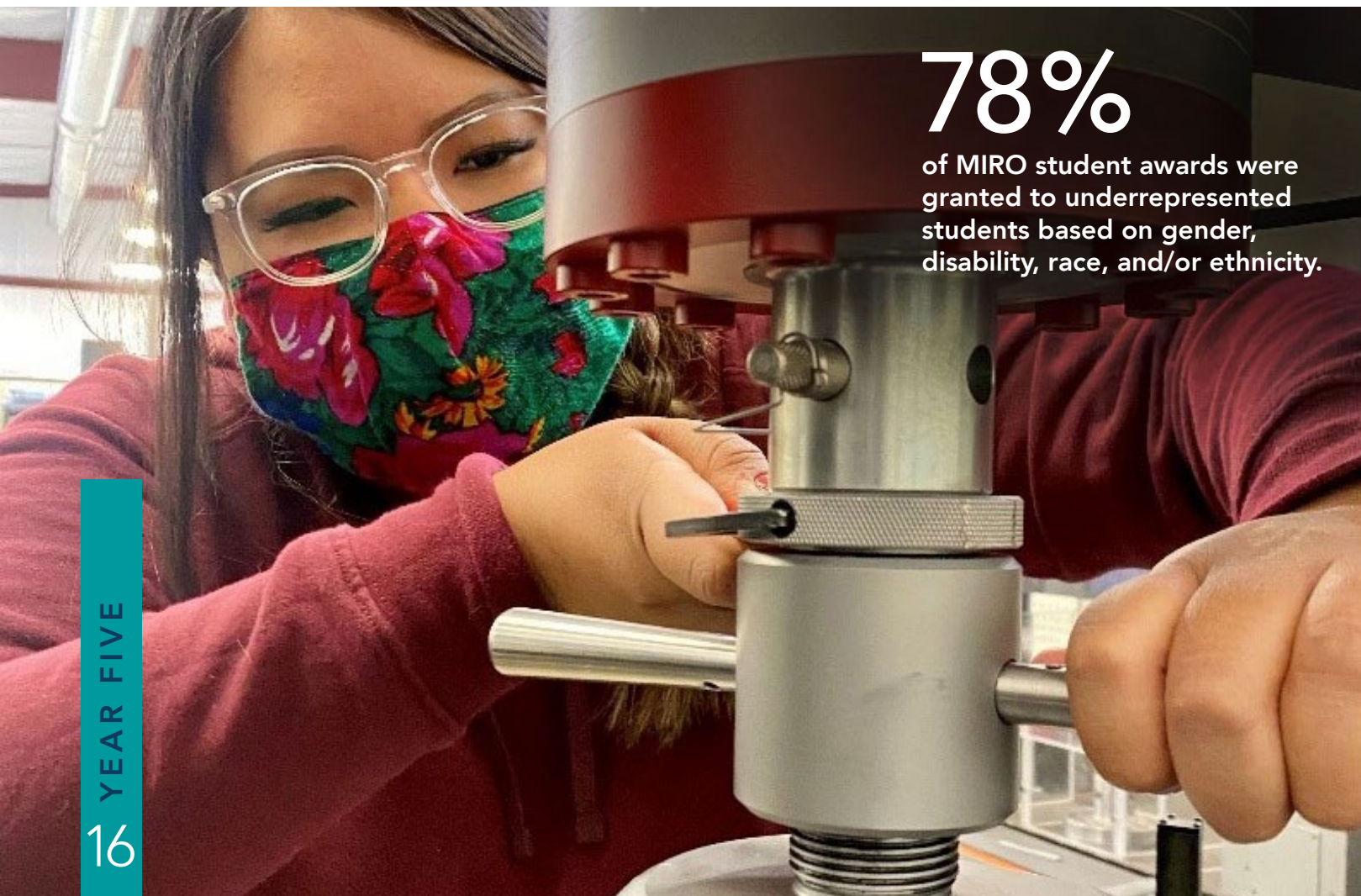
828 students attended 18 Space Grant webinars featuring resume workshops and NASA subject matter experts.



HISD team developed 96 NASA mission-focused 5E lessons and integrated them into classrooms ranging from K-Physics.

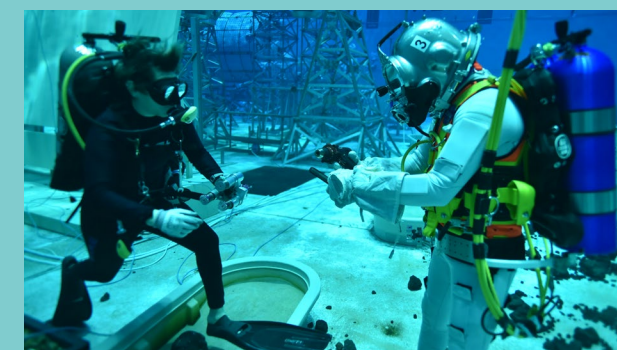
## 78%

of MIRO student awards were granted to underrepresented students based on gender, disability, race, and/or ethnicity.



23% increase in MITTIC letters of intent from 2020.

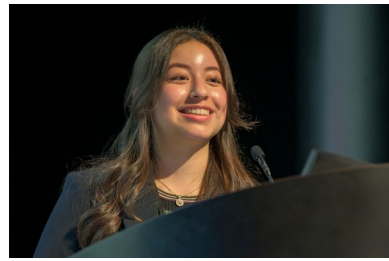
The University of Baltimore NASA SUITS team shared their research and experiences during a special video event hosted by the Baltimore Museum of Industry.



54% of Micro-g NExT participants were underrepresented learners.

# NSPACE Year 6 at a Glance

JUNE 1, 2022 – FEBRUARY 28, 2023



**72K**  
students and educators served



**4**  
new employees hired



**6**  
onsite events



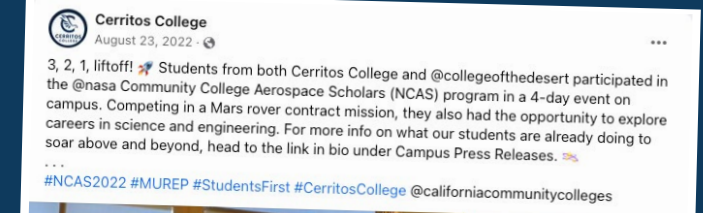
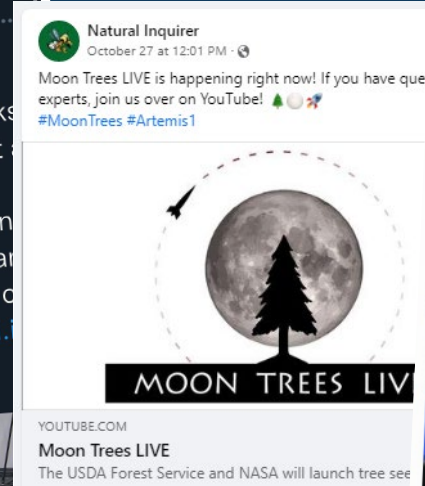
**12**  
activities implemented

HAS • HISD • Micro-g NExT • MIRO • MITTIC • MUREP  
NCAS • NASA SUITS • NGS Aeronaut-X • NGS Earth  
NGS NASA SPARX • Space Grant



**25**  
employees attended the NASA STEM Better Together conference.

# YEAR 6 SOCIAL FEED



S.U.I.T. Lab @spacesuitup  
The S.U.I.T. Lab is looking for @ERAU\_Daytona students to join our NASA Micro-g NExT team, developing and testing tools for @NASA!

**WE WANT YOU**  
Join our Micro-g NExT Project to **develop** and **test** tools for NASA

We Need Skills in:  
• Human Factors  
• Spaceflight Operations  
• Financial planning  
• SCUBA Diving  
• Video Editing

Come to the lab  
CoA 355 MW 7pm  
For more information, contact Emma at [goode@my.erau.edu](mailto:goode@my.erau.edu)



# High School Aerospace Scholars (HAS)

High School Aerospace Scholars provides an innovative unique one-of-a-kind experience opportunity for all Texas high school juniors culminating in a team-based summer experience where teams are mentored by NASA scientists and engineers with a goal of creating a preliminary design review with a specific design challenge and research based on one of nine sequential Artemis missions. During the HAS online course students are provided opportunities to engage with NASA subject matter experts who are directly involved with NASA's Artemis mission initiatives. During the summer virtual experience, Moonshot, students connect to NASA internships, robotic and engineering experts, and Texas colleges to pursue STEM careers.

**880**  
scholars from 333  
high schools in 176  
cities across Texas.

**79%**  
completion rate  
of Module One.

**200+**  
students from  
Title 1 high schools  
(5<sup>th</sup> year in a row).

**100+**  
students from  
rural high schools  
(4<sup>th</sup> year in a row).

## SUCCESS STORY

The HAS team expanded recruitment efforts with in-person recruitment in areas of Texas with historically less participation in HAS. The team visited five schools to share information about HAS with students and teachers, resulting in 38 students accepted into the HAS online course from the schools. Compared to last year, in which only two students were accepted into HAS from the five schools visited. The HAS team's in-person visits made a substantial impact on recruitment in underrepresented schools.



# Houston Independent School District Aerospace Academies (HISD)

NASA instructional coaches help teachers create structured and widely accessible, experiential learning opportunities for students on campus to engage with NASA's work in exploration and discovery. Partnering with teachers, NASA instructional coaches develop and deploy a continuum of STEM experiences to facilitate authentic learning opportunities to cultivate student interest in pursuing STEM careers and foster interest in aerospace fields.

**4,000+**  
students served at five campuses in the  
7th largest school district in the country.

**100** teachers receiving  
direct support.



## SUCCESS STORY

The five Houston ISD Aerospace Academies receiving NASA support all improved in their school ratings from the start of service by the NASA instructional coaching team.

HISD School	2019 Rating	2022 Rating
Wesley Aerospace Academy	D	B
Davila Aerospace Academy	B	A
Deady Middle School	F	C
Booker T. Washington High School	C	B
Milby High School	C	B



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

Micro-g NExT challenges students to design innovative solutions to real-world problems as they work alongside a NASA mentor to design mission ready hardware meeting a specific relevant mission need. In 2022, Micro-g NExT offered three Artemis-focused concept design challenges, two created by the Extravehicular Activity (EVA) Tools Group out of NASA's Johnson Space Center and one developed by NASA's Jet Propulsion Laboratory. For the 2022-2023 academic year, Micro-g NExT is offering four unique design challenges related to diverse aspects of NASA's missions. Two challenges focusing on extravehicular activity tools were created by the Tools Group, a challenge focusing on Orion Crew Safety was created by NASA's Search and Rescue office out of Goddard Spaceflight Center, and a challenge focusing on astronaut training was created by the engineering team at the Neutral Buoyancy Laboratory at Johnson.

# 150

attendees from **33 institutions in 18 states** attended info sessions.

# 52%

of participants were **underrepresented learners.**

# 15

institutions from **12 states.**

“

I don't think I would be an [International Space Station] flight controller now without the experience that I had gained from Micro-g NExT.

HARRIET HUNT

”

# NASA Spacesuit User Interface Technologies for Students (NASA SUITS)

The NASA SUITS design challenge engages undergraduate and graduate student teams to design and create spacesuit information displays in augmented reality environments. The NASA SUITS challenge requirements support NASA's Artemis missions through research and development of human autonomy for future spacewalks on the Moon and Mars. Teams receive invitations to test and evaluate prototypes with engineers while using mission-unique facilities and assets at NASA's Johnson Space Center in Houston.

# 10

teams selected from **15 institutions, including five Minority Serving Institutions, and four community colleges.**

# 8

of 10 teams from 2022 submitted research for publication.

# 3

former SUITS students interned at Johnson Space Center in Fall 2022.





# Minority University Research and Education Project (MUREP)

The MUREP Space Technology Artemis Research Grant strengthens and develops the research capacity and infrastructure of U.S. minority serving institutions in areas of strategic importance and value to NASA's mission and national priorities. The main goals are to promote STEM literacy and to enhance the capability of institutions to participate in NASA's Space Technology Mission Directorate opportunities.

Minority Serving Institution Engagement creates relationships with Minority Serving Institutions (MSIs) and underrepresented students to assist them in participating in NASA MUREP activities. Outreach events spanned the country, including:

- Historically Black Colleges and Universities (HBCU) Week Career Fair in Washington, D.C.
- NASA's virtual booth at the Federal Asian Pacific American Council Career Fair
- MUREP Precollege Summer Institute program at Alabama A&M University

MUREP sponsored a total of 25 fellows and scholars to attend the 2022 Southern Regional Education Board Institute on Teaching and Mentoring. Alumni fellows served as panelists to share their experience in a NASA student program and tips for current students to succeed. Fellows and scholars participated in networking opportunities, social events, and a cultural immersion experience at the Martin Luther King Jr. National Historical Park.

17

interns placed at five NASA centers during summer 2022.

4

interns placed during fall 2022 and spring 2023.

7

awardee institutions hosted site visits.

100%

of principal investigators participated in NASA STEM Better Together conference.



# MUREP Institutional Research Opportunity (MIRO)

The MIRO activity continues to demonstrate progress in building research capacity at Minority Serving Institutions. NASA STEM-related academics and research promoted through the MIRO-funded projects have allowed the awardees to establish viable partnerships, conduct research in alignment with NASA priorities, and offer experiential opportunities for diverse student groups.

**8,704**

students and 1,706 educators reached through 316 activities.

**31**

internships across nice NASA centers funded by MIRO awardees.

**5**

site visits to foster connections between NASA and awardees.



## RESEARCH OUTCOMES

- 179 peer-reviewed publications and 16 other technical publications
- 239 presentations - 105 invited papers and 134 peer-reviewed papers
- 8 patents
- 18 new courses
- 61 revised courses
- 84 new proposals received funding, with over \$26,150,827 received

# MUREP Innovation & Technology Transfer Idea Competition (MITTIC)

MITTIC increases the diversity of the NASA pipeline by engaging specifically with Minority Serving Institutions to expose them to NASA missions, technology, and opportunities. Students, as well as institution representatives, are presented with unique opportunities to engage with NASA subject matter experts within the fields of STEM and business to learn about NASA's mission and develop their entrepreneurial skills as they further NASA's reach and the Artemis Generation.

MITTIC provides an engaging in-person experience through live conversations with subject matter experts and a unique experience through the Space Tank competition. Teams are also able to attend a multitude of tours with NASA and industry subject matter experts.

*\*Some Minority Serving Institutions qualify as more than one category.*

**66%**

female student participants.

**38%**

Historically Black Colleges and Universities.

**50%**

Hispanic Serving Institutions.

**25%**

Asian American and Native American Pacific Islander-Serving Institutions.



MITTIC - not only does it give you the opportunity to learn more, but it gives you the support you need, as a student, to keep going.

**JACQUELINE PALMA,**  
Fall 22 Student Team Member



# NASA Community College Aerospace Scholars (NCAS)

NCAS funded 14 NASA internships in summer 2022 to NCAS alumni. Since 2014, informal tracking shows nearly 275 internships awarded to NCAS alumni. Through internships, NCAS alumni contribute to NASA's missions and programs. NCAS uses a proven model to inspire students to continue to a four-year institution pursuing a STEM degree.

## 41%

self-reported as female.

## 69%

self-reported as a minority.

## 87%

of participants from a MSI.



## HIGHLIGHT REEL



Orange Coast College, in partnership with Southwestern College, hosted the 2022 NASA Community College Aerospace Scholars experience on August 17-20, 2022. Click the image above to watch video highlights!



## NextGen STEM: Earth

[In-flight Education Downlinks](#) align to NASA's Office of STEM Engagement's goals by attracting a diverse group of students to STEM. Utilizing pre-recorded videos removes facility and technology barriers thus broadening participation. Engaging with astronauts and learning how they live and work, provides authentic learning experiences with NASA's people, content, and facilities.

[Moon Trees](#) is a unique opportunity for students across the United States to directly engage in the Artemis mission. Students can connect with NASA missions and contribute to NASA's work through the citizen science opportunities featured in the newly released Moon Tree Toolkit. Through the collaboration with the USDA Forest Service, students can explore different career opportunities which help them see themselves in the future STEM workforce.

[Student Payload Opportunity with Citizen Science \(SPOCS\)](#) teams consisted of multi-disciplinary, diverse college students contributing to microgravity research performed on station. Students sent research payloads to the space station and involved K-12 students in an authentic learning experience. Each SPOCS team worked with a NASA mentor who was able to connect each team directly to other NASA missions.

## 54K+

students and educators reached through 18 In-Flight Education Downlinks.

## 3

SPOCS teams launched their experiment payloads aboard CRS-25 and CRS-26.

## 35

pre-service teachers provided professional development through our partnership with The University of Houston.

## 4

new STEMonstrations: Simple Machines, Area and Volume, Engineering Design Process, and Lab Safety.



# NextGen STEM: Sparking Participation and Real-World Experiences (SPARX)

SPARX activities are hands-on, standards-based, authentic learning experiences designed to provide opportunities for students to improve their STEM identity and connect with NASA work and missions.

The new format for SPARX establishes a set of thematic activities, divided into four grade bands: K-2, 3-5, 6-8, and 9-12. Each set of activities focuses on NASA missions with an emphasis on learning the engineering design process. The new activities are undergoing various internal and external reviews.



# National Space Grant College and Fellowship Project Space Grant

The Space Grant national network includes over 850 affiliates from universities, colleges, industry, museums, science centers, and state and local agencies. These affiliates belong to one of 52 consortia in all 50 states, the District of Columbia and the Commonwealth of Puerto Rico.

**905**  
students attended  
**16 webinars.**  
(9% increase in attendance from last year.)

**250**  
directors and  
affiliates attended  
**five webinars and meetings.**

**10**  
states in the  
Western Region  
are represented  
by NSPACE.



# NextGen STEM: Aeronaut-X

8,000 students and teachers attended the STEM expo at Edwards Air Force Base on Oct. 14, 2022, to learn about aeronautics, robotics, and rocketry. NSPACE employees flew in from around the country to engage children in STEM activities, including building marshmallow versions of Ingenuity, the Mars helicopter, and learning binary.







**NASA STEM Pathway Activities –  
Consortium for Education**

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