NAC STEM Engagement Committee Meeting

OPEN TO THE PUBLIC

July 20, 2023
Welcome!
Agenda

Welcome and Introduction

STEM Engagement Priorities
Broadening Student Participation
Discussion
Break
Partnerships
Discussion
Break
Discussion, Findings and Recommendations
NAC STEM Engagement Committee Members

Kristin De Vivo  
Executive Director, Lucas Education Research

Dan Dumbacher  
Executive Director, American Institute of Aeronautics and Astronautics

Norman Fortenberry  
Former Executive Director, ASEE

Jamar Reid  
Former NASA Intern and Student Government Association President, Embry-Riddle Aeronautics University

Darryl Williams, PhD  
Senior Vice President of Science and Education, The Franklin Institute

New Members

Julia Ross, PhD  
Dean, Virginia Tech's College of Engineering

Erika Shugart, PhD  
Executive Director, National Science Teacher Association
Opening Remarks

Dan Dumbacher
Chair
NAC STEM Engagement Committee
Agenda

Welcome and Introduction

**STEM Engagement Priorities**

Broadening Student Participation

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Partnerships

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Discussion, Findings and Recommendations
NASA STEM 2021-2023 Priorities

K-12 Efforts

Broadening Participation

Partnerships
NASA Strategic Objective 4.3
Build the next generation of explorers. Engage students to build a diverse future STEM workforce.

NASA STEM Engagement Goals:
1. Create unique opportunities for a diverse set of students to contribute to NASA’s work in exploration and discovery.
2. Build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA people, content, and facilities.
3. Attract diverse groups of students to STEM through learning opportunities that spark interest and provide connections to NASA’s mission and work.

Focus Areas:
• Expand NASA contributions in engaging K-12 students in STEM pathways.
• Broaden student participation to increase diversity, equity, and inclusion in STEM through NASA opportunities and activities.
• Build strategic partnerships and networks, expanding NASA’s STEM ecosystem to magnify reach and impact.
Strategy for STEM Engagement

- Current strategy will end in Dec. 2023
- Core elements of the strategy have been incorporated into NASA’s 2022 Strategic Plan:
  - Strategic Objective 4.3
- STEM Engagement Council currently developing a Strategic Implementation Plan

Strategic Objective 4.3
Build the next generation of explorers.
Engage students to build a diverse future STEM workforce.
Strategic Implementation Plan

- **Inclusive** of NASA STEM Engagement efforts within Mission Directorates, Centers, OSTEM, and other STEM Engagement Council member organizations
- **Actionable** and provides associated metrics/measures
  - Clarifies who is involved/responsible for certain actions
- **Useful** to an internal NASA audience, but also shared with the public to provide insights on our direction and provide transparency to stakeholders
Engaging Students in Artemis

Join Artemis Website

Artemis Student Challenges

Kids and Families Hands-on Activities

Teach Artemis

NASA STEM
INSPIRE · ENGAGE · EDUCATE · EMPLOY
The Next Generation of Explorers

stem.nasa.gov
Dream to Reality follows Callie's trailblazing path as the first woman on the Moon.

Audience: Formal & Informal Educators
Grade Levels: 5-8
Subjects: Engineering design, Mathematics, Physical Science, and Technology
Minecraft (owned by Microsoft) is one of the world’s most popular video games

- **100M** users in commercial product
- **45M** in education product

Space Act Agreement partnership uses the Artemis Mission to introduce students to STEM concepts and careers

- New Minecraft worlds introduce students to:
  - NASA missions and science
  - a variety of NASA STEM careers
  - coding skills
  - engineering and design thinking skills

- Products will be translated into 29 languages
“Today’s signing, with the support of Vice President Harris and the National Space Council, continues NASA’s collaborative efforts with the Department of Education to amplify the excitement of space to all students across our country, allowing every young person to know they are a part of the Artemis Generation – today and for decades to come.” – NASA Administrator Bill Nelson

"I am excited for this partnership with NASA that will inspire and prepare young people from all backgrounds to become our next generation of leaders in STEM fields and to propel our nation and our workforce into the future." – U.S. Secretary of Education Miguel Cardona

NASA Administrator Bill Nelson and Secretary of Education Miguel Cardona participate in a memorandum of understanding (MOU) signing ceremony, Wednesday, May 24, 2023, at the Mary W. Jackson NASA Headquarters building in Washington.
Coming Up:

- **July 27**: National Intern Day (week-long campaign)
- **August 14-25**: NASA Back to School (two-week campaign)
- **September 24-28**: HBCU Week
- **September 21**: OSIRIS-REx Sample Capsule Returns to Earth
- **October 14**: Annular solar eclipse
- **November 8**: National STEM Day
- **December 4-10**: Computer Science Week
- **Last week of each month**: new episodes of Surprisingly STEM career series on YouTube

Follow along with NASA STEM on social media

Get Social with NASA STEM

- @NASASTEM
- /nasa/nasa-stem/

Scan to watch the latest Surprisingly STEM episode!
NASA invests in our nation’s future workforce by providing unique STEM opportunities to students, educators, and institutions. Utilizing NASA experts, the agency connects students to exciting NASA missions through dynamic science, technology, engineering, and mathematics content and experiences.

The Resources for Educators and Students flyer contains a collection of links to connect you to a wide array of those resources.
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New Executive Order – February 2023

- Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (EO 14091)
- Requires each Agency to develop a new Equity Action Plan anchoring work in areas described in the EO
  - Educational Equity: Pursue educational equity so that our Nation’s schools put every student on a path to success
  - STEM Engagement work will be reflected in this plan; awaiting feedback from OMB about draft actions

Redefined Agency-Level Organizational Approach to Equity and DEIA

- **External Equity Team** – focus on actions that impact external stakeholders, membership across organizations that focus on external stakeholders
  - Our Broadening Student Participation work falls under this umbrella
- **Internal DEIA Team** – focus on actions internal to NASA as an employer, led by ODEO working with Mission Directorates and Centers
  - STEM Engagement Internships fall under this umbrella
Broadening Student Participation

Stakeholder Events contributing to the evidence base included:

• Equity Action Plan K-12 Stakeholder Town Hall in September 2022
  o Follow-on to K-12 Stakeholder Needs Assessment
• Broadening Student Participation session at OSTEM Better Together Conference in Aug/Sept 2022
  o Identify Barriers and Solutions to BSP in higher ed, K-12, informal
• Overcoming Barriers to Broadening Student Participation Listening Session in June 2023
  o Enable stakeholders to learn from one another about best practices and successful strategies

STEM Engagement Council Working Group on Broadening Participation in Higher Ed Challenges and Competitions

• Developed checklists focusing on general strategies, and strategies for women, Tribal Colleges and Universities, and Historically Black Colleges and Universities
• Internal Broadening Student Participation website under development
Measuring Progress

Completed Evidence-Building Activities
- NASA Internship Outcome Assessment Phase I and II
- Workforce and Career Readiness Evaluation Study
- K-12 Stakeholder Needs Assessment and Gap Analysis
- MUREP Program-Level Outcome Assessment Pilot

In-Progress Evidence-Building Activities
- Internship Process Evaluation
- Internships Retrospective Evaluation
- MUREP Program-Level Outcome Assessment
- Space Grant Program-Level Evaluation
- K-12 Student Outcome Assessment
- Evidence-Based Program Design Framework

Learning Question 1
How can NASA STEM Engagement develop cross-project metrics that support internal and external contributions to STEM Engagement goals and objectives?

Learning Question 2
How do NASA Internships broadened participation of underrepresented and underserved students to advance equity and build a diverse future STEM workforce?

Learning Question 3
How can NASA attract K-12 students, especially those underrepresented and underserved, to STEM?
MUREP Outcome Evaluation

**FY 2020**

**Phase I Program-Level Evaluation Study**
- Focus was on **Efficiency and Effectiveness** of MUREP Management & Operations, **Achieving NASA STEM Engagement & MUREP Priorities, Goals, & Objectives**, Identify **Promising Practices & Challenges, Sustainability & Partnerships**
- Help prioritize MUREP investments, share promising practices, influence activity design, and improve sustainability and lower barriers to entry
- Included 10 Activities.

**Literature Review & Benchmarking Study: Solicitations**

**FY 2021**

**Phase II Program-Level Evaluation Study**
- Focus was on **Student Engagement, Partnerships, & Competitiveness**
- Help prioritize MUREP investments, share promising practices, influence activity design, and improve sustainability and lower barriers to entry
- Included 11 Activities
- **Create a Theory of Action and Logic Model.**

**FY 2022**

**MUREP Outcome Assessment Framework**
- **Development of outcome assessment strategy**
- Provide tools and evidence that that can be used to better understand what achievements are being realized by MUREP investments, and
- Prioritize MUREP investments

**FY 2023**

**MUREP Outcome Assessment Study**
- **Execute Strategy**
- Assess MUREP outcomes: **Student Engagement & Strategic Partnerships**
OUTCOME ASSESSMENT FRAMEWORK

How and to what extent are MUREP Funded Activities:
- recruiting student participants?
- retaining student participants?
- supporting student conversion to the STEM workforce?

Has participating in a MUREP Funded Activity enhanced student:
- STEM identity?
- sense of belonging?

How and to what extent are strategic partnerships helping to:
- broaden participation of students from historically underrepresented and underserved communities?
- increase the STEM workforce?

How and to what extent are strategic partnerships helping to:
- broaden participation of Minority Serving Institutions?
- increase the STEM workforce?

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MSI Awardees
- Student Data
- Focus Group Data
- Partnership Data
- Activity Implementation Data

MUREP
- Partnership Data
- Gateway Data

Students
- Survey Data
- Focus Group Data
- Recruitment Data
- Retention Data

MSI direct support for URM STEM Success
- Advance Equity & Build A Diverse Future STEM Workforce
- Increased Diverse STEM Workforce
- Strengthening Partnerships

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stem.nasa.gov
FY23 MUREP Solicitations
FY23 Snapshot

New MUREP Solicitations

MUREP Data Science, Equity, Access and Priority in Research (DEAP) - February 2023
~$500k per award / 3-Year POP
8 Awards
8 HBCUs

MUREP Precollege Summer Institute (MUREP PSI) - March 2023
~$65k per award / 3-Year POP
8 Awards
8 HBCUs / PBIs

MUREP Women's Colleges and Universities (WCU) - June 2023
~$250k per award / 3- 5-Year POP
7 Awards
1 HSI / 6 WCUs
Forthcoming MUREP Solicitations

MUREP Curriculum Awards (MCA) - Tentative July 2023
-~$400k per award / 3-Year POP
-~4-6 Awards

MUREP Space Technology Artemis Research (MSTAR) – Tentative July 2023
-$300k per award / 3-Year POP
-~10 awards

MUREP Partnerships Learning Annual Notification (MPLAN) – Tentative July 2023
-$50K per award / 6-Month POP
-~18 Awards
MUREP Obligations to MSIs (FY21 – FY23)

FY21
Total: $24M

FY22
Total: $21M

FY23
Total: $20M *

*Preliminary data includes continuing awards; does not include pending awards.
FY23 Geographical Distribution of MUREP Awards

124 Awards
78 MSIs
29 States/Territories

**Data includes no cost extensions, new, and continuing awards**
Improving Dissemination Efforts to Reach MSIs
The MSI Exchange is a public website and searchable database, to present capabilities found at HBCUs / MSIs that are relevant to NASA’s Mission. NASA, other federal agencies, industry and academia can search STEM profiles and capability statements to identify Institutions for partnership opportunities.

19 Technical Assistance Workshops
126 Searchable Capability Statements
33 States & Territories

**Data reflects FY22 results**
By the end of fiscal year 2022, approximately 1,900 representatives from 490 MSIs subscribed to receive MUREP’s bi-weekly MSI Engagement Newsletter for NASA opportunities.
MUREP Partnerships and Sustainability
MUREP Leveraging Partnerships to Drive Participation

Goal - Create and leverage internal and external strategic partnerships that build capacity at MSIs

White House Initiatives:

White House Initiative on Advancing Educational Equity, Excellence, and Economic Opportunity for Hispanics

White House Initiative on Advancing Educational Equity, Excellence, and Economic Opportunity through Historically Black Colleges and Universities

Key Partners

Internal:

NASA Mission Directorates:
- Aeronautics Research
- Exploration Systems Development
- Science
- Space Operations
- Space Technology

Mission Support Offices:

Federal Agencies:

Minority Conference Organizations:

stem.nasa.gov
NASA HBCU / MSI Technology Infusion Road Tour

MUREP hosted the HBCU / MSI Technology Infusion Road Tour, a semi-annual hybrid event in partnership with NASA’s Office of Procurement, Office of Small Business Programs, and the Small Business Innovation Research and Small Business Technology Transfer (SBIR / STTR) program.

126 HBCUs / MSIs
23 States & Territories

Campus Hosts:

University of Chicago Illinois, April 2022
Texas Southern University, September 2022
University of Central Florida, April 2023
Clark Atlanta University, October 2023
MUREP Partnerships Learning Annual Notification (MPLAN)

A new way for MSIs to collaborate with NASA
Targeted Efforts for HBCUs and PBIs
Advancing NASA’s Goal to Increase Funding to HBCUs - EO 14041

NASA has established strategic goals and metrics in support of White House Executive Order 14041 to increase the capacity of HBCUs to compete effectively for funding and increase their participation in programs and initiatives that contribute substantially to NASA’s mission and national priorities.

**Goal 1:** Increase the capacity of HBCUs to compete for and receive NASA funding and other financial resources.

**Goal 2:** Increase the amount of funds awarded to HBCUs through competitive grants, contracts, and cooperative agreements.

**Goal 3:** Increase the recruitment/applicant pool of HBCU students and graduates for STEM engagement & future workforce opportunities.

**Goal 4:** Increase the representation/selection of HBCU students in NASA-sponsored programs.
NASA Awards $11.7M to 8 HBCUs – February 2023

MUREP DEAP
Data Science, Equity, Access and Priority in Research and Education

Established to enable HBCU students and faculty to conduct innovative data science research that contributes to NASA’s missions.
NASA Awards $3.4M to 7 HBCUs & 1 PBI – March 2023

MUREP PSI
Precollege Summer Institute

Established to enhance high school students’ precollege performance and help them achieve success in higher education pursuits and STEM careers
Central Intercollegiate Athletic Association (CIAA)

**STEM + PUBLIC ENGAGEMENT / Over 15 Years**

High School Education Day

NASA "Color of Space" Documentary Screening

Career Fair

Fan Fest Public Engagement

NASA showcase at CIAA games
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• Summary of Partnership Efforts
• Recent Partnerships
  • Types of Engagements
• Trends in Support Requests and New Opportunities
• US Dept of ED: Initial Engagement
CONNECTION TO THE AGENCY PORTFOLIO

NASA Support Structures (STEM Engagement)

**Grants and Cooperative Agreements**
- NASA Defines Requirements and Provides financial support
  - Space Grant
  - EPSCOR
  - MUREP
  - TEAMS II

**Networks and Alliances**
- NASA led support structure to share mission content and direct services to institutions or educators.
  - Museum and Informal Education Alliance
  - Astro-camp
  - CONNECTS
  - SPARX

**Partnerships**
- NASA and External organizations collaborate on mutually beneficial goals.
  - Level of effort is substantial enough that a formal agreement is generally necessary.
  - No NASA funding is provided.
Goals and Priorities

Goals
• Engage students across the United States in opportunities connected to NASA missions, themes or and Programs
• Bolster external efforts that contribute to federal STEM goals
• Broaden participation of students from groups traditionally underrepresented and underserved in STEM and STEM careers

Typical Supports
• NASA mission data
• NASA Imagery and Video
• Access to Subject matter expertise in scientific and technical disciplines
• NASA consultation on technical content review and career pathways
• Access to subject matter expertise in NASA STEM education and related disciplines

STEM Engagement Committee Content Priorities
• Artemis I
• James Webb
• K-12 Engagement
## FY2022-23: Strategic Partnerships

### Engagement with 121 Organizations

#### Key Numbers

- **23** Active Enterprise OSTEM Non-Reimbursable Space Act Agreements
- **17** Artemis I Themed Opportunities development in collaboration with partners
- **7M+** Digital engagements (Content Downloads, Education Multi-Media Uses and Virtual Event Participants)*

#### Example Collaborators

*FY 22 Metrics Provided by Partners or available through Public Sources

*U.S. Department of Education
Guiding Documents:
- Agency Partnership Handbook
- STEM Engagement Partnerships Practical Guide STEM
- Engagement Partnership Best Practices
- Open Partnership Call
- STEM Engagement Partnership Rubric

Partnership Review Process (STEM Engagement)

- Statement of Interest Received
- Score Against Rubric
- Initial Recommendation Shared with OSTEM Leadership
- Discuss in SE Working Group
- PAM Routing Process (included impact offices)
Office of STEM Engagement releases on open call for partnerships. This document is updated annually based upon feedback from the SEC and OGC.

- Goals
- Priorities
- Supports Available
- Selection Process and Criteria
- Format for Statement of Interest Submission
- Timeline
- Shell Agreement

### Selection Criteria (Top Level)

<table>
<thead>
<tr>
<th>Criteria</th>
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<tbody>
<tr>
<td>Alignment to Goals</td>
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<tr>
<td>Benefit to NASA and Partner</td>
</tr>
<tr>
<td>Target Audience</td>
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<tr>
<td>Diversity and Inclusion Plan</td>
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<tr>
<td>Intended Outcomes</td>
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<tr>
<td>Anticipated Return on Non-Financial Investment</td>
</tr>
<tr>
<td>Timeline</td>
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</tbody>
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[https://www.nasa.gov/stem/partnerships/index.html](https://www.nasa.gov/stem/partnerships/index.html)
### Typical Use Case of NASA Support

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position NASA resources within partner networks and platforms</td>
<td>29%</td>
</tr>
<tr>
<td>Modify NASA resources or use them as inspiration for new products</td>
<td>29%</td>
</tr>
<tr>
<td>Collaborate around common themes or events</td>
<td>42%</td>
</tr>
</tbody>
</table>
## Summary of Product/Activity Audience

<table>
<thead>
<tr>
<th>Product or opportunities delivered directly to students</th>
<th>Materials or resources for educators to use both in and out of classrooms</th>
<th>Opportunities for families, parents, or caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>27%</td>
<td>56%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Example Projects

- Code.org
- Flip
- Discovery Education
- LabXchange
- Million Girls Moonshot
- Charles Stewart Mott/Mizzen
- AT&T Achievery
- STEM Connector

Hour of Code

- Code.org
- Flip
- Discovery Education
- LabXchange
- Million Girls Moonshot
- Charles Stewart Mott/Mizzen
- AT&T Achievery
- STEM Connector

95K Resource Engagements

Discovery Education

1.1M+ Product Engagements in last 10 months
Modify NASA Resources or Use them as Inspiration for New Products

Example Projects
- AIA
- Crayola Education
- Frito-Lay
- LEGO Education
- Peanuts Worldwide
- Pear Deck
- Google (Applied Digital Skills)

Crayola Education
3.5M Students Registered

Frito Lay (Back to School)
Displays in 250K US Stores
Collaborate around Common Themes or Events

Example Projects
- Minecraft Edu
- AIAA
- Amazon Future Engineers
- Challenger Learning Centers
- Discover Engineering
- Microsoft
- Girl Scouts USA
- Google (Arts and Culture)
- Learn Fresh
- Disney
- US Forest Service

Minecraft Edu
Millions of Downloads in Commercial and Education Version

AIAA/Students to Launch
Enables participation of hundreds of students from under resourced communities in launches

Google
Huge Popularity in use of 3D Models and imagery, videos and articles

NOGGIN
2M+ Views in Space Explorers YouTube Channel
Updates on New Supports Tied to Common Trends

STEM+: DATA SCIENCE AND DATA LITERACY

INTERNSHIPS

CAREER PATHWAYS AND ROLE MODEL EXAMPLES
Updates on New Supports Tied to Common Trends

- Including Data Sets as New Product Category in NASA Online Search/Materials Repository
- Created 6 Earth Science Data Sets and supporting data sheets (Cleaned and Original Versions) for use in K-12 Settings (Release in August)

- Developing Internal Guidance for Centers, Missions and Mentors on Process to Engage Partners in Student Identification and Selection

- Completed First Season of Surprisingly STEM a video career series for K-12 Audiences
  - Will launch Season 2 in the Fall and include opportunities for live interaction with featured SMEs as part of support structure
US Dept of Education MOU

MOU Highlights
• White House Space Priorities
• You Belong in STEM Campaign
• Earth System Research
• Inspiration Through Missions

Priority Points
• Strengthen coordination around strategies, plans and communications
• Expand Access to Research, Internships, etc
• Support STEM Ecosystem Effort
• Increase Teaching Capacity
• Diversity and Inclusion Efforts
• Career and Technical Education
• Broad Based Student Engagement
## US Dept of Education Projects

### Active Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career and Technical Education</td>
<td>• CTE Momentum Your Place in Space Challenge (Released in April 2023)</td>
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<tr>
<td></td>
<td>• Middle School Space Accelerator (Summer and Fall 2023)</td>
</tr>
<tr>
<td>TRIO/Upward Bound</td>
<td>• Coordination of Grant Opportunities with MUREP Precollege Summer Institute (8 Multi-Year Awards Announced in March 2023 with UB/UBMS Programs)</td>
</tr>
<tr>
<td>21st Century Community Learning Centers</td>
<td>• Multi-Year Collaboration for Afterschool STEM Challenges and Support (Launches in Fall 2023)</td>
</tr>
<tr>
<td>Communications Coordination</td>
<td>• Collaboration on Artemis Crew II Announcement (April 2023)</td>
</tr>
<tr>
<td></td>
<td>• Planning for Back-to-School Campaign (Summer/Fall 2023)</td>
</tr>
<tr>
<td>You Belong in STEM</td>
<td>• NASA support and alignment for next steps in campaign</td>
</tr>
</tbody>
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Science Webinar Series

Collaborative Webinar Series for Partners
- Developed with SMD and OCOMM
- Upcoming Topics
  - Eclipse (July)
  - Asteroid Autumn (August)
  - James Webb (December)
  - Eclipse Update (February)

Eclipse Agenda
- Eclipse Overview and Safety
- Connections to NASA Mission and Key Messages
- NASA Engagement Plans
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• What noteworthy partnerships between federal agencies and organizations have you seen recently?

• What additional national scale organizations share similar goals and values with NASA and warrant further investigation for non-funded collaboration?
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