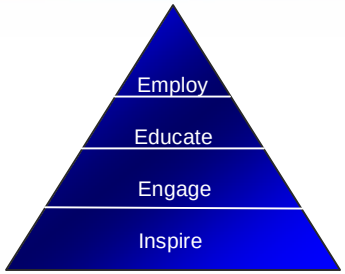
National Aeronautics and Space Administration

NASA Education

Strategies for Engaging Underrepresented Students



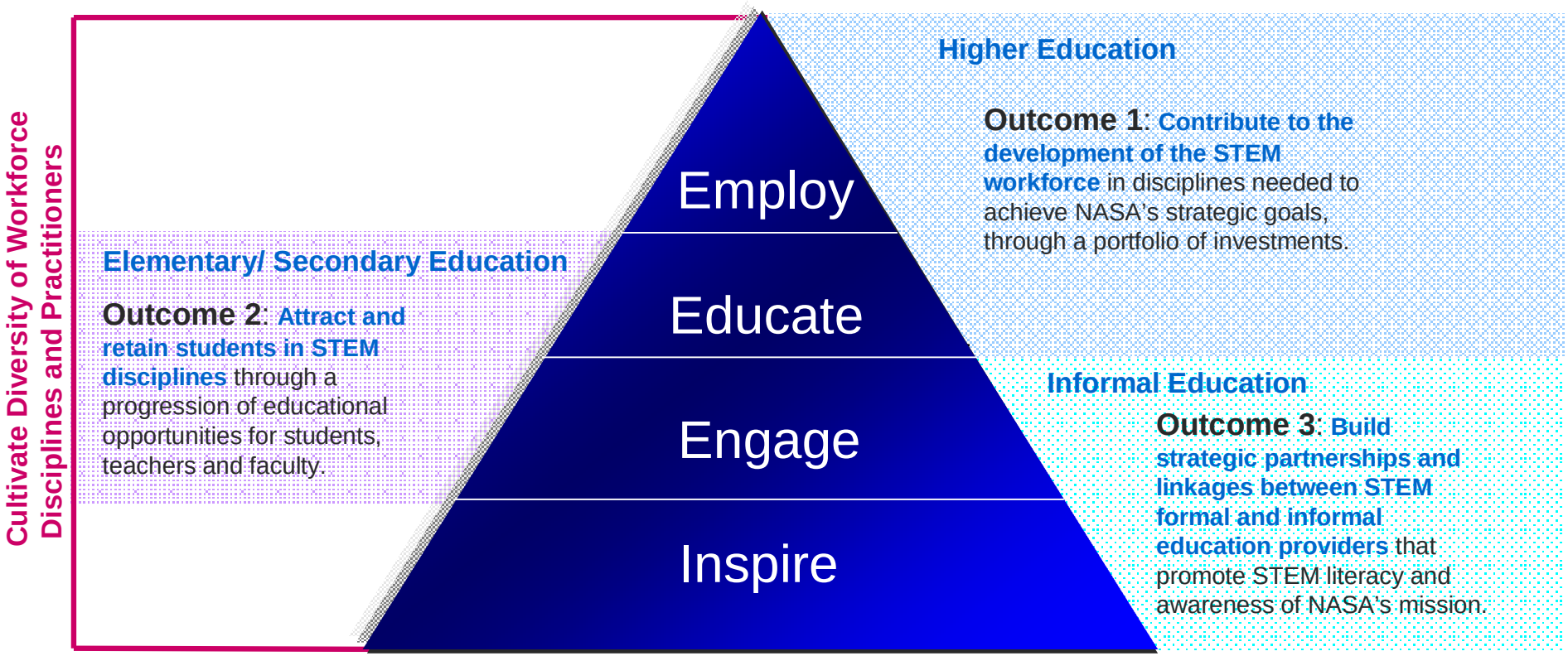
National Academies Committee on Underrepresented Groups and the Science and Engineering Pipeline

March 10, 2008

Carl Person, Ed.D.

Manager, Minority University Research and Education Program

The Education Portfolio Strategic Framework



Principles/ Criteria

Relevance	NASA Content	Diversity	Evaluation	Continuity	Partnerships/ Sustainability

* Science, Technology, Engineering and Mathematics (STEM)

Our Priorities

- ***Continuing the Tradition***
- ***Maintaining Commitment to excellence in STEM Education***

- ***In 2008 and beyond, NASA will continue to pursue three major education goals aligned with the Strategic Plan:***
  - *Strengthen NASA and the Nation's future workforce.*
  - *Attract and retain students in STEM disciplines.*
  - *Engage Americans in NASA's mission.*

NASA Explorer Schools

- Three-year partnership between NASA and grades 4 - 9 school teams from diverse communities across the country, focusing on underserved populations.

• Uses NASA mission content as a context for teacher professional development and to help address school improvement goals in Science, Technology, Engineering and Mathematics (STEM)

• Provides schools with $17,500 in grants for technology tools

• Works to add relevance to school STEM curriculum by providing unprecedented access to NASA research, people and technologies

NASA Explorer Schools

Approach to Service

- Each school develops a customized action plan
- Project supports schools efforts through teacher training, student opportunities, technology integration and family involvement

Participation Numbers

Total School Partnerships: 200

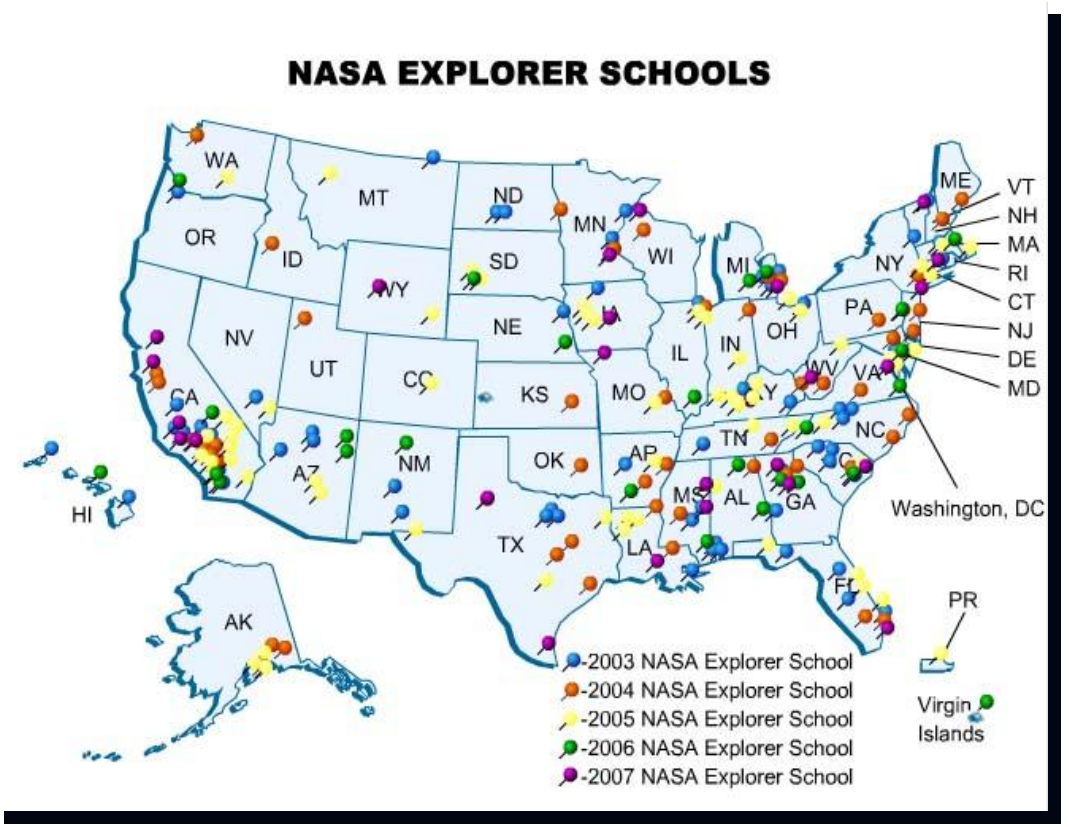
Total Students Served: 153,840

Total Educators Served: 7,955

Demographics

Percent of High Poverty Schools: 87

Percent of Schools with Greater then 50% minority population: 77



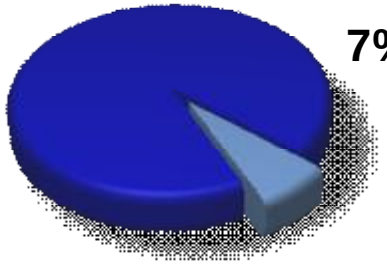
NASA's Science, Engineering, Mathematics & Aerospace Academy (SEMAA)

- NASA SEMAA is an innovative, national project designed to increase the participation and retention of historically underserved and underrepresented K-12 youth in the areas of Science, Technology, Engineering, and Mathematics (STEM).
- NASA SEMAA is currently located at 14 sites located throughout 11 states and the District of Columbia. SEMAA site locations include community colleges, four-year colleges and universities, HBCUs, HSIs, TCUs, elementary and secondary schools, science centers and museums.

Total US Population

24% *African Americans, Hispanics, Native Americans, and persons with disabilities*

US Science & Engineering Workforce



7% *African Americans, Hispanics, Native Americans, and persons with disabilities*

**National Science Board. Science and Engineering Indicators, 2000.*

Science, Engineering, Mathematics & Aerospace Academy

Project Overview

GOALS

- **Inspire** a more diverse student population to pursue careers in STEM related fields.
- **Engage** students, parents and teachers by incorporating emerging technologies.
- **Educate** students by utilizing rigorous STEM curriculum enhancement activities that meet national math, science and technology standards, and encompass the research and technology of NASA's four Mission Directorates.

SEMAA COMPONENTS

- **Hands-on/Minds-on K-12 Curriculum Enhancement Activities (CEA)**
- **Aerospace Education Laboratory (AEL)**
- **Family Café**

2007 SEMAA STATISTICS

- **64,296 students, parents and teachers served (***17773 Direct Students Participants 5393 Direct Parent Participants 41130 Outreach***)**
- **2,081 elementary, middle and high schools represented**

*2007 SEMAA DEMOGRAPHICS

- **86% represent ethic groups historically underrepresented in STEM**
- **49% female participation**
- **53% lived at or below poverty level**
- **495 with special needs**

**Direct Student Participants*

Science, Engineering, Mathematics & Aerospace Academy

FY-2007 Project Highlights

• HARVARD RECOGNIZES NASA SEMAA AS TOP GOVERNMENT INNOVATOR
SEMAA was recognized as one of the top 18 innovative government programs in the 2007 Innovations in American Government Award competition. SEMAA also received a Congressional Record sponsored by Congresswoman Carolyn Kilpatrick recognizing SEMAA's contribution to America's youth.


Congressional Record

House of Representatives

HONORING THE NASA SCIENCE, ENGINEERING, MATHEMATICS AND AEROSPACE ACADEMY (SEMAA)

• STRENGTHENING THE NATIONAL STEM PIPELINE
Fostered the participation of NASA SEMAA students in 50+ other STEM programs/projects, thus maximizing student exposure and interest in STEM and strengthening the national K-12 STEM pipeline.

• INCREASING K-12 STUDENT EXPOSURE & INTEREST IN STEM
Increased 3rd-12th grade exposure by 36 classroom hours annually, and K-2 by 27 classroom hours annually.
Science – 33% increased interest
Technology - 30% increased interest
Engineering – 40% increased interest
Mathematics – 30% increased interest

• BUILDING PROJECT SUSTAINABILITY
Collaborated with a network of 200+ partners. Leveraged an annual record number $3.8 Million in sustaining funds for SEMAA, representing over a 100% match to the total project budget provided by NASA.

Motivating Undergraduates in Science and Technology

MUST - Overview

- **Managed via a cooperative agreement with the MUST Consortium (the Hispanic College Fund (HCF), the United Negro College Fund Special Programs (UNCFSP) and the Society for Hispanic Professional Engineers (SHPE));**
- **The MUST Program supports 100 undergraduate students pursuing degrees in STEM with a one-year competitive scholarship of up to one-half of tuition, not to exceed $10,000 and $5,000 stipend to participate in a summer research experience at a NASA facility; May be renewed up to 3 years.**
- **Enriches scholar education through the MUST Professional Academic Support System (MUST PASS), an academic enrichment, mentoring, and career development system; and**
- **Project implementation enhanced by the NASA Inter-Center Coordinating Committee. This committee assists with scholar selection, internship placement, development of summer enrichment activities in association with internship assignments; and ensures that programmatic guidelines are understood and adhered to by program participants and stakeholders.**

Motivating Undergraduates in Science and Technology

Cohort 1: 2006-2007 Scholar Demographics

GENDER
52 Male
48 Female

CLASSIFICATION
22 Freshman
31 Sophomore
47 Juniors

ETHNICITY
34 African American
8 Caucasian
55 Hispanic
1 Asian
1 Pacific Islander
1 Native American

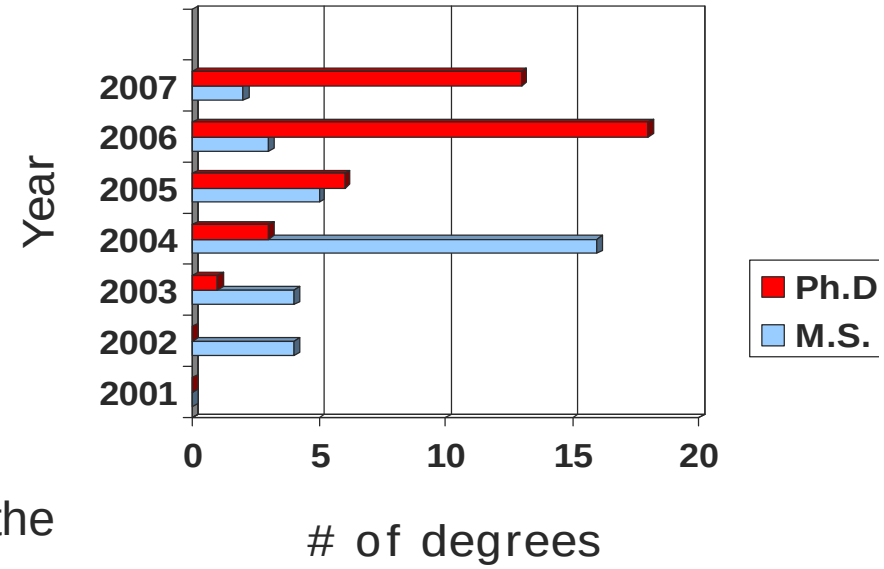
MINORITY SCHOOLS REPRESENTED
10 at HBCUs
16 at HSIs
0 at TCUs

DISABILITIES
1 student

Harriett G. Jenkins Pre-doctoral Fellowship Project

Outcomes

- 131 scholars funded since 2001
- 17% of the JPFP Fellows matriculate at Minority Institutions (MIs).
- The JPFP has established linkages with other NASA Office of Education Programs, including NPP
- 59 JPFP graduates as of March 2008
- All JPFP graduates employed in STEM aerospace industries
- 11 (18%) JPFP Alumni employed with NASA



Graduate Degrees

- 43 Ph.D. and 34 M.S. recipients to date
- To date, 59 JPFP Graduates have entered the STEM workforce.
- By the year 2010, the JPFP will contribute 50 Ph.D. to the NASA pipeline and STEM workforce.

University Research Centers

- Multidisciplinary research units performing scientific and/or engineering research in support of NASA's Mission Directorates.
- Established at Minority Institutions (MIs) to expand the nation's base for aerospace research and development; increase participation by faculty and students in the research programs of NASA's Mission Directorates; and increase the number of underrepresented and underserved students at MIs who obtain advanced degrees in NASA-related fields.

URC Participants

Norfolk State University
Morgan State University
Texas Southern University
Southern University
UPR at Rio Piedras
CA State University at Los Angeles
Tennessee State University
UPR at Mayaquez
University of TX at El Paso
Fisk University
Florida A&M University
Clark Atlanta University
Tuskegee University
Hampton University
City University of New York
University of TX at Brownsville
Alabama A&M University
Prairie View A&M University
Morehouse School of Medicine
Howard University
North Carolina A&T State University

University Research Centers

Awards are for 5 years, not to exceed $1.2 million per year

Annually 25% of the funding or $300,000 must be used as direct support to students

Examples of URC research**:**

- **Morehouse School of Medicine - Space Medicine**
- **University of TX at Brownsville - Gravitational Wave Astronomy**
- **Prairie View A&M University - Applied Radiation Research**
- **University of Puerto Rico at Rio Piedras - Nanoscale Materials**
- **Tuskegee University - Food and Environmental Systems for Human Exploration of Space**

Accomplishments for 2003 - 2005

•Total Undergraduate Students Participants = 1086 - STEM Degree Recipients = 204

•Total Master's Students Participants = 571 - STEM Degree Recipients =167

•Total Doctoral Students Participants = 268 - STEM Degree Recipients = 28

•Number of patents = 12

•Number of refereed publications = 1315 - Student Authors - 775

Project ACCESS

Achieving Competence in Computing, Engineering and Space Science

Overview

- Responds to Objective 1.2 – *Provide NASA competency-building education and research opportunities to individuals to develop qualified undergraduate and graduate students who are prepared for employment in STEM disciplines at NASA, industry, and higher education.*
- Managed by American Association for the Advancement of Science
- Summer internship program for students with disabilities
- Exposure program and a gateway to co-ops and other NASA programs, leading to permanent positions
- Students major in NASA-relevant STEM disciplines

Project ACCESS

Significant Outcomes

- 72 of 199 are minority students
- 241 placements made since 1996
- 199 students; 42 have completed multiple internships
- 20 ACCESS alumni hired or accepted co-op positions with NASA
- 50 alumni have pursued graduate degrees
- 100 alumni are working in STEM fields

Toya Barros
PHYS/Aero Eng., Spelman College
intern at NASA LaRC
Hired at Patuxent River Naval Air Base

Chris Lamoreaux
Physics, Tufts University
Intern at NASA JSC
Hired at JSC

Federal Career Intern Program Notices

The Federal Career Intern Program (FCIP) Notices for NASA Education Program participants.

Students who have participated in NASA education programs (internships, scholarships, fellowships, competitions, flight projects, etc.) between 2006 and 2008 are eligible to apply for the following potential job openings.

NA08N0002 - Professional Engineering Positions
http://jobsearch.usajobs.gov/ftva.asp?opmcontrol=1101145

NA08N0003 - Physical Sciences/Biological Sciences
http://jobsearch.usajobs.gov/ftva.asp?opmcontrol=1101137

NA08N0004 - Accounting and Budget/Business and Industry/Organizational Administration/Human Resources
http://jobsearch.usajobs.gov/ftva.asp?opmcontrol=1101194

NA08N0005 - Computer Engineer/Computer Scientist
http://jobsearch.usajobs.gov/ftva.asp?opmcontrol=1101254