

**MEMORANDUM OF UNDERSTANDING**  
**FOR**  
**SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM)**  
**EDUCATION COOPERATION**

**between the**  
**NATIONAL SCIENCE FOUNDATION (NSF)**  
**and the**  
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)**

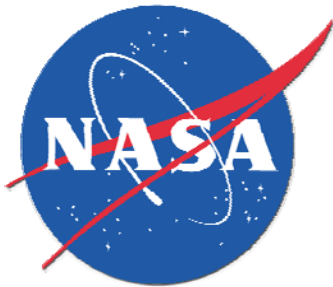
**Signed February 22, 2007**

**By**

**Cora B. Marrett**  
**Assistant Director**  
**Directorate for Education and Human Resources**  
**National Science Foundation**

**and**

**Joyce L. Winterton**  
**Assistant Administrator for Education**  
**National Aeronautics and Space Administration**



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**I. AUTHORITIES**

NASA enters into this MOU pursuant to Section 203 (c)(5) and (c)(6) of the National Aeronautics and Space Act of 1958, as amended, 42 U.S.C. § 2473 (c)(5) and (c)(6).

NSF enters into this MOU pursuant to the National Science Foundation Act of 1950 (as amended 42 U.S.C. 1861 et Seq.).

**II. PURPOSE**

The purpose of this Memorandum of Understanding (MOU) is to facilitate a collaborative partnership between NASA and NSF (“the Agencies”) that advances the scientific and technological capabilities of the Nation. It is imperative to coordinate the education efforts of these Agencies to promote a comprehensive knowledge base for addressing national challenges and to manage resources efficiently. Building on individual agency strengths and competencies, collaborative partnerships extend and strengthen the work of the Agencies to ensure future generations have a bright future.

**III. BACKGROUND/GOALS/OBJECTIVES**

**a. Background**

NASA has primary responsibility for advancing U.S. scientific, security, and economic interests through robust space exploration and aeronautics research programs. NASA’s mission to understand and explore depends upon educated, motivated people, and as such has a strong interest in inspiring and motivating students to pursue careers in science, technology, engineering, and mathematics. With its ability to capture the imagination of educators, students, and the general public, NASA has a unique capacity to help revitalize science, technology, engineering, and mathematics (STEM) education in America. This will contribute to the continued availability of trained scientists, technologists, engineers, and educators to meet the Nation's technical workforce needs in the 21st century.

NSF plays a critical role in supporting fundamental research, education and infrastructure at colleges, universities, and other institutions throughout the country, and is the principal federal agency charged with promoting science and engineering education at all levels and in all settings, from pre-kindergarten through career development. Leadership in today's knowledge economy requires world-class scientists and engineers and a national workforce that is scientifically, technically and mathematically strong. As such, the development of a diverse, competitive, and globally engaged U.S. workforce of scientists, engineers, technologists and well-prepared citizens is a primary goal for the Foundation. Embedded in all NSF programs are efforts to build a more inclusive, knowledgeable, and globally engaged workforce that fully reflects the strength of the Nation's diverse population. This helps ensure that the United States has world-class scientists, mathematicians and engineers, and well-prepared citizens.

The Administration's American Competitiveness Initiative (ACI) has as its cornerstone a commitment to increase investments in the physical sciences and engineering, along with a commitment to strengthen K-12 math and science education, and to build a well-educated and skilled workforce. The missions of NASA and NSF are closely aligned to these commitments. Through this MOU, NASA and NSF will partner with each other to work toward achieving the goals of the ACI.

b. Agencies' Overarching Goals

- 1) Improve effectiveness by jointly supporting exemplary projects that advance STEM excellence and increase STEM proficient workforce.
- 2) Improve the national knowledge base regarding scientific literacy, human and social capital, workforce development, infrastructure and competitiveness, and innovation.
- 3) Contribute to the production of scientific workforce to meet national needs, reflecting the diversity of the U.S. population and its changing demographics.

c. Agency Goals and Objectives

1) NSF

The National Science Foundation Act of 1950 authorizes and directs NSF to initiate and support:

- Basic scientific research and research fundamental to the engineering process,
- Programs to strengthen scientific and engineering research potential,
- Science and engineering education programs at all levels and in all fields of science and engineering, and
- An information base on science and engineering appropriate for development of national and international policy.

Over time, the following additional responsibilities were added to the agency's mission: (1) foster the interchange of scientific and engineering information nationally and internationally; (2) support the development of computer and other methodologies; (3) maintain facilities in the Antarctic and promote the U.S. presence through research conducted there; and (4) address issues of equal opportunity in science and engineering.

NSF investments are guided by the following strategic goals:

**DISCOVERY GOAL** – FOSTER RESEARCH THAT WILL ADVANCE THE FRONTIERS OF KNOWLEDGE, EMPHASIZING AREAS OF GREATEST OPPORTUNITY AND POTENTIAL BENEFIT AND ESTABLISHING THE NATION AS A GLOBAL LEADER IN FUNDAMENTAL AND TRANSFORMATIONAL SCIENCE AND ENGINEERING.

**LEARNING GOAL** – CULTIVATE A WORLD-CLASS, BROADLY INCLUSIVE SCIENCE AND ENGINEERING WORKFORCE, AND EXPAND THE SCIENTIFIC LITERACY OF ALL CITIZENS.

**RESEARCH INFRASTRUCTURE GOAL** – BUILD THE NATION'S RESEARCH CAPABILITY THROUGH CRITICAL INVESTMENTS IN ADVANCED INSTRUMENTATION, FACILITIES, CYBERINFRASTRUCTURE AND EXPERIMENTAL TOOLS.

**STEWARDSHIP GOAL** – SUPPORT EXCELLENCE IN SCIENCE AND ENGINEERING RESEARCH AND EDUCATION THROUGH A CAPABLE AND RESPONSIVE ORGANIZATION.

NSF's Directorate for Education and Human Resources (EHR) supports activities that strengthen U.S. education at all levels and help ensure continued U.S. economic and research preeminence. The EHR portfolio focuses on four goals:

- Prepare the next generation of science and engineering (S&E) professionals and attract and retain more Americans in S&E careers.
- Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in S&E education and will integrate research and education.
- Broaden participation (individuals, geographic regions, types of institutions, S&E disciplines) and close gaps in all S&E fields.
- Increase the technological, scientific, and quantitative literacy of all Americans so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.

## 2) NASA

For nearly 50 years, NASA's journeys into air and space have deepened humankind's understanding of the universe, advanced technology breakthroughs, enhanced air travel safety and security, and expanded the frontiers of scientific research. These accomplishments share a common genesis: education. NASA will continue the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will manage and lead the Nation's laboratories and research centers of tomorrow.

In 2006 and beyond, NASA will continue to pursue three major education goals:

- **Strengthen NASA and the Nation's future workforce**—NASA will identify and develop the critical skills and capabilities needed to achieve the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics (STEM) workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- **Attract and retain students in STEM disciplines**—To compete effectively for the minds, imaginations, and career ambitions of America's young people, NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines critical to NASA's future engineering, scientific, and technical missions.
- **Engage Americans in NASA's Mission**—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive, education activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase American's science and technology literacy.

As the United States begins the second century of flight, the Nation must maintain its commitment to excellence in science, technology, engineering, and mathematics (STEM) education to ensure that the next generation of Americans can accept the full measure of their roles and responsibilities in shaping the future.

#### IV. ROLES & RESPONSIBILITIES

Each Agency agrees to conduct its respective activities in a coordinated and mutually beneficial manner.

NSF (EHR) agrees to:

1. Provide support to attract and prepare U.S. students for S&E careers, including strengthening partnerships between K-12 and higher education through the engagement of disciplinary faculty and graduate students in K-12 activities.
2. Support research on the development of the effective S&E instructional materials and technological tools/applications as well as promising practices in teacher preparation and professional development.
3. Expand the Nation's S&E talent, addressing federal workforce needs for cyber security specialists, fostering the S&E education capacity at minority-serving institutions, and promoting the participation and advancement of women, minority students, and persons with disabilities in the S&E enterprise.
4. Emphasize the use of evaluation and research to inform improvements in educational practice and to generate knowledge to advance the S&E educational agenda.

NASA agrees to:

1. Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals, through a portfolio of investments.
2. Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.
3. Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.

Under the Memorandum, NASA and NSF agree to establish a working group to develop and coordinate activities that will address, but not necessarily be limited to, the following objectives:

##### *1. Synergistic Collaboration*

- Identification, discussion, and recommendation of common strategies and relative agency roles for major science, mathematics, engineering, and technology education initiatives. Of particular relevance are American Competitiveness Initiative (ACI) and creation of a science education panel.
- Joint participation in strategic planning and the design of projects that advance STEM education.
- Develop coordinated strategies in areas where the agencies have mutual investments to ensure education reform.

## 2. *Focal Areas*

- Review new and existing programs to identify opportunities for collaboration in instances where programs directly complement or supplement one another. Program collaboration will be designed in a manner that capitalizes on the relative strengths and expertise of each agency and reflects agency missions.
- Project Evaluation & Program Reviews: NASA and NSF have engaged in mutually productive, collaborative evaluation activities in the past. These activities were enabled through a letter of understanding, dated July 14, 1995. Through this MOU, the agencies will continue to work together to coordinate activities, share information about successful evaluation approaches, and conduct joint evaluations when mutually beneficial. Potential collaborations include, (a) implementing objective, independent evaluations of specific STEM education projects; (b) conducting program reviews using NSF's Committee of Visitors model; (c) training staff in evaluation concepts and techniques; and (d) engagement of NSF's evaluation contractors, subject to a statement of requirements and funding from NASA.
- Initiation of targeted studies as deemed appropriate by the NASA Assistant Administrator for Education and the NSF Assistant Director for Education and Human Resources.

## 3. *Leveraging of Resources*

- Share resources and/or support joint efforts in the following areas: broadening participation, pre-college and postsecondary partnerships, integration of STEM research and education, and assessment of effectiveness and impacts of the S&E education investment.
- Set program priorities and allocation of resources to ensure joint alignment to achieve common goals and objectives.

## 4. *Shared Knowledge and Expertise*

- Strengthen the knowledge-base by sharing intellectual expertise:
  - Exchange information on pending legislation related to science, mathematics, engineering and technology education that potentially affects the agencies' programs. The agencies will review the legislation to identify common issues and assess impacts on their respective programs, as well as to coordinate responses.
  - Share information on legislative initiatives originating from either of the two agencies. The agencies will review legislation to identify common issues, as well as to assess impact on agency programs and the relation of proposed initiatives to agency strategies and priorities.
  - Share information on program announcements and program reports that potentially affect agency programs. The agencies will jointly review program announcements to identify common issues and strategies to maximize allocation of resources and attainment of common goals.

## 5. *Leadership Support and Accountability*

- The agencies agree to provide points of contact with the necessary program support to enable them to carry out the purposes and scope of the MOU, as specified by implementing agreements.

## V. KEY PERSONNEL POINTS OF CONTACT (POC)

The POCs and their designees will have overall day-to-day responsibility for carrying out this collaboration. Specific collaborative projects may have their own project leads appropriately drawn and supported from their Agencies. The following individuals are designated points of contact for this MOU:

NSF:	NAME	Dr. Bernice T. Anderson
	OFFICE	Directorate for Education and Human Resources
	ADDR	4201 Wilson Blvd., Arlington, VA 22230, Room 805
	PHONE (DESK)	(703) 292 – 5151 or 292- 8600
	PHONE (CELL)	
	EMAIL ADDRESS	banderso@nsf.gov
NASA:	NAME	Dr. Anngienetta R. Johnson
	OFFICE	Office of Education
	ADDR	300 E Street SW, Washington DC. 20546, Room 2J17
	PHONE (DESK)	(202) 358-4717
	PHONE (CELL)	(202) 253-1913
	EMAIL ADDR	angie.johnson@nasa.gov

## VI. ANTI-DEFICIENCY ACT & AVAILABILITY OF APPROPRIATIONS LIMITATIONS

All activities under or pursuant to this agreement are subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligations or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341.

## VII. FINANCIAL OBLIGATIONS (No exchange of Funds/covered in Implementing Arrangements/Reimbursable)

This MOU is not a funding document and does not authorize the obligations or transfer of funds. Collaborative activities under this MOU will be conducted under Implementing Arrangements to be developed as specific activities are identified.

## VIII. LIABILITY & RISK OF LOSS

The parties agree to assume liability for their own risks associated with all activities undertaken under this MOU or related Implementing Arrangements. In particular, each party shall be responsible for any liabilities associated with use of its own facilities, equipment, and people under this MOU or related Implementing Arrangements.



**IX. INTELLECTUAL PROPERTY AND DATA RIGHTS**

Unless otherwise agreed by the Agencies, data rights and right in inventions made as a consequence of, or in direct relation to, the performance of activities under this MOU by employees of an Agency or employees of an Agency's contractors or grantees will be administered according to the Agency's own standard practices. In the event that employees of the Agencies and/or employees of the Agency's contractors or grantees make an invention jointly, the Agencies shall consult and agree as to future actions toward establishment of patent protection for the invention.

**X. TERMINATION**

Either Agency may terminate this MOU at any time prior to its expiration, with or without cause, and without incurring liability or obligation to the other parties, by giving at least ninety (90) calendar days written notice to the other Agency. This MOU may be terminated immediately by mutual written agreement of the parties. The Agencies agree to review this MOU annually to determine whether it should be revised, renewed, or canceled.

**XI. TERM OF AGREEMENT AND AMENDMENT**


This MOU will be effective when signed by NASA and NSF and shall remain in effect for a 5-year term from the effective date. The MOU may be amended at any time by the mutual written consent of the Agencies.

**XII. DISPUTE PROCESS**

All differences between the Agencies concerning this MOU shall be submitted jointly for resolution to the NASA Assistant Administrator for Education and the NSF Assistant Director for Education and Human Resources, if not resolved by the key personnel officials listed above.


Signed on behalf of:

**National Science Foundation**

  
Cora B. Marrett  
Assistant Director

  
Date

**National Aeronautics and Space Administration**

  
Joyce L. Winterton  
Assistant Administrator for Education

  
Date