



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

# *Update on the Committee on Science Technology Engineering and Math Education (CoSTEM) Activities: Implications for Federal Undergraduate Research Programs*

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CoSTEM Undergraduate Interagency Working Group Co-Chair

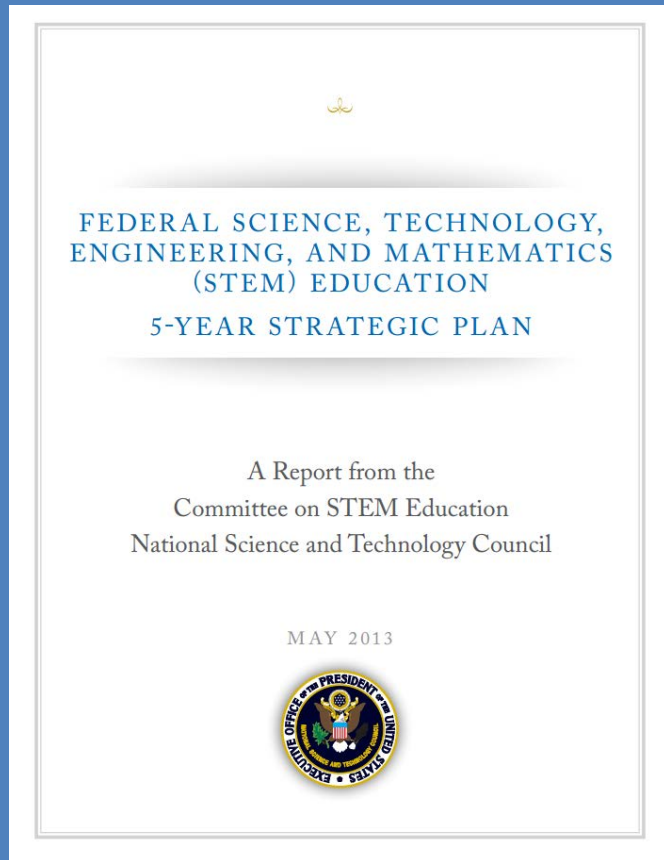
# Federal Coordination in STEM Education (FC-STEM) Interagency Working Groups: An Overview and Update

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# Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan



## *Priority Areas*

- P-12 STEM education
- Undergraduate education
- Graduate education
- Broadening participation
- Public engagement
- Coordination and evaluation



# Members of the Committee on STEM Education



*U.S. Department of Agriculture*



*U.S. Department of Commerce*



*U.S. Department of Defense*



*U.S. Department of Education*



*U.S. Department of Energy*



*U.S. Department of Health and Human Services*



*U.S. Department of Homeland Security*



*U.S. Department of the Interior*



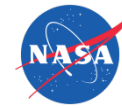
*U.S. Department of Transportation*



*Environmental Protection Agency*



*Office of Science and Technology Policy,  
Executive Office of the President*



*National Aeronautics and Space Administration*



*National Science Foundation*



*Smithsonian Institution*

*Directorate for Education and Human Resources*

# The National Science and Technology Council's Committee on STEM Education

*Formed February 2011*

## **Coordination of STEM Activities and Programs**

*Work across agencies and  
with OMB to review and  
ensure efforts are not  
duplicative*

*Develop, implement, and update a 5-year  
STEM education strategic plan (once every  
five years)*

*Report to Congress every year with the  
President's budget a description of STEM  
education programs and activities with  
levels of funding in the budget, an  
evaluation of the levels of duplication and  
fragmentation, and progress toward  
implementing the goals of the Strategic  
Plan*



# Co-STEM Organization

## Co-STEM

### Co-Chairs

OSTP: Jo Handelsman  
NSF: France Córdoba

## FC-STEM

*Federal Coordination in STEM Education (subcommittee)*

Responsible for the implementation of the 5-Year Federal STEM Education Strategic Plan  
Provides annual reports to Co-STEM

### Co-Chairs

NSF: Joan Ferrini-Mundy  
NASA: Donald James

## IWG

*Interagency Working Groups*

Meet monthly  
Work aligns with STEM Education CAP Goal  
Provides quarterly reports to FC-STEM

### *IWG: P-12 STEM Education*

Co-Leads: Department of Ed, NSF

### *IWG: Engagement*

Co-Leads: Smithsonian, NASA

### *IWG: Undergraduate Education*

Co-Leads: NSF, Department of Energy

### *IWG: Broadening Participation*

Co-Leads: NSF, NIH

### *IWG: Graduate Education*

Co-Leads: NSF, NIH

### *IWG: Coordination Objectives*

Lead: FC-STEM

## FI-STEM

*Federal Investment in STEM Education (Fast-track Action Committee)*

Purpose to design and conduct an inventory of current Federal investments in STEM education

*Through May 2013, to be re-chartered as appropriate*

*Directorate for Education and Human Resources*



# Cross Agency Priority Goal

## **STEM Education CAP Goal Statement**

*Improve science, technology, engineering, and mathematics (STEM) education by implementing the Federal STEM Education 5-Year Strategic Plan*

CAP Goal Objectives align with the five priority areas and two coordination objectives outlined in the Strategic Plan

## **Vision**

*The Federal STEM Education 5-Year Strategic Plan sets out ambitious national goals to drive Federal investment in five priority STEM education areas toward which significant progress will require improved coherence and coordination across Federal agencies with STEM assets and expertise and STEM education resources*



# CoSTEM, FC-STEM, and CAP Goal Organization Chart

## National Science Technology Council's Committee of STEM Education (CoSTEM)

Co-Chairs: France Cordera (NSF)  
and Jo Handelsman (OSTP)  
Executive Secretary: Susan Camarena (NSF/OSTP)

## Federal Coordination in STEM Education (FC-STEM) Task Force

Co-Chairs: Joan Ferrini-Mundy (NSF)  
and Donald James (NASA)  
Executive Secretary: Layne Scherer (NSF)

## Cross Agency Priority (CAP) Goal on STEM Education

Goal Co-Leads: Joan Ferrini-Mundy (NSF)  
and Jo Handelsman (OSTP)  
Deputy Goal Co-Leads: Nafeesa Owens (NSF)  
and Danielle Carnival (OSTP)

Below, the **6 FC-STEM Interagency Working Groups**,  
who report their activities quarterly to FC-STEM through the CAP Goal Report.

### IWG: P-12 STEM Instruction (CAP SubGoal 1)

Co-Leads:

- Department of Education
- NSF

### IWG: Engagement (CAP SubGoal 2)

Co-Leads:

- Smithsonian
- NASA

### IWG: Undergraduate STEM Education (CAP SubGoal 3)

Co-Leads:

- NSF
- Department of Energy

### IWG: Under represented Groups/ Broadening Participation (CAP SubGoal 4)

Co-Leads:

- NSF
- HHS (NIH)

### IWG: Graduate STEM Education (CAP SubGoal 5)

Co-Leads:

- NSF
- HHS (NIH)

### IWG: Coordination Objectives (CAP SubGoal 6 and 7)

Lead:

- FC-STEM



# *Federal STEM Education 5-Year Strategic Plan: Priorities and Strategic Objectives*

<b>P-12 Teacher Education</b>	<b>100,000 new K-12 STEM teachers by 2020 and support existing STEM teacher workforce</b>
<b>Undergraduate Education</b>	<b>Graduate 1 million additional students with degrees in STEM fields over a decade</b>
<b>Graduate Education</b>	<b>Provide basic research expertise, professional development, and specialized skills development to graduate-trained STEM professionals</b>
<b>Broadening Participation</b>	<b>Increase number of underrepresented minorities graduating in STEM and improve women's participation where they are significantly underrepresented</b>
<b>Public Engagement</b>	<b>Support a 50% increase in the number of youth who have authentic STEM experiences each year</b>
<b>Coordination Objectives</b>	<b>Build new models for leveraging assets and expertise Build and use evidence-based approaches</b>



# Strategic Objectives: Undergraduate Education

## Co-Leads: NSF and DoE

Implementation of evidence-based instructional practices and innovations

Improve STEM education at 2-year colleges and transfer to 4-year colleges

Support the development of university-industry partnerships to provide relevant and authentic experiences

Address high failure rates in introductory undergraduate mathematics



# Strategic Objectives: Graduate Education

## Co-Leads: NSF and NIH

Recognize and provide financial support to students of high potential

Provide opportunities for fellows' preparation in areas critical to the Nation

Combine and enhance mechanisms that evaluate the impact of fellowships to inform future federal investments



# Strategic Objectives: Broadening Participation

## Co-Leads: NSF and NIH

Be more responsive to rapidly changing demographics

Focus investments on developing and testing strategies for improving preparation for higher education

Invest in efforts to create campus climates that are effective in improving success for students from under-represented groups



# Strategic Objectives: Engagement

## Co-Leads: Smithsonian and NASA

Provide access to scientific and engineering assets of the federal government

Integrate STEM into school-readiness and after-school programs

Improve empirical understanding of how authentic STEM experiences influence learning or interest



# Strategic Objectives: P-12 STEM Instruction

**Co-Leads: Department of Education and NSF**

Support teacher preparation efforts that encourage use of evidence-based STEM learning opportunities

Increase and improve authentic STEM experiences for teachers



# Strategic Objective: Coordination

## Lead: FC-STEM

Build new models for leveraging assets and expertise

Build and use evidence-based approaches

Implement a concept of lead and collaborating agencies to leverage capabilities across agencies to ensure the most significant impact of Federal STEM education investments.

Conduct STEM education research and evaluation to build evidence about promising practices and program effectiveness, use across agencies, and share with the public to improve the impact of the Federal STEM education investment.



# FC-STEM Undergraduate Interagency Working Group (IWG)

## Federal STEM Education 5-year Strategic Plan: Enhance STEM Experience of Undergraduate Students

***Impact Statement: Graduate one million additional students in STEM fields over the next 10 years.***

### **Summary of Strategic Objectives:**

- Identify and broaden evidence based instructional practices and innovations
- Improve support of STEM education at 2 year colleges; create bridges between 2 and 4 year institutions
- Support development of partnerships to provide relevant authentic STEM experiences
- Address problem of excessively high failure rates in introductory math courses





# Undergraduate IWG 2015 Highlights

- Released public brief on Federal Investment in STEM Education and the goals, knowledge base, and gaps in undergraduate STEM education
- Identification of Common Indicator Metrics, such as data from the National Center for Science and Engineering Statistics, in order to measure progress of the IWG
  - Added two new items on undergraduate mathematics instruction in 2009 High School Longitudinal Survey second follow up.
  - Almost 20,000 downloads of *Reaching Students* to support widespread use of evidence-based practices
- Launched NRC studies on:
  - Course-based research
  - Indicators for undergraduate STEM education
  - Measuring intra- and interpersonal skills that enhance college success
- MSI community college event with 14 federal agencies
- First Community College Innovation Challenge



# Upcoming Undergraduate IWG Activities

- Launch searchable web-based undergraduate portal to find:
  - Federally funded opportunities for STEM undergraduate students
  - Programs supporting STEM undergraduate students
- Undergraduate STEM Symposium in late Spring
- Federal Playbook in late Spring



# NSF Staff Contributions

- Align solicitations focused on undergraduate education with the undergrad strategic objectives
  - Contribute to the knowledge-base to advance the objectives
  - Build on the resources generated by the IWG
- Spread the word about the portal and eventually the playbook (e.g., REU PIs.)
- Recommend PIs with expertise for our summit
- Follow our progress on [performance.gov](https://www.performance.gov) and share your good ideas with us

