Funding Priorities and Opportunities For The ITEST Program

David Haury,

ITEST Program Director

ITEST Priorities

- Ongoing Priorities:
  - "Innovative Technology Experiences" to engage the future STEM workforce.
  - Broadening Participation
- Targeted Initiatives
  - Computer Science For All Initiative
  - National Robotics Initiative

National Robotics Initiative

- NSF one of eight federal agencies involved.

- *The goal of the National Robotics Initiative is to accelerate the development and use of robots in the United States that work beside or cooperatively with people.*

NRI Basic Research Topics

*STEM Education: Research on robotic technologies that will enable the development of interactive and adaptive learning environments for learners of all ages, across all domains; and **preparation of the next generation of researchers to confront new challenges in data-enabled robotic technologies and science** (e.g., co-robot systems that support experimental workflow design, data ubiquity, and personalized learning).*

NRI Applied Research Topics

*Produce empirical findings that contribute to knowledge about the **use of robotics to facilitate STEM learning across the K-16 continuum**, with particular emphasis being placed on means to stimulate and motivate participation in STEM careers and broaden participation in them.*

NSF Funding Opportunities for STEM and Special Education Research and Development

Rob Ochsendorf
Division of Research on Learning
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Dear Colleague Letter (16-064)

April 5, 2016

- Fundamental Research to Improve STEM Teaching and Learning, and Workforce Development for Persons with Disabilities

- Invites proposals focused explicitly on advancing knowledge about STEM teaching and learning, and workforce development, for individuals with disabilities.

- Research in disabilities education includes fundamental research about learners (of all ages) with disabilities in STEM, with a particular focus on efforts to understand and address disability-based differences in STEM education and workforce participation.

- Proposers are encouraged to explore a wide range of fundamental and applied research projects.

Example Topics

- The cognitive and neurological underpinnings of mathematics learning disabilities (such as attention, working memory, spatial reasoning, or executive function);

- Investigating developmental trajectories of persons with specific learning disabilities, or other types of disabilities, such as dyslexia or autism, in STEM education and professional disciplines over time;

- Studying the efficacy of STEM instructional strategies for persons with disabilities;

Example Topics, cont.

- Studying instructional practices for young students with disabilities who are not responsive to typical mathematics and/or science classroom instruction;

- The promise of computer and on-line training programs for improving mathematics learning and performance for students with dyslexia and other specific learning disabilities;

- Examining the auditory processing and learning mechanisms employed by students with visual impairments, and/or visual processing learning mechanisms by students who are Deaf or hard of hearing, in the context of learning science/math;

EHR Core Research (ECR) Program

- Introduced in 2013 to support **fundamental research to generate foundational knowledge** in the following focal areas:
  - STEM learning and STEM learning environments
  - STEM professional workforce development
  - Broadening participation in STEM
- Encouraging integration across the focal areas and collaboration among researchers in related disciplines, including social and behavioral sciences.
- Funding and management is shared across all 4 Divisions in EHR.

Goals of the ECR Program

- Invest in fundamental research in STEM education about critical areas - essential, broad and enduring.

- Seek proposals that help synthesize, build and/or expand research foundations in focal areas.

- Contribute to the accumulation of robust evidence to inform efforts to understand, build theory to explain, and suggest interventions and innovations.

- Address challenges in STEM interest, education, learning, participation and workforce development.

- Develop foundational knowledge in STEM learning contexts, both formal and informal, from childhood → adulthood, for all groups, and from the earliest developmental stages of life → workforce participation.

EHR Core Research (ECR) Research Proposal Types

- Level I
  - Up to maximum award size: $500K
  - Up to maximum duration: 3 years
- Level II
  - Up to maximum award size: $1.5M
  - Up to maximum duration: 3 years
- Level III
  - Up to maximum award size: $2.5M
  - Up to maximum duration: 5 years

EHR Core Research (ECR) Resources

- ECR Program Page Website and Announcement
    - ECR Program Announcement (NSF 15-509)
    - Full Proposal Deadline Dates: September 8,   2016; Second Thursday in September, Annually

- NSF Grant Proposal Guide (GPG) (NSF 16-1)

- Common Guidelines for Education Research and Development (NSF 13-126)
    - FAQs on the Common Guidelines (NSF 13-127)

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NSF INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science)

NSF INCLUDES is a comprehensive initiative to enhance U.S. leadership in science and engineering discovery and innovation by proactively seeking and effectively developing STEM talent from all sectors and groups in our society.
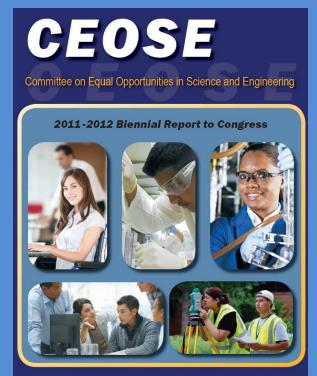
Motivation for NSF INCLUDES

In response to CEOSE report:

"NSF should implement a bold new initiative, focused on broadening participation of underrepresented groups in STEM, similar in concept and scale to NSF's centers, that emphasizes institutional transformation and system change; collects and makes accessible longitudinal data; defines clear benchmarks for success; supports the translation, replication and expansion of successful broadening participation efforts; and provides significant financial support to individuals who represent the very broadened participation that we seek."

CEOSE

Committee on Equal Opportunities in Science and Engineering

2011-2012 Biennial Report to Congress

Broadening Participation in America's STEM Workforce

Three Essential Components of NSF INCLUDES

- INCLUDES Design and Development Launch Pilots

- INCLUDES Alliances

- INCLUDES Backbone Organization

INCLUDES Timeline

Development

- **Launch Pilots** – NSF 16-544
- Workshops for Backbone Organizations – DCL

2016

Implementation

- **Alliances** (up to 5)
- **Launch Pilots**
- **Linkages to BP portfolio**
- National Backbone Organization?

2017

Expansion

- **Alliances**
- **National Backbone Organization**
- **Linkages to BP portfolio**
- **Assessment & Evaluation**

2018 - 2021

Design and Development Launch Pilots

Successful Launch Pilots will:

- Identify the broadening participation challenge, measurable goals and objectives

- Identify teams of local, regional, national, and/or disciplinary-based partners and justify the contribution of team members

- Present bold and innovative approaches for solving broadening participation challenges in STEM and articulate the potential for scaling

- Deliver models or prototypes for collective efforts to increase the participation of underrepresented groups in STEM

Design and Development Launch Pilots
(section V.A.II, NSF 16-544)

- Are expected to test the feasibility of developing a full-scale plan beyond the pilot
  - Year 1: Refine collective commitment to common set of objectives
  - Year 2: Implement and report the results of the collective-impact style approach

- Deadlines:
  - Preproposal (required): April 15, 2016, must address 5 key questions
  - Full proposal: June 24, 2016

- Number of awards: 30-40 Design and Development Launch Pilots
- Budget: Approximately $300,000 over 2 years for a total investment of $12.5M

NSF INCLUDES Alliances

- Up to five NSF INCLUDES Alliances will be funded beginning in FY2017

- Alliances will involve the most promising launch pilot activities

- Design and Development Launch Pilots may be reconfigured by adding new partners, collaborators or networks = new Alliance team

- Key components = common goal, collective-impact style approaches & a strategy to deploy at scale

- Alliances may focus on emerging fields in science and engineering or established fields that promote inclusion as key domains to advance BP

- **Each Alliance to be funded for 5 years at $2.5M per year**

NSF INCLUDES Backbone Organizations

- Successful Backbone Organizations foster communication and cohesion (e.g., within Alliances)

- It is a separate and neutral entity focused on facilitation and support

- Role of the Backbone Organization (NSF 2017 budget request):
  - communication, assessment, measurement of progress towards goals
  - data collection and monitoring, supporting implementation research
  - scaling technological innovations, providing technical expertise on collective impact - style approaches

Useful Resources

- Solicitation: NSF 16-544

- Email: NSFINCLUDES@nsf.gov

- NSF INCLUDES website:
  http://www.nsf.gov/news/special_reports/nsfincludes/index.jsp

- Grant Proposal Guide, January 2016:
  http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg