Funding Opportunities in the Division of Undergraduate Education

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2016 NSF HBCU-UP Outreach Day
April 5, 2016
Outline

• Introduction to NSF, EHR, and DUE
• Overview of Programs
  ▪ IUSE
  ▪ S-STEM
  ▪ Noyce
  ▪ ATE
  ▪ Other Programs
• Merit Review Process
• Connecting with NSF/EHR/DUE
• Questions
NSF by the numbers

Other than the FY 2016 estimation, numbers shown are based on FY 2015 activities.
$880 million FY 2016 estimation

97% funds research, education and related activities

4,243 proposals

831 awards funded

650 EHR-funded Institutions

147,000 EHR-supported individuals

All S&E disciplines funded

Funds research into STEM education

42 former GRF fellows received Nobel Prize

EHR is committed to an inclusive STEM enterprise for science and society
DUE’s Mission:

To promote excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students.

Potentially Transformative Education R&D
Transformative Activity

- Transformative activity involves ideas, discoveries, or tools that radically change our understanding of an important existing scientific or engineering concept or educational practice or leads to the creation of a new paradigm or field of science, engineering, or education. Such research challenges current understanding or provides pathways to new frontiers.

- Transformative activity results often do not fit within established models or theories and may initially be unexpected or difficult to interpret; their transformative nature and utility might not be recognized until years later.

### Transformative Activity

| Challenges conventional wisdom | Leads to unexpected insights that enable new techniques or methodologies | Redefines the boundaries of science, engineering, or education |
The Innovation Cycle of Educational Practice and Research

Educational Practice

which help improve
Answers Insights

that results in
Educational Research

Educational Research

identifies and motivates
Questions Ideas

which lead to

Adapted from Booth, Colomb, and Williams, 2008
Proposals should describe projects that build on available evidence and theory, and that will generate evidence and build knowledge.

Implement / adapt and study

- Effective high quality curricular and co-curricular activities and professional development
- Activities tailored to students, STEM faculty, and different types of institutional contexts

Know what has been done!

Use the literature!

Inform the community of the results!
The submitter’s three jobs

- Identify the right funding opportunity
- Conceptualize a fantastic project
- Write a persuasive proposal in 15 pages
GOAL: to encourage talented STEM majors and STEM professionals to become K-12 STEM teachers

Scholarship, stipend, and fellowship recipients must teach in a high-need school district for a specified number of years

**Track 1** (S&S) Scholarships & Stipends
- Undergraduate STEM majors and/or STEM career changers

**Track 2** (TF) NSF Teaching Fellowships
- STEM career changers

**Track 3** (MTF) NSF Master Teaching Fellowships
- Exemplary, experienced STEM teachers

**Track 4** (Noyce Research) Research on the Preparation, Recruitment, and Retention of K-12 STEM Teachers
Robert Noyce Teacher Scholarship Program

Proposals must provide evidence of exemplary teacher preparation and development efforts.

Proposals must provide evidence of genuine collaboration between faculty in STEM and faculty in education.

Every project is expected to be grounded in and contribute to the knowledge base.

Proposal Due Dates

2016 Date TBA
2002-2014 Projected Impact of Noyce Program

Expected Number of STEM Teachers Prepared by Noyce Projects

- **New Teachers**
- **Master Teachers**

<table>
<thead>
<tr>
<th>Fiscal Year of Award</th>
<th>Number of Teachers</th>
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<tbody>
<tr>
<td>2002</td>
<td>497</td>
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<tr>
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<td>917</td>
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NSF-funded preparation for 12,971 New STEM Teachers and 571 Master Teachers
Improving Undergraduate STEM Education (IUSE: EHR)

Improve STEM Learning & Learning Environments:
Improve the knowledge base for defining, identifying, and innovating effective undergraduate STEM education teaching and learning for all NSF-supported disciplines, and foster widespread use of evidence-based resources and pedagogies in undergraduate STEM education.

Build the Professional STEM Workforce for Tomorrow:
Improve the preparation of undergraduate students so they can succeed as productive members of the future STEM workforce, regardless of career path, and be engaged as members of a STEM-literate society.

Broaden Participation & Institutional Capacity for STEM Learning:
Increase the number and diversity of undergraduate students recruited and retained in STEM education and career pathways through improving the evidence base for successful strategies to broaden participation and implementation of the results of this research.

Proposals should describe projects that build on available evidence and theory, and that will generate evidence and build knowledge.
IUSE: EHR Program

Two Program Tracks

Engaged Student Learning
- Exploration & Design (smaller scale)
  - Up to $300K
  - Up to 3 yrs
- Development & Implementation (larger scale)
  - Level I: Up to $600K Up to 3 yrs
  - Level II: $601K to $2M Up to 5 yrs

Institutional and Community Transformation
- Exploration & Design (smaller scale)
  - Up to $300K
  - Up to 3 yrs
- Development & Implementation (larger scale)
  - Up to $3M
  - Up to 5 yrs

Focuses on approaches to increase the propagation of highly effective methods of STEM teaching and learning.

Deadlines (Both tracks):
- Exploration/Design: November 2, 2016
- Development/Implementation: January 11, 2017

Focuses on design, development, implementation of and research on STEM learning models, approaches, and tools.
Supports institutional scholarship programs for full-time, academically-talented STEM students with demonstrated financial need.

- Scholarship Amount: Up to $10,000 per student per year (depending on financial need)
- 60% of Budget to Scholarships – 40% to Student Support, Admin., Research, Evaluation
S-STEM Program

Two Program Tracks

Institutional Capacity Building
(Strand 1)

- Up to $650K
- Up to 5 yrs

For institutions with limited experience in implementing effective curricular and co-curricular activities

Design and Development
(Strand 2)

Two Types

- Single Institution (Type 1)
  - Up to $1M
  - Up to 5 yrs
- Multi-institutional Consortia (Type 2)
  - Up to $5M
  - Up to 5 yrs

Seeks to leverage S-STEM funds with institutional efforts and infrastructure to increase and understand impacts

Deadlines (All Proposals):
- May 16, 2016
- April 20, 2017
- 3rd Thursday in April, annually thereafter
**Issue:** Some proposals may appear to be “totally focused” on simply giving out scholarships.

**Background:** A major goal of the new solicitation is that all proposals should be “knowledge generating.” Projects should be gathering information on their unique thrust. Learning about how the ...

- Particular workforce needs identified,
- Instructional focus of their academic programs, and
- Support structures targeting “points of failure” identified in an institutional scan

...work together and how they are being evaluated and the “lessons learned” disseminated to the broader S-STEM community.

We want to learn how to best award scholarships to have the maximum impact!
Advanced Technological Education (ATE) Program

• ATE Goals
  • Produce more qualified science and engineering technicians to meet workforce demands for existing and emerging advanced technological fields
  
  • Improve the technical skills and the general science, technology, engineering, and mathematics (STEM) preparation of these technicians and the educators who prepare them
  
  • Involve partnerships among two-year colleges, four-year colleges and universities, secondary schools, business, industry, and government to respond to employers' needs for well-prepared technicians with the ability to learn and embrace change
Advanced Technological Education (ATE) Program

ATE was launched by NSF in 1993 in response to the Scientific and Advanced-Technology Act (SATA) of 1992

• FOCUS: education of science and engineering technicians for high-technology fields that drive the nation’s economy
• ATE Projects, ATE Centers & Targeted Research on Technician Education

Community and technical colleges must be in leadership roles

Grades 7-12, two-year and four-year institutions (pathways)

Education / Industry partnerships are a hallmark of ATE

Deadline: October 6, 2016
ATE Program

Three Program Tracks

ATE Projects
Up to $900K, Up to 3 yrs
except
Small/New to ATE:
Up to $200K for 4 yrs

Coordination Networks:
Up to $800K for 4 yrs

ATE Centers

Targeted Research in Technician Education
From $150K, Up to 2 yrs to $800K, Up to 3 yrs

Three Types

National
Up to $4M 5 yrs

Regional
Up to $3M 4 yrs

Support Centers
Up to $1.6M 4 yrs

Deadlines (All Proposals):
October 6, 2016
ATE Projects

Focus on one or more of activities below (up to $900K, for 3 yrs)

- Program Development and Improvement
- Curriculum and Educational Materials Development
- Professional Development for Educators
- Leadership Capacity Building for Faculty
- Teacher Preparation (example on next slide)
- Conferences and Workshops
- Business and Entrepreneurial Skills Development for Students

For institutions new to ATE program there are SMALL GRANTS - up to $200K for 4 yrs

- ATE Coordination Networks- Up to $800K for 4 yrs

- Online Resources for ATE
  - Mentor Connect [www.mentor-connect.org](http://www.mentor-connect.org)
  - Evalu-ate Center [www.evalu-ate.org](http://www.evalu-ate.org)
Other Programs
Innovation Corps for Learning (I-Corps L)

- **Problem**: Educational innovations not reaching potential users. Increase sustainable scaling of outcomes of NSF research.

- Promote **adoption of innovations** in STEM education resulting from prior NSF support

- Lean and agile philosophy: Customer discovery
Innovation Corps for Learning (I-Corps L)

- $50K award combined with intensive workshops and highly engaged mentors
- Participate as a 3-person team in a 7-week program

- 24 teams to be supported
- 1 page application!

[Website Link: www.asee.org/i-corps-l]
EHR Core Research (ECR) Program

- STEM Learning
- STEM Learning Environments
- STEM Workforce Development
- Broadening Participation
EHR Core Research (ECR) Program

Addresses persistent challenges in STEM:

- Interest
- Education
- Learning
- Participation
- Understand
- Build theory to explain

by emphasizing accumulation of robust evidence to inform efforts to:

Suggest interventions and innovations
Faculty Early Career Development (CAREER) Program [NSF-wide]

• Supports junior faculty early in their independent research careers who exemplify the role of teacher-scholar

• EHR CAREER research may focus on understanding STEM learning and education

• Five-year integrated research and education plan, with minimum total budget request of $400K ($500K in BIO, ENG, PLR)

• EHR programs that accept CAREER proposals include:
  ▪ Improving Undergraduate STEM Education (IUSE)
  ▪ EHR Core Research (ECR)

Proposal Deadline Dates: July 2016 (various)

www.nsf.gov/career
The Merit Review Process
NSF has TWO Review Criteria

- **Intellectual Merit**: What will we learn? How will it advance science?
- **Broader impacts**: What will the immediate or eventual impact be on society? How will it make the world a better place?

Educationally focused projects often have a hard time disentangling these, but you need to separate them out in your proposal.
Elements of the Merit Review Criteria

1. What is the potential for the proposed activity to make a difference?
   a. By **advancing knowledge** and understanding within its own field or across different fields (Intellectual Merit); and
   b. By **benefitting society** or advancing desired societal outcomes (Broader Impacts)?

1. To what extent do the proposed activities suggest and explore **creative, original, or potentially transformative** concepts?

2. Is the **plan** for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale?

3. Does the plan incorporate a **mechanism to assess success**?

4. How **qualified** is the individual, team, or institution to conduct the proposed activities?

5. Are there **adequate resources** available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?
Receiving NSF Notifications

• Deadlines are 90 days after the announcement is posted to the NSF website

• To get notifications, go to www.nsf.gov
  – Click on “News” in the top menu panel
  – Click on the “Get News Updates by Email” link at the top
  – You can also sign up to get updates from Directorates
Special Announcements

**Common Guidelines for Education Research and Development**

A publication titled *Common Guidelines for Education Research and Development* has just been released by the National Science Foundation and the U.S. Department of Education. It provides a framework for producing and sharing knowledge and evidence resources, so that innovations that work can be more quickly and widely used in classrooms around the country.

Here is a set of [Frequently Asked Questions](#) about the Guidelines.

**Look here for STEM Education Resources**
Two new reports have recently been issued:

The first is a report of a workshop on Advancing Technology-Enhanced Education.
The second is the report of a meeting on Describing and Measuring Undergraduate STEM Practices.

If you are interested in reviewing proposals for DUE please fill out this form.
Ways to Participate with NSF

- **Grant Holder**
  - Principal Investigator
  - Member of Project Team, Advisory Board, etc.
  - Test Site

- **User of Products**

- **Participant in Workshops & Symposiaums**

- **Reviewer of Proposals**
Questions?
Thank you!

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