Funding Opportunities at the National Science Foundation to Support Undergraduate STEM Education

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Division of Undergraduate Education
National Science Foundation
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NSF at a Glance

$7.2 billion
FY 2014 Appropriations

24 percent
NSF’s share of total federal support for basic research conducted at academic institutions

10,800
Competitive awards funded by NSF

22 percent
Funding rate of proposals submitted to NSF

50,000
Proposals evaluated through competitive merit review

233,000
Number of proposal reviews

36,500
Number of experts who participate in the merit review process

1,922
Colleges, universities and other institutions in all U.S. states and territories that receive NSF funding

299,000
Number of people NSF supports directly (researchers, postdoctoral fellows, trainees, teachers and students)

200 plus
Number of Nobel Laureates supported by NSF

90 percent
Proportion of NSF funding allocated through grants and cooperative agreements

$169,107
Average annual size of NSF research grant

2.9 years
Average duration of NSF research grant

Figures represent FY 2013 actuals except where noted.
# Fiscal Year 2014 Funding Rates

## Overall FY14 EHR Funding Rate: 17%

<table>
<thead>
<tr>
<th>Division</th>
<th>Funding Rate</th>
<th>Actions</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUE</td>
<td>19%</td>
<td>1713</td>
<td>324</td>
</tr>
<tr>
<td>DRL</td>
<td>13%</td>
<td>1454</td>
<td>194</td>
</tr>
<tr>
<td>DGE</td>
<td>25%</td>
<td>301</td>
<td>74</td>
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<tr>
<td>HRD</td>
<td>19%</td>
<td>581</td>
<td>109</td>
</tr>
</tbody>
</table>

## Overall FY14 MPS Funding Rate: 24%

<table>
<thead>
<tr>
<th>Division</th>
<th>Funding Rate</th>
<th>Actions</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST</td>
<td>19%</td>
<td>946</td>
<td>178</td>
</tr>
<tr>
<td>CHE</td>
<td>25%</td>
<td>1544</td>
<td>381</td>
</tr>
<tr>
<td>DMR</td>
<td>21%</td>
<td>1897</td>
<td>393</td>
</tr>
<tr>
<td>DMS</td>
<td>26%</td>
<td>2388</td>
<td>626</td>
</tr>
<tr>
<td>PHY</td>
<td>29%</td>
<td>957</td>
<td>276</td>
</tr>
</tbody>
</table>
Division of Undergraduate Education (DUE)

Programs and Funding Opportunities

Key: Crosscutting | NSF-wide

- Advanced Technological Education (ATE)
- Cooperative Activity with Department of Energy Programs for Education and Human Resource Development (Request for Supplement)
- CyberCorps(R): Scholarship for Service (SFS)
- Improving Undergraduate STEM Education
- Nanotechnology Undergraduate Education (NUE) in Engineering
- National STEM Education Distributed Learning (NSDL)
- NSF Director’s Award for Distinguished Teaching Scholars (DTS)
- NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)
- Robert Noyce Teacher Scholarship Program
- Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP)
- Secure and Trustworthy Cyberspace (SaTC)
- STEM-C Partnerships: MSP (STEM-CP: MSP)
- Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES) (TUES)
- Widening Implementation & Demonstration of Evidence-Based Reforms (WIDER)
What Questions do you have?
Advanced Technological Education (ATE) Program

• 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 Ed.
  • Funding from $150,000-$4 million over all 3 tracks

• Grades 7-12, two-year and four-year institutions (Pathways).

• Community and technical colleges must be in leadership roles.

• Education / Industry Partnerships are a hallmark of ATE.

• Proposal Deadline: October 8, 2015.
ATE Projects

• Projects: up to $300,000/yr for 3-yrs ($900,000 max. total)

• Small, New to ATE: up to $200,000 total over 2-3-yrs
  ➢ Mentor-Connect (www.mentor-connect.org)

• ATE Coordination Networks: up to $200,000/yr for 4-yrs
ATE Projects and Centers
292 Active Grants in Spring 2013

- Micro and Nanotechnologies: 53 (18%)
- Advanced Manufacturing Technologies: 56 (19%)
- Agricultural and Environmental Technologies: 29 (10%)
- Bio and Chemical Technologies: 50 (17%)
- Engineering Technologies: 46 (16%)
- Advanced Technological Education: 53 (18%)
- Information and Security Technologies: 23 (8%)

https://atecentral.net/ate20
8,000 Business & Industry Collaborations in 2012

Reported purposes of collaboration

- Information about workforce needs: 55%
- General support: 40%
- Developing program content: 22%
- Financial or in-kind support: 21%

Percentage of respondents indicating collaboration served this purpose.

https://atecentral.net/ate20

Source: EvaluATE
Active ATE Projects

https://atecentral.net/projects
Single-Use Bioreactor Systems Education and Training

Award ID DUE 1405766  PI: James DeKloe, Solano Community College

- PROJECT GOAL – To create curricular materials to address the single-use, disposable bioreactor gap in the national biotechnology curricula and expanding the biotechnology program at the college to incorporate this technology.

- PROJECT OBJECTIVES
  a. Develop educational units that can be inserted into courses that utilize single-use cell culture technology, including detailed content, learning objectives, teaching materials and instruction activities for the new units
  b. Support the implementation of the curriculum at the college and other institutions
  c. Host workshops to disseminate the curriculum
  d. Develop a web site hosting the model curriculum and other information generated from this project
  e. Disseminate through Bio-Link.
A Biomanufacturing Enterprise for Innovative Student Training & Entrepreneurship

Award ID DUE 1003292 PI: Mary Nelson, Salt Lake Community College

• PROJECT GOAL - To develop a faculty and industry mentored, student-run contract manufacturing organization known as STUDENTfacturED

• PROJECT OBJECTIVES
  a. Support students mastering competencies essential to biomanufacturing by preparing products that are needed by the community college biotechnology program, and neighboring high school biology and biotechnology programs.
  b. Students from biomanufacturing and the School of Business work together.
Questions about ATE?
NSF Scholarships in STEM (S-STEM) Program

• Supports institutional scholarship programs for full-time, academically-talented students with financial need. Funds are provided through H1B visa fees.

• Strong proposals develop programs for cohorts of students that address local needs, and effectively mentor and support students to enable them to enter the STEM workforce or graduate school.


S-STEM Strands

• Strand 1: S-STEM Institutional Capacity Building
  – $650,000 over 5-yr, 60% funds go to scholarships
  – work with offices of institutional research or researchers. Findings from these types of projects shall be used to improve local implementation of academic and student supports, provide an understanding of student success and inform any future proposals for S-STEM Design and Development Strand.

• Strand 2: S-STEM Design and Development
  – Single Institution, $1 million over 5-yr, 60% scholarships
  – Multi-Institutional Consortia, $5 million over 5-yr, 60% scholarships
    • 2-yr – 4-yr, or any combination in consortium
Robert Noyce Teacher Scholarship Program

• Supports and encourages talented STEM undergraduates (and professionals) in pursuing teaching careers

✓ **Noyce Scholarship Track**: supports institutional scholarships and programs for talented undergraduate STEM majors to become K-12 teachers who commit to teach in high-needs school districts

✓ **Capacity-Building Track**: supports the establishment of infrastructure and partnerships for a future Noyce project

✓ **NSF Teaching Fellowship/Master Teaching Fellowship Track**: supports STEM professionals enrolled in master's degree programs leading to teacher certification

• **Proposal Deadline**: August 4, 2015
IUSE Program [NSF 15-585]

IUSE emphasizes knowledge-based & knowledge-generating approaches.

**Two program tracks**

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**Engaged Student Learning**

- **Two tiers**
  - **Exploration** (Smaller Scope)
    - Up to $300k, 3 yrs.
    - **Nov 3, 2015**
  - **Design and Implementation** (Larger Scope)
    - Level I: Up to $600k, 3 yrs.
    - Level II: $601k to $2M, 5 yrs.
    - **Jan. 13, 2016**

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**Institutional and Community Transformation**

- **Two tiers**
  - **Exploration** (Smaller Scope)
    - Up to $300k, 3 yrs.
    - **Nov 3, 2015**
  - **Design and Implementation** (Larger Scope)
    - Up to $3M, 5 yrs.
    - **Jan. 13, 2016**

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Focus on design, development, implementation of and research on STEM learning models, approaches, and tools

Focus on approaches to increase the propagation of highly effective methods of STEM teaching and learning
NSF-IUSE Goals

• use and build evidence about improved STEM instructional practices;
• design and study innovative learning opportunities, including cyberlearning;
• create, implement, and test program, curricular, course, and technology-driven models;
• develop, implement, and test creative approaches for adoption of education research into disciplinary teachings;
• develop and validate assessments/metrics for undergraduate STEM learning and instructional practice; and
• conduct fundamental research on issues of undergraduate STEM teaching and learning.
RISE - Research-based Interdisciplinary STEM Education
Award ID DUE 1432018   PI: Kalyn Owens, North Seattle Community College
Collaborative Project between N. Seattle CC and Central Washington University

• PROJECT GOAL - To use undergraduate research and interdisciplinary experiences as vehicles to cultivate meaningful thinking opportunities in the first and second years of the college experience.

• PROJECT OBJECTIVES
a. Provide progressive and innovative STEM curriculum that significantly improves preparation of diverse student populations for upper level courses and careers in science

b. Establish the foundation for a Pacific Northwest Collaboration focused on excellence in STEM education at the community college level

c. Make a significant contribution to the body of knowledge regarding our understanding of how students think, learn, and problem solve in a research and interdisciplinary context early in the college experience
Expanding Instrumentation Access at Multiple Institutions Using Portable IR, Raman, and XRF Spectrometers
Award ID: DUE 1431522   PI: Christopher Stromberg, Hood College

Collaborative Project between Hood College, Frederick CC and Mt. St. Mary’s College

• PROJECT GOAL - To develop inquiry based laboratory experiments while providing a replicable model for increasing instrumentation access across multiple institutions.

• PROJECT OBJECTIVE - Activities will place the responsibility for learning on the students, so that they engage with the material at a deeper level than in traditional "confirmation" experiments. This will lead to greater internalization and integration of the material, which increases both student learning and confidence.

• BROADER IMPACTS - Assessment will allow the activities to be vetted across different institution types (PUI and community college) with varied student profiles, resulting in a library of experiments that can be shared with the chemical education community.
Questions about S-STEM, Noyce or IUSE?
Research Collaborations with SBIR/STTR Phase II Grantees

Community College Students and Teams Partnership funding between small businesses and community college researchers and students.

Max Funding: $40,000 per year

Deadline: Rolling submission; submission 3 months before target start date is suggested
Part I: Grant Proposal Guide (GPG) and Part II: Award & Administration Guide (AAG)

Grant Proposal Guide (GPG)
Chapter I: Pre-submission Information
Chapter II: Proposal Preparation Instructions
Chapter III: NSF Proposal Processing and Review
Chapter IV: Non-Award Decisions and Transactions
Chapter V: Renewal Proposals

Award & Administration Guide (AAG)
Chapter I: NSF Awards
Chapter II: Grant Administration
Chapter III: Financial Requirements and Payments
Chapter IV: Grantee Standards
Chapter V: Allowability of Costs
Chapter VI: Other Post Award Requirements
Chapter VII: Grant Admin. Disputes and Misconduct
The Program Solicitation

- Program Description
- Program-specific considerations & restrictions
  - Institutional Eligibility & Limitations
  - PI Eligibility & Limitations
  - Budgetary Limitations
- Submission Deadlines & Target Dates
- Resources for proposal preparation
- Program Director Contact Information
• The *Common Guidelines* describe the roles of different types of R & D projects in generating evidence about strategies and interventions for enhancing student learning.

• For each type of R & D, the *Common Guidelines* describe:
  - Purpose
  - Empirical and theoretical justifications (evidence base)
  - Types of project outcomes (evidence generation)
  - Quality of evidence
Questions?