Funding Opportunities at NSF for Undergraduate Education in STEM

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Presentation Topics

- Introduction to NSF
- Selected NSF programs in undergraduate education
  - ATE
  - TUES
  - S-STEM
  - STEP
Introduction to the NSF

- NSF is an independent federal agency with a budget over $7 billions.
- “To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes” (NSF Act of 1950)
- Support and promote excellence in STEM research and education.
- About 10,000 new awards a year, funding sources for about 20 percent of all federally supported basic research conducted by America's colleges and universities
The NSF Structure

Office of the Director & Staff Offices

Director

Deputy Director

National Science Board

Directorate for Biological Sciences

Directorate for Computer and Info. Sciences & Engineering

Directorate for Education and Human Resources

Directorate for Engineering

Directorate for Geosciences

Directorate for Mathematical and Physical Sciences

Directorate for Social, Behavioral and Economic Sciences

Office of Budget, Finance and Award Management

Office of Information and Resource Management

Office of Inspector General
The EHR Structure

Directorate of Education and Human Resources
Assistant Director
Deputy Assistant Director

Division of Undergraduate Education (DUE)
Division Director
Division of Human Resource Development (HRD)
Division Director

Division of Graduate Education (DGE)
Division Director
Division of Research on Learning in Formal and Informal Settings (DRL)
Division Director
Selected DUE Programs

- Advanced Technological Education (ATE)
- Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES)
- NSF Scholarship in Science, Technology, Engineering, and Mathematics (S-STEM)
- STEM Talent Expansion Program (STEP)
ATE: NSF Advanced Technological Education (NSF 11-692)

- **Goal:** Focus on the education of technicians in the high-tech fields that drive the nation’s economy and promote excellence in technological education with an emphasis on two-year colleges.

- **Institution Types:** Grades 7-12, 2yr- and 4-yr institutions can be supported.

- **Community colleges** have leadership roles on all projects.

- **Three Tracks:** Projects, Centers and Targeted Research on TE
ATE: Program Track 1 - Projects

- Program Development and Improvement
- Curriculum and Educational Materials Development
- Professional Development for Educators
- Leadership Capacity Building for Faculty
- Teacher Preparation (for K-12 teachers, project must involve both two-year and four-year institutions)
- Business and Entrepreneurial Skills Development for Students
- Small Grants for Institutions New to the ATE Program (no award in last 10 yrs)
- Conferences and Workshops (<$250,000)
ATE: Program Track 2 - Centers

- National Centers
  - Larger in scope and size than a project
  - Provide models, leaderships and resources in a particular field
  - Built on prior efforts (had ATE projects before)
  - Cooperative efforts
  - Have financial supports from other sources

- Regional Centers
  - Similar to national center with a regional focus

- Resource Centers
  - Provide support and mentoring of prospective PIs
  - Establish and support industry, business and academic partnerships
  - Promote the visibility and public images of technician careers
  - Evaluate the skills and competencies required in a technical field
  - Disseminate exemplary materials and practices
ATE: Program Track 3 – Targeted Research on Technician Education

- Advance the knowledge base needed to make technician education programs more effective and forward-looking
- Topics of broad interest and importance to ATE PIs
- Build on existing knowledge
- Guide the practice of technician education
- Represent a true collaboration between the researchers and various stakeholders
ATE: Budget and Deadline

- ATE Project: up to $300,000 per year for 3 years (40-56)
- Small grants for new institutions: $200,000 for 3 years (15-20)
- National Center: up to $5 million for 4 years, possibility of competitive renewal for another 3 years with lower level of funding (<=2)
- Regional center: up to $3 million for 4 years, possibility of competitive renewal for another 3 years with lower level of funding (<=3)
- Resource center: up to $1.6 million for 4 years, possibility of competitive renewal
- Planning grant for centers: $70,000 (<=4)
- Targeted Research: up to $300,000 per year for 4 years (5-8)
- **Deadline**: Oct. 18, 2012; Oct. 17, 2013
TUES: Transforming Undergraduate Education in STEM (NSF 10-544)

- **Vision:** Excellent STEM education for all undergraduate students

- **Institution Types:** 2yr- and 4-yr institutions can be supported (most competitive)

- **Three Types:** 1, 2 and 3

- **Deadlines:**
  - Type 1: 5/28/2012 (A-M); 5/29/2012 (N-Z)
  - Type 2 & 3: 1/14/2013
TUES: Components

- Creating learning materials and strategies
- Implementing new instructional strategies
- Development faculty expertise
- Assessing and evaluating student achievement
- Conducting research on undergraduate STEM education
TUES: Project Types

**Type 1**
- Total budget up to $200,000 for 2 to 3 years
  - $250,000 when 4-year and 2-year schools collaborate

**Type 2**
- Total budget up to $600,000 for 2 to 4 years

**Type 3**
- Budget negotiable -- not to exceed $5,000,000 over 5 years

**Central Resource Projects**
- Small focused workshop projects -- Budget negotiable -- up to $100,000 for 1 to 2 years
- Large scale projects -- Budget negotiable -- $300,000 to 3,000,000 for 3 to 5 years
Develops materials that use a new instructional approach based on the current understanding of how students learn, or introduces content from current research into an existing course.

Integrates new instrumentation or equipment into undergraduate laboratories or field work in a way that demonstrably improves student learning.

Develops a model to provide the needed courses for a seamless transfer between faculty from two-year and four-year schools.

Explores the practical aspects of using remote laboratories or instruction among several institutions.

Integrate current science and pedagogy into the teacher preparation curriculum.

Explores Internet-based approaches for faculty professional development.

Develops an instrument to assess students’ knowledge in a particular area, their abilities with certain processes, or their attitude about some aspect of STEM.

Develops an understanding of how various factors affect how students learn particular content or skills.
TUES: Examples of Type 2 Projects

- Develops material for a sequence of courses that vertically integrates a conceptual or pedagogical approach at several institutions.
- Involves diverse partnerships between community colleges and four-year schools to develop robust models for providing community college courses needed for a true two-plus-two transfer program.
- Uses faculty professional development as a part of a widespread beta-testing effort with faculty in several diverse institutions to disseminate proven, innovative instructional material or approaches.
- Converts an effective, in-person faculty professional development approach to an Internet-based or blended approach in order to improve accessibility and sustainability.
- Involves several diverse institutions using an existing instrument to assess students’ knowledge in a particular area or their abilities with certain processes.
- Involves several diverse institutions to identify what factors and characteristics effect how faculty members and departments adopt innovative approaches.
TUES: Examples of Type 3 Projects

- Involves a regional or national effort to disseminate proven materials or pedagogies.
- Develops a self-sustaining model for faculty professional development that introduces new faculty to a field or provides retraining for experienced faculty.
- Uses an existing assessment instrument to develop a database on students’ knowledge in a particular area or their abilities with certain processes.
- Explores how various factors affect how students learn particular content or skills across a broad range of diverse institutions.
- Compares the efficacy and efficiency of several instructional methodologies such as hands-on, remote, and virtual laboratories across a broad range of diverse institutions.
S-STEM: NSF Scholarships in Science, Technology, Engineering, & Math (NSF 12-529)

- **Goal:** Award grants to institutions to provide scholarships to academically talented, but financially needy students

- Students can be pursuing associate, baccalaureate, or graduate degrees

- Scholarships can be up to $10,000/yr - the limits of students official level of need. (They can be less than $10K/yr)

- **Deadline:**
  - Proposal Deadline: August 14, 2012
  - August 13, 2013
S-STEM: Major Features of Program

- Most STEM disciplines are eligible - except Social & Behavioral sciences
- Grant size - max $600,000 for 5 yrs with a annual limit of $225,000, (up to 5% can be spent for admin costs and up to 10% for student support services)
- One proposal per constituent school or college that awards STEM degrees (e.g. school of eng, college of arts & sciences)
- Est: $50 to $70 million available with 80-100 awards
- Significant change from previous solicitation: Indirect Cost allowed
S-STEM: Special program features

- PI must be member of STEM faculty
- Scholarships to “natural” cohorts of students
- S-STEM students are full time & are US Citizens, Residents, Nationals, or refugees
- Institution must provide some student support structures
- Optional enhancements: research opportunities, tutoring, internships, etc., but cannot treat the scholarship as payment for service
**STEP: STEM Talent, Expansion Program (NSF 11-550)**

- **Goal:** Increase the number of students receiving associate or baccalaureate degrees in established or emerging fields within STEM.
- **Institution Types:** 2yr- and 4-yr institutions can be supported.
- **One proposal per institution**
  
  (can be a partner on only one proposal with the exception of community colleges which can be a partner on one or more Type 1 proposals if it is not a lead institution.)

- **Community colleges** get credit for transfers to 4-year STEM programs.
- **Types:** 1A, 1B and 2.
- **Deadline:** Sept. 25, 2012; Sept. 26, 2013.
STEP: Types of Proposals

- **Type 1:** Efforts aimed at adapting and implementing best practices that will lead to the increase of the number of degrees awarded in STEM fields
  - Type 1A: have not been a lead institution on a STEP award
  - Type 1B: previous lead institution on a STEP award; a new five-year implementation project

- **Type 2:** Education research on factors affecting associate and baccalaureate degree attainment in STEM. (Exempt from the one submission per institution rule)
STEP: Budgets

- **Type 1** Maximum Support Levels – Enrollment based
  - $500 K for 5 years for 1-5,000 FTE undergrads
  - $1.0 M for 5 years for 5,001-15,000 undergrads
  - $2.0 M for 5 years for >15,000 undergrads

- **Type 2**
  - Up to $1.5 millions for four years.

- **STEP Budget**
  - $30 million expected in FY 2012
  - ~20 awards expected
STEP: Sample Topics of Type 1 Proposal

- Capacity expansion
- Interdisciplinary approaches to STEM education
- Bridge program from CC to baccalaureate programs
- Increase the number of pathways
- Recruitment and retention
- Mentoring
- Cooperative programs with industry and government
- Programs encourages undergraduate research
STEP: Expected Outcomes

Type 1:

- Meeting the targeted increase in the number of degrees awarded
- Description of activities that will be institutionalized from the project
- Plan for continuing efforts to increase number of STEM students & graduates
- Formative assessment of progress towards goals
- Dissemination of project results to broader community

Type 2:

- Evidence of factors affecting degree attainment
- Practical information about these factors that can be used by educators to increase degree attainment
- Dissemination of research results
Other Programs in Undergraduate STEM Education

DUE/EHR Programs:
- Math and Science Partnership (MSP) (NSF 12-518)
- Robert Noyce Teacher Scholarship Program (Noyce) (NSF 12-525)
- Federal Cyber Service: Scholarship for Service (SFS) (NSF 12-531)

EEC/ENG
- Research in Engineering Education (REE) (PD 10-1340)
- Research Initiation Grants in Engineering Education (NSF 11-507)
- Nanotechnology Undergraduate Education (NUE) in Engineering (NSF 12-534)
- Broadening Participation Research Initiation Grants in Engineering (BRIGE) (NSF 11-576)
Other Programs in Undergraduate STEM Education

CNS/CISE:
- Computing Education for the 21st Century (CE21) (NSF 12-527)

Cross-Directororate:
- Research Experiences for Undergraduates (REU) (NSF 09-598)
- Research Experiences for Teachers (RET) (NSF 11-509)
- Faculty Early Career Development (CAREER) Program (NSF 11-690)
Questions?

Thank you for participating.