Funding Opportunities at NSF (with emphasis on EHR Directorate)

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Program Directors  
Division of Undergraduate Education (DUE)  
Directorate for Education and Human Resources (EHR)

NSF Organizational Structure

- Independent executive branch agency that supports research & education in STEM disciplines
- 7 Discipline-based Directorates
  - Biological Sciences
  - Computer & Information Sciences & Engineering
  - Education and Human Resources
  - Geosciences
  - Mathematical and Physical Sciences
  - Social, Behavioral, & Economic Sciences
- Divisions or sections within each Directorate

Ten Big Ideas for Future NSF Investments

- NSF INCLUDES
- Harnessing data
- Human/technology frontier
- Rules of life
- Next quantum revolution
- Navigating the Artic
- Windows on the Universe
- Convergent research
- Midscale research infrastructure
- Large ambitious projects (NSF 2026)
EHR Goals

- Prepare the next generation of STEM professionals and attract and retain more Americans to STEM careers.
- Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in STEM education and that integrates research and education.
- Increase the technological, scientific and quantitative literacy of all Americans so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.
- Broaden participation (individuals, geographic regions, types of institutions, STEM disciplines) and close achievement gaps in all STEM fields.

EHR Investment Priorities

STEM Learning and Learning Environments
- Build on cognitive and "non-cognitive" foundations in STEM
- Support research and the development of innovative tools, approaches and practices in formal and informal STEM learning contexts

Broadening Participation and Institutional Capacity in STEM
- Promote accessibility, supports and success for underrepresented groups through high-quality STEM education

STEM Workforce
- Build capacity and prepare a diverse STEM workforce
- Capitalize on novel advances in science and technology
- Address emerging global, social, and economic challenges and opportunities
Division for Undergraduate Education (DUE)

DUE invests in projects that promote excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students. DUE’s current programs constitute a comprehensive approach to strengthening STEM education at two- and four-year colleges and universities by improving curricula, instruction, laboratories, infrastructure, assessment, diversity of students and faculty, and collaborations.

Are You Interested In:

- Making changes at your institution to improve students’ STEM learning and engagement? [YES]
- Using assessment to enhance what is known about effective STEM teaching and learning practices? [YES]
- Considering the implications of the aforementioned factors for preservice STEM teacher preparation? [YES]

Stay tuned to learn more about the IUSE: EHR program...
Improving Undergraduate STEM Education (IUSE: EHR) broadly focuses on improving undergraduate STEM Education, including pre-service education for future K-12 STEM teachers.

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

**IUSE: EHR Program (NSF 17-590)**

**Two Program Tracks**

- **Engaged Student Learning**
  - Focus on designing, developing, and implementing research on STEM learning models, approaches, and tools.
  - Two Tiers:
    - Exploration & Design (smaller scale)
      - Up to $300K
      - Up to 3 yrs
    - Development & Implementation (larger scale)
      - Up to $3M
      - Up to 5 yrs

- **Institutional & Community Transformation**
  - Focus on increasing the propagation of highly effective methods of STEM teaching and learning.
  - Two Tiers:
    - Exploration & Design (smaller scale)
      - Level I: Up to $60K, Up to 2 yrs
      - Level II: $60K to $2M, Up to 5 yrs
    - Development & Implementation (larger scale)
      - Up to $3M
      - Up to 5 yrs

**Common Guidelines for Education Research and Development**

- Released by Institute of Education Sciences (IES) and NSF in 2013.
- Offers guidance on building the evidence base in STEM learning.
- Notes that R & D efforts that increase understanding of effective undergrad STEM teaching and learning provide the foundation for building the future STEM workforce and improving scientific literacy.
Description of Tracks in E & D Tier

Engaged Student Learning (ESL) Projects

• Focus on design, development, and research studies.

• Involve the creation, exploration, or implementation of tools, resources, and models that show promise to:
  • increase engagement in STEM learning; and
  • lead to measurable and lasting learning gains.

• Reflect disciplinary differences in needs and priorities.

ESL Track Specifics cont.

• Collaborations are encouraged among:
  • STEM disciplinary researchers
  • Education researchers
  • Cognitive scientists

• Such collaborations should:
  • Leverage what is known about how people learn
  • Contribute to the growth of that body of knowledge
Target Populations for Projects in ESL Track

Target populations include:

- Students at two- and four-year institutions
- STEM majors (declared and undeclared)
- Students whose course of study require solid skills and knowledge of STEM principles
- Non STEM majors seeking to fulfill a general education requirement in STEM
- STEM faculty members
- Pre-Service STEM teachers in undergraduate teacher preparation programs

Sample ESL Project Themes

- Assessment/metrics of learning and practice (in STEM or pedagogy courses for teachers)
- Educational Research (of best practices in STEM teacher preparation)
- Conducting undergraduate disciplinary research (for pre-service teachers)
- Developing the STEM and STEM-related workforce (including teachers)
- Educating a STEM-literate population
- Broadening participation in STEM (including STEM teachers)
- Exploring co-curricular activities to increase student motivation and persistence (in STEM teaching)
- STEM faculty professional development (including PD for STEM faculty teaching pre-service STEM teachers)
- Building capacity in higher education (including STEM teacher preparation programs)

While these are some examples of ESL project themes, other themes are appropriate and many other applications to preservice STEM teacher preparation are possible.

Institutional & Community Transformation (ICT)

ICT projects may:

- Use innovative approaches to increase the propagation of highly effective teaching and learning methods, curricular and co-curricular practices across/within disciplinary communities.
- Be proposed by an institution, set of institutions, or prof community.
- Seek to transform high enrollment, lower division courses.
- Implement their efforts in multiple courses within a department or a college or in a particular disciplinary area.
- Focus on leadership development for pedagogical and curricular innovation.
ICT Projects

- Describe theory of change.
- Include research literature and theoretical perspectives concerning change.
- Recognize STEM higher education as a complex system.
- Promote institutional change and include:
  - Teams of faculty members
  - Support from the department chairs, college deans, or others within the institution's academic leadership
  - Support from Provosts or Presidents

Sample ICT Project Themes

- Technology and distance education methods
- Institutional STEM planning efforts and investigation of evidence-based practices in institutional strategic planning and faculty rewards
- STEM faculty professional development
- Development of instruments and metrics to assess institutional shifts towards evidence-based teaching practices
- Research studies on approaches for advancing change in the STEM undergraduate community

While these are some examples of ICT project themes, other themes are appropriate and many other applications to preservice STEM teacher preparation are possible.

IUSE Fact Check (True or False)

- Q1: All proposals must have a research component.
  - True. Each proposal must have a research component: either an educational or an educational research study that poses and answers one or more significant questions and uses a research design to investigate the questions.
- Q2: Funds for STEM curriculum development, programmatic pathways, learning resources, assessment instruments, and faculty development may receive funding.
  - True
- Q3: Proposals may focus on both STEM and non-STEM majors.
  - True. Efforts to improve STEM undergraduate education for either or both are welcome.
- Q4: Proposals may focus solely on STEM teacher preparation.
  - True. Proposals may focus in any area of STEM undergraduate education.
- Q5: Proposals should demonstrate a solid grounding in relevant literature on STEM teaching and learning.
  - False. All proposals must have a research component; they do not need to be evidence-based.
- Q6: Proposals must include an evaluation plan that provides formative and summative assessment of the effectiveness of the project in achieving its goals.
  - True
- Q7: Only Universities and Colleges may submit a proposal.
  - False. All categories of proposers identified in the NSF PAPPG are eligible.
IUSE Fact Check (cont.)

Q7. Which of the following may receive IUSE funding?

a. use and build evidence about improved STEM instructional practices;

b. design and study innovative learning opportunities;

c. create, implement, and test program, curricular, course, and technology-driven models;

d. develop, implement, and test creative approaches for adoption of education research into disciplinary teachings;

e. develop and validate assessments/metrics for undergraduate STEM learning and instructional practice; and

f. conduct fundamental research on issues of undergraduate STEM teaching and learning.

• Answer — ALL of the above

Robert Noyce Scholarship Program

Robert Noyce Teacher Scholarship Program

Program Solicitation

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

August 28, 2017
(Last Tuesday in August thereafter)
Robert Noyce Teacher Scholarship Program

The primary program goal is 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.

Institutions are responsible for tracking recipients and monitoring teacher service (or repayment).

Robert Noyce Scholarship Program

Track 1: S&S
Scholarships & Stipends
Undergraduate STEM majors and/or STEM professionals

Track 2: TF
NSF Teaching Fellowships
STEM professionals

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

Track 4: Noyce Research
Research related to STEM teacher effectiveness, persistence, and retention in high-need LEAs

Robert Noyce Teacher Scholarship Program
Act of Congress
2002: established scholarships and stipends
2015: STEM Education Act allows for MTFs holding bachelor's degrees in their field

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

Institutions are responsible for tracking recipients and monitoring teacher service (or repayment).
The S-STEM program provides Institutions of Higher Education (IHEs) with funds for scholarships to encourage eligible low-income academically talented students with demonstrated financial need to enter the workforce or graduate study following completion of associate, baccalaureate, or graduate degrees in STEM.

S-STEM Program Tracks

- **Track 1**: Institutional Capacity Building
  - For institutions with limited experience in implementing effective curricular and co-curricular activities
  - Seeks to leverage S-STEM funds with institutional efforts and infrastructure to increase and understand impacts

- **Track 2**: Design & Development: Single Institution

- **Track 3**: Design & Development: Multi-Institutional

NSF Solicitation 17-527 Proposal Deadline: 3/28/2018

Research Experiences for Undergraduates (REU)

- **REU Sites**
- **REU Supplements**
- **Budget**
  - Summer: general no more than $1,200 per student per week.
  - Others: comparable scale
- **Found in many directorates**
  - EHR: Supplements Only
Solid REU Site Proposals

- Undergraduates in meaningful, focused research projects
- Target under-represented groups
- Research, not instruction
- Primarily students from outside institutions
- Target students with limited opportunities
- Make your experience unique
- Involve students in entire research experience

Additional Points to Consider

- Contact Program Officer for targeted discipline
  - Variations in expectations
  - Agreements within community
- Talk to others with successful programs
  - Devil is in the details
  - Community building is critical
- Assessment and evaluation important
- Effective Mentor Training

For More Information

- REU Site Director’s Workshops and Working Groups
  - NSF Pan REU Site Directors Workshop (2016)
Thank you