Future of Research in Higher Education
(from NSF perspective)

Tasha R. Inniss, Ph.D.
National Science Foundation
EHR/HRD

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NSF by the numbers

- $7.5 billion FY 2016 estimation
- 95% funds research, education and related activities
- 49,600 proposals
- 12,000 awards funded
- 1,859 NSF-funded Institutions
- 350,000 NSF-supported researchers, students, etc.
- 214 Nobel Prize winners

Other than the FY 2016 estimation, numbers shown are based on FY 2015 activities.
Current Priorities at NSF and in the Directorate for Education and Human Resources (EHR)

- Networks to make systematic change (broadening participation by “moving the needle”)
- STEM Education Research (knowledge generating)
- Collaborations across disciplinary lines (“Teams of researchers”)
- Rigorous Evaluation
- Dissemination
Selected NSF Programs

- INCLUDES (agency-wide)
- ECR (directorate-wide)
- IUSE (Division of Undergraduate Education)
- LSAMP (Division of Human Resource Development)
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.

Source: Program Solicitation NSF 16-544
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.”
EHR Goals:

• Prepare the next generation of STEM professionals and attract/retain more Americans to STEM careers.

• Develop a robust research community that can conduct rigorous research and evaluation to 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 Core Research (ECR)

• 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

• From the onset, 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 directorates in EHR.

**NSF 15-509**
Goals of ECR

- Investing in **fundamental research in STEM education** about critical areas that are essential, broad and enduring.
- Seeking proposals that help synthesize, build and/or expand research foundations in the focal areas.
- Contributing to the **accumulation of robust evidence** to inform efforts to understand, build theory to explain, and suggest interventions and innovations.
- Addressing persistent challenges in STEM interest, education, learning, participation and workforce development.
- Developing **foundational knowledge in STEM learning** and learning contexts, both formal and informal, from childhood through adulthood, for all groups, and from the earliest developmental stages of life through participation in the workforce.
Proposal Expectations from the Division of Undergraduate Education (DUE)

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!
Improving Undergraduate STEM Education (IUSE: EHR) Program Goals

• **Improve STEM Learning & Learning Environments:**
  Improve the knowledge base for defining, identifying, and innovating effective undergraduate STEM education teaching and learning

• **Broaden Participation & Institutional Capacity for STEM Learning:**
  Increase the number and diversity of undergraduate students

• **Build the Professional STEM Workforce for Tomorrow:**
  Improve the preparation of undergraduate students

Proposals should describe projects that **build on available evidence and theory**, and that will **generate evidence and build knowledge**.
Mission: To grow the innovative and competitive U.S. STEM workforce that is vital for sustaining and advancing the Nation's prosperity by supporting the *broader participation and success of individuals currently underrepresented in STEM* and the institutions that serve them.
Louis Stokes Alliances for Minority Participation

The **LSAMP program** assists universities and colleges in their efforts to significantly increase the numbers of students from underrepresented racial/ethnic groups matriculating into and successfully completing high quality degree programs in science, technology, engineering and mathematics (STEM) disciplines.

**The LSAMP Program priorities are to:**

- Increase individual student retention and progression to baccalaureate degrees for underrepresented racial and ethnic groups,
- Enable successful transfer of underrepresented students from 2-year to 4-year institutions in STEM programs,
- Increase access to high quality undergraduate research experiences, and
- Facilitate seamless transition of underrepresented students into STEM graduate degree programs.
Knowledge-Generating Research Study

- For alliances funded 10+ Years by LSAMP

- **Education/Social Science** research study that rigorously investigates effective practices or innovations related to the proposed alliance strategies for recruiting, retaining, and graduating students historically underrepresented in STEM
Thank you!

Tasha R. Inniss
tinniss@nsf.gov
703-292-4684