Welcome to the National Science Foundation

Where Discoveries Begin

The NSF Statutory Mission, 1950: “to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense and for other purposes....”
NSF Strategic Plan, 2011 to 2015

- Transform the Frontiers
- Innovate for Society
- Perform as a Model Organization
National Science Foundation (NSF)
Directorate for Education and Human Resources (EHR)
Overview

Innovations
Building Bridges to the Future
Presentation Overview

- About EHR
- Connecting Learning and Education for a Knowledge Society
- The EHR Enterprise at NSF: Program Overview
- Coordination and Cooperation with other NSF Directorates
- Collaboration with other Federal Agencies
What Does EHR Seek to Achieve?

- Build a globally competitive, diverse STEM workforce
- Inspire and engage the public as science learners
- Advance understanding and anticipate the form and value of tomorrow’s learning
- Innovate to meet societal challenges.
EHR’s Organizational Structure

Office of the Assistant Director

- Division of Research on Learning in Formal and Informal Settings (DRL)
- Division of Undergraduate Education (DUE)
- Division of Graduate Education (DGE)
- Division of Human Resource Development (HRD)
<table>
<thead>
<tr>
<th>Division</th>
<th>FY 09 Actual</th>
<th>FY 10 Enacted</th>
<th>FY 12 Request</th>
<th>Change Over FY10 Enacted</th>
<th>Percent Change from FY10 Enacted</th>
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<tr>
<td>DRL</td>
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<td>260.00</td>
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<td>DGE</td>
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<td>HRD</td>
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<td>$872.77</td>
<td>$911.20</td>
<td>$38.44</td>
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Myths About EHR

• EHR does not accept RAPID or EAGER proposals.
• EHR does not accept CAREER proposals.
• Graduate Research Fellowships do not include STEM education as a field of study.
• EHR does not fund international activity.

Arctic Exhibit – Detroit Zoo
Knowledge and Experience

Basic Research on Learning
Multidisciplinary Learning and Education R&D
Small-Scale Implementation
Building Capacity of People and Organizations
Large Scale Deployment

Knowledge and Innovation

*Connecting Learning and Education for a Knowledge Society.* Internal Task Force on Innovation in Learning and Education, National Science Foundation, draft, January 30, 2010.

Anytime, Anywhere, Anybody Technology
The EHR Enterprise at NSF: Program Overview

- Investments across STEM fields to support education achievement and workforce development:
  - Education Research, Development, Evaluation
  - Teacher Development, Capacity Building and Partnerships in K-12 Education
  - Broadening Participation; Support for Minority Serving Institutions
  - STEM Career Pathways: Undergraduate Education
  - Public Engagement with Science
  - Innovation in Graduate Education
EHR: Bridges to Addressing Societal Challenges

- Climate Change
- Energy
- Cyber-security
- New Emerging STEM Areas

Public Understanding
Research and Evaluation on Education in S&E (REESE) advances research at the frontiers of STEM learning, education, and evaluation, and provides the foundational knowledge necessary to improve STEM teaching and learning at all educational levels and in all settings.

Discovery Research K-12 (DR-K12) enables advances in student and teacher learning of the STEM disciplines through research and development on innovative resources, models, and technologies.

The Fostering Interdisciplinary Research on Education (FIRE) strand in the REESE program seeks proposals by which scholars can cross disciplinary boundaries and facilitate the development of innovative theoretical, methodological, and analytic approaches to STEM education issues of national importance.
Research on Gender in S&E (GSE) seeks to broaden the participation of girls and women in all fields of STEM education by supporting research, the diffusion of innovations, and extension services.

Research in Disabilities Education (RDE) seeks to increase the participation of persons with disabilities in STEM education and careers. Emphasis is placed on contributing to the knowledge base.

Promoting Research & Innovation in Methodologies for Evaluation (PRIME) seeks to provide the foundational knowledge necessary to improve STEM teaching and learning at all educational levels and in all settings.
Innovative Technology Experiences for Students and Teachers (ITEST) program addresses the growing demand for information technology workers in the U.S. and seeks solutions to help ensure the breadth and depth of the STEM workforce.

Robert Noyce Teacher Scholarship (NOYCE) program seeks to encourage talented STEM majors and professionals to become K-12 mathematics and science teachers and provides scholarships and stipends for students holding STEM degrees who earn a teaching credential and commit to teaching in high-need K-12 school districts.
Math and Science Partnership (MSP) program is a major R&D effort supporting innovative partnerships to improve K-12 student achievement in math and science. MSP projects contribute to what is known in math and science education and serve as models that have a sufficiently strong evidence/research base to improve student outcomes.

NSF Graduate STEM Fellows in K-12 (GK-12)* enhances graduate students’ teaching skills and improves STEM teaching and learning within K-12 classrooms through sustained partnerships between institutions of higher education and local school districts.
Public Engagement in Science

**Informal Science Education (ISE)**
program supports innovation in anywhere, anytime, lifelong learning, through investments in research, development, infrastructure, and capacity-building. ISE also supports PIs of NSF-funded research projects for *Communicating Research to Public Audiences*.

**Climate Change Education (CCE)**
supports a broad range of efforts to enhance climate literacy and to enable individuals and communities to make informed, responsible decisions regarding actions affecting climate.

*Virtual Human Museum Guides and Living Laboratory Exhibit at the Boston Museum of Science*

*Mute Swan spotted by “Citizen Counter” participating in the 2008 NSF-funded Great Backyard Bird Count*

*NSF-supported graduate students work with Inuit villagers on Baffin Island, Canada*
STEM Career Pathways: Undergraduate Education

Advanced Technological Education (ATE) focuses on education of technicians for high-technology fields that drive our nation's economy. Partnerships among academia and industry are prominent features.

ATE Technician Education Project

STEM Talent Expansion Program (STEP) supports projects leading to an increase in the number of students earning STEM degrees. Educational research projects on degree attainment in STEM are encouraged.

NSF Scholarships in STEM (S-STEM) makes grants to institutions of higher education to support scholarships for academically talented, financially needy students for an associate, baccalaureate, or graduate level degree.
Federal Cyber Service: Scholarship for Service (SFS) supports scholarships and capacity building activities designed to increase the number of qualified students entering the fields of information assurance and computer security.

Transforming Undergraduate Education in STEM (TUES) supports efforts to create, adapt, and disseminate new learning materials and teaching strategies, develop faculty expertise, implement educational innovations, assess learning and evaluate innovations, and conduct research on STEM teaching and learning.
Innovation in Graduate Education

Transforming STEM Learning (TSL) program invites interdisciplinary proposals to study prototypes for innovations like virtual schools; and design and conduct exploratory development of new, potentially transformative models for STEM learning environments.

Integrative Graduate Education and Research Traineeship (IGERT) supports education of U.S. Ph.D. scientists and engineers with the deep interdisciplinary knowledge and technical, professional, and personal skills to become leaders and creative agents for change.

IGERT-funded researcher develops hand-held spectrometer.
Graduate Research Fellowships (GRF) awards support for graduate study leading to research-based masters or doctoral degrees. Provides three years of support within a five-year period, which may be used at an institution in the U.S. or abroad.

NSF Graduate STEM Fellows in K-12 (GK-12)* provides funding to broadly prepare graduate students for professional careers and, through interactions with teachers in K-12 schools, improve their communication and teaching skills and enrich STEM instruction in K-12 schools.
Support to Minority-Serving Institutions

**Tribal Colleges and Universities (TCUP)** program enhances the quality of STEM instructional and outreach programs at Tribal, Alaskan Native-serving, and Native Hawaiian-serving institutions.

**Centers of Research Excellence in Science and Technology (CREST)** enhances research capabilities of minority serving institutions and their faculty through effective integration of education and research, and expands the presence of students historically underrepresented in STEM disciplines.

**Historically Black Colleges and Universities—Undergraduate Program (HBCU-UP)** seeks to increase the quality of STEM education at Historically Black Colleges and Universities, addressing their STEM needs goals and mission.
Large-Scale Programs for Broadening Participation

Research in Disabilities Education (RDE) seeks to increase the participation of persons with disabilities in STEM education and careers. Emphasis is placed on research to expand the knowledge base in disabilities education.

Undergraduate research fellows with disabilities work at U. Southern Main laboratory.

Alliances for Graduate Education and the Professoriate (AGEP) aims to increase the number of underrepresented minorities receiving PhD degrees in STEM.
Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers (ADVANCE) develops systematic approaches to increase the representation and advancement of women in academic science and engineering careers.

Louis Stokes Alliances for Minority Participation (LSAMP) seeks to increase the quality and quantity of students receiving baccalaureate degrees in STEM fields, and provides a “Bridge to the Doctorate” component.
## Educational Research at NSF Today: In the EHR Directorate

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<thead>
<tr>
<th>Research Programs</th>
<th>Research and Development Programs</th>
<th>Programs with Research Tracks</th>
<th>Programs to Support Development of Education Research Workforce</th>
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<tr>
<td>Research and Evaluation on Education in Science and Engineering (REESE)</td>
<td>Cyberlearning Transforming Education (CTE) – Proposed for FY2011 with support across five EHR programs [DR-K12; ISE; TUES; CREST; NSDL]</td>
<td>Innovative Technology Experiences for Students and Teachers (ITEST)</td>
<td>Fostering Interdisciplinary Research on Education (FIRE) – a strand of the Research and Evaluation on Education in Science and Engineering (REESE) program.</td>
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<tr>
<td>PRIME</td>
<td>Discovery Research K-12 (DR-K12)</td>
<td>Informal Science Education (ISE)</td>
<td>Graduate Research Fellowships (GRF)</td>
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<td>Climate Change Education Partnerships (CCEP) – with support from the BIO and GEO Directorates, and OPP</td>
<td>Historically Black Colleges and Universities, Undergraduate Program (HBCU-UP)</td>
<td>Faculty Early Career Development (CAREER) proposals to the EHR Directorate</td>
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<td>Research on Gender in Science and Engineering (GSE)</td>
<td>Math and Science Partnership (MSP)</td>
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<td>STEM Talent Expansion (STEP) – Track II</td>
<td>Transforming Undergraduate Education in STEM (TUES)</td>
<td>Advanced Technological Education (ATE)</td>
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*Transforming STEM Learning (TSL)*
Education Research Elsewhere at NSF

• Mathematics and Physical Sciences Directorate [Education and Interdisciplinary Research]

• Engineering Directorate [Innovations in Engineering Education, Curriculum, and Infrastructure program]

• Computer and Information Science and Engineering Directorates [Proposed FY2011 Program in Cyberlearning for Transforming Education (CISE/EHR/SBE/OCI); a new planning effort underway for a program on research on learning in the context of computing education]

• Social and Behavioral Sciences Directorate [Science of Learning Centers, Developmental and Learning Sciences, Social Psychology, and Linguistics]
### EHR Programs:

<table>
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<tr>
<th>Program</th>
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<th>Multidisciplinary Learning R&amp;D</th>
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<td>FIRE: Fostering Interdisciplinary Research on Education</td>
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<td>GRF: Graduate Research Fellowships</td>
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<td>STEP: Science Technology, Engineering, and Mathematics Talent Expansion</td>
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<tr>
<td>TCUP: Tribal Colleges and Universities Program</td>
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<td>TUES: Transforming Undergraduate Education in STEM</td>
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<td>ADVANCE</td>
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<td>CAREER</td>
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<td>Climate Change Education (CCE)</td>
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<td>Computing in the Cloud (CiC)</td>
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<td>Nanotechnology in Undergraduate Education in Engineering (NUE)</td>
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EHR Coordination/Cooperation with other NSF Directorates
Selected *Cross-Cutting* Programs

- ADVANCE
- CAREER
- STEM Talent Expansion Program (STEP)
- Climate Change Education (CCE)
- Computing in the Cloud (CiC)
- Cyber-Enabled Discovery and Innovation (CDI)
- Partnerships for International Research and Education (PIRE)
- Science of Learning Centers (SLC)
- NSF Fellows in Graduate Education K-12 (GK-12)
- Integrative Graduate Education and Research Traineeships (IGERT)
- Nanotechnology in Undergraduate Education in Engineering (NUE)
- Research Coordination Networks in Biological Sciences (RCN)
- Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM)
- International Research and Education (OIE)
NSF Collaboration with other Federal Agencies
New Programs Proposed for FY2012

✓ Teacher Learning for the Future (TLF)
  - provide R&D awards to further understanding of the preparation and continuing education of STEM teachers.

✓ Transforming Broadening Participation through STEM (TBPS)
  - seeks innovative solutions for broadening participation in STEM at the undergraduate level in anticipation of tomorrow’s changing demographics, including increased engagement with Hispanic-serving institutions.

✓ Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)
  - fund research on how to achieve widespread sustainable implementation of evidence–based undergraduate instructional practices to improve student outcomes, based in part on demonstration models of such practices.
Visiting the EHR Website
Glossary of Principal EHR Programs

• AGEP: Alliances for Graduate Education and the Professoriate
• ATE: Advanced Technological Education
• CREST: Centers of Research Excellence in Science and Technology
• DR-K12: Discovery Research K-12
• Federal Cyber Service: Scholarship for Service (SFS)
• FIRE: Fostering Interdisciplinary Research on Education
• GRF: Graduate Research Fellowships
• GSE: Research on Gender in Science and Engineering
• HBCU-UP: Historically Black Colleges and Universities, Undergraduate Program
• ISE: Informal Science Education
• ITEST: Innovative Technology Experiences for Students and Teachers
• LSAMP: Louis Stokes Alliances for Minority Participation
Glossary of Principal EHR Programs

• MSP: Math and Science Partnership  

• NSDL: National STEM Education Distributed Learning  

• S-STEM: NSF Scholarships in STEM  

• NOYCE: Robert Noyce Teacher Scholarship Program  

• PRIME: Promoting Research and Innovation in Methodologies for Evaluation  

• REESE: Research and Evaluation on Education in Science and Engineering  

• RDE: Research in Disabilities Education  

• STEP: Science Technology, Engineering, and Mathematics Talent Expansion  

• TCUP: Tribal Colleges and Universities Program  

• TSL: Transforming STEM Learning

• TUES: Transforming Undergraduate Education in STEM  