

National Science Foundation (NSF)

**Directorate for Education
and Human Resources (EHR)**

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Division of Undergraduate Education

Innovations

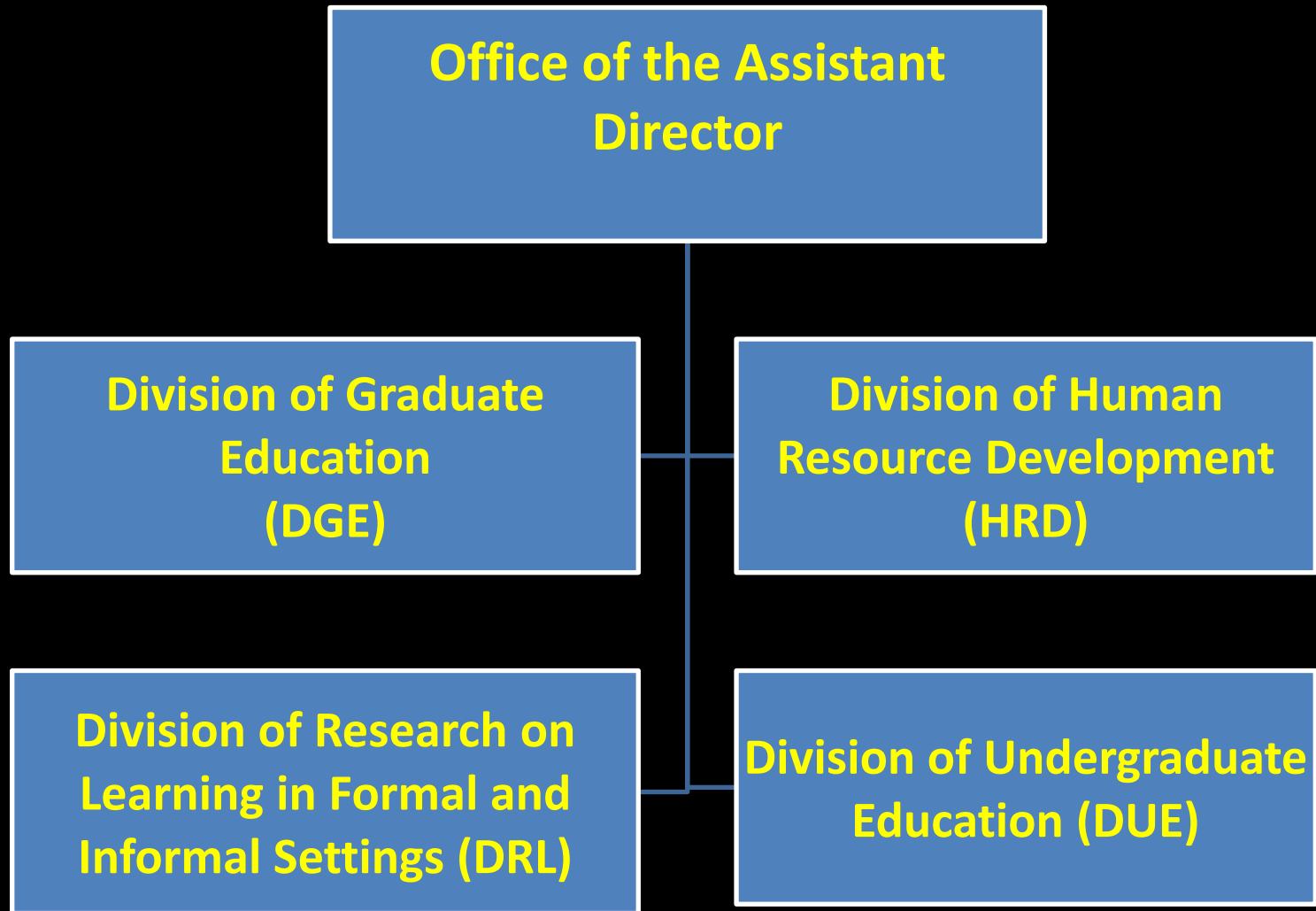
NSF Day

**Indiana University of
Pennsylvania**

September 21, 2011



EHR's Organizational Structure



Visiting the EHR Website

<http://www.nsf.gov/dir/index.jsp?org=EHR>

The screenshot shows the NSF EHR website homepage. At the top is a dark blue navigation bar with links: HOME | FUNDING | AWARDS | DISCOVERIES | NEWS | PUBLICATIONS | STATISTICS | ABOUT | FastLane. Below this is the NSF logo and the text "National Science Foundation DIRECTORATE FOR Education and Human Resources (EHR)". To the right is a search box with "NSF Web Site" selected in a dropdown menu and a search button. A secondary navigation bar below the header contains: EHR Home | EHR Funding | EHR Awards | EHR Discoveries | EHR News | About EHR. The main banner features a photo of a man in a white lab coat looking at a computer monitor, with the text "Ensuring the health and vitality of our nation's education". The page is divided into three columns. The left column has a grey header "EHR Organizations" and lists: Graduate Education (DGE), Research on Learning in Formal and Informal Settings (DRL), Undergraduate Education (DUE), and Human Resource Development (HRD). Below this is a grey header "About EHR" with links: View EHR Staff Directory, Search EHR Staff Directory, and a search box. The middle column has a grey header "August 25 Deadlines" with text about a deadline for Innovation Through Institutional Integration (I-3) proposals. Below is a grey header "Special Announcements" with text about two Division Director positions: the Division of Research on Learning and the Division of Graduate Education. The right column has a green header "Get EHR Updates by Email" with a "Publications See All" link and a featured article "Fostering Learning in the Networked World: The Cyberlearning Opportunity and Challenge". Below is a grey header "Other Site Features" with links: Special Reports, Research Overviews, Multimedia Gallery, Classroom Resources, and NSF-Wide Investments. The bottom right corner of the page shows the number "3".

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.



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



The EHR *Enterprise* at NSF:

□ Investments across STEM fields to support:

- ❖ Teacher Development, Capacity Building and Partnerships in K-12 Education
- ❖ Undergraduate Education in STEM including Career Prep
- ❖ Innovation in Graduate Education
- ❖ Broadening Participation; Support for Minority Serving Institutions
- ❖ Public Engagement with Science
- ❖ Education Research, Development, Evaluation

Teacher Development, Capacity Building and Partnerships in K-12 Education



Innovative Technology Experiences for Students and Teachers (ITEST) program supports research about the growing demand for professionals and 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 encourages talented STEM majors and professionals to become 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. It also serves the needs of those seeking career change into STEM or become Master Teachers



Cal State, Long Beach,
NOYCE Scholars

Teacher Development, Capacity Building and Partnerships in K-12 Education [cont'd]



Appalachian MSP Project

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.

STEM Career Pathways: Undergraduate Education



ATE Technician
Training Project

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.

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.



STEM Career Pathways: Undergraduate Education [cont'd]



Customized, scaled model of a city water supply system used by NSF Cyber Corps students to test operating software weaknesses.

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



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 terahertz spectrometer.

Innovation in Graduate Education [cont'd]



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 any accredited U.S. institution.

Large-Scale Programs for Broadening Participation



Sitting Bull College students gather nets capturing animal field data in environmental science research.

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

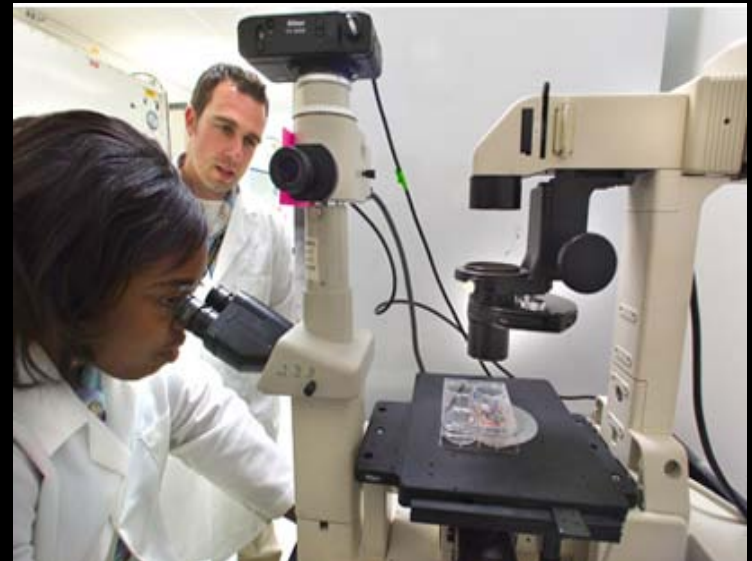
Centers of Research Excellence in Science and Technology (CREST) enhances research capabilities of minority serving institutions and their faculty through effective integration of education and research, and expands the presence of students historically underrepresented in STEM disciplines



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

Alliances for Graduate Education and the Professoriate (AGEP) aims to increase the number of underrepresented minorities receiving PhD degrees in STEM.



Large-Scale Programs for Broadening Participation [cont'd]



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.



Public Engagement in Science



Mute Swan spotted by “Citizen Counter”
Darla May of Ft. Lauderdale, FL, participating
in the 2008 NSF-funded *Great Backyard Bird Count*

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

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*



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

Education Research, Development, Evaluation



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.

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.

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

Education Research, Development, Evaluation [cont'd]



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.



Undergraduate student teachers use SimSchool® module to learn to how to teach students with disabilities

Education Research, Development, Evaluation [cont'd]



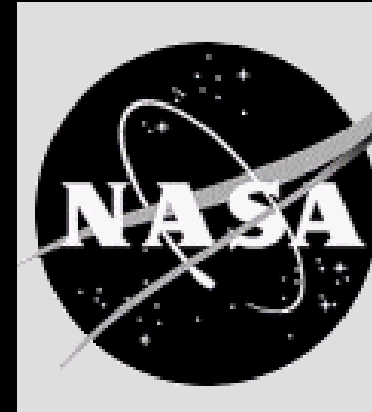
Transforming STEM Learning (TSL) program invites interdisciplinary proposals to study prototypes for innovations like virtual schools; and design and conduct exploratory development of new, potentially transformative models for STEM learning environments.

Promoting Research & Innovation in Methodologies for Evaluation (PRIME) supports research on evaluation; explores innovative new approaches for determining impacts and usefulness of STEM education activities.

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*]

NSF Collaboration with other Federal Agencies



Glossary of EHR Programs

- AGEP: Alliances for Graduate Education and the Professoriate
<http://www.nsf.gov/pubs/2010/nsf10605/nsf10605.htm>
- ATE: Advanced Technological Education
<http://www.nsf.gov/pubs/2010/nsf10539/nsf10539.htm>
- CREST: Centers of Research Excellence in Science and Technology
<http://www.nsf.gov/pubs/2010/nsf10519/nsf10519.htm>
- Federal Cyber Service: Scholarship for Service (SFS)
<http://www.nsf.gov/pubs/2010/nsf10505/nsf10505.htm>
- GRF: Graduate Research Fellowships
<http://www.nsf.gov/pubs/2010/nsf10604/nsf10604.htm>
- GSE: Research on Gender in Science and Engineering
<http://www.nsf.gov/pubs/2010/nsf10516/nsf10516.htm>
- HBCU-UP: Historically Black Colleges and Universities, Undergraduate Program
<http://www.nsf.gov/pubs/2010/nsf10518/nsf10518.htm>
- ISE: Informal Science Education
<http://www.nsf.gov/pubs/2010/nsf10565/nsf10565.htm>
- ITEST: Innovative Technology Experiences for Students and Teachers
<http://www.nsf.gov/pubs/2009/nsf09506/nsf09506.htm>
- LSAMP: Louis Stokes Alliances for Minority Participation
<http://www.nsf.gov/pubs/2010/nsf10522/nsf10522.htm>

Glossary of Principal EHR Programs

- MSP: Math and Science Partnership
<http://www.nsf.gov/pubs/2010/nsf10556/nsf10556.htm>
- S-STEM: NSF Scholarships in STEM
<http://www.nsf.gov/pubs/2009/nsf09567/nsf09567.htm>
- NOYCE: Robert Noyce Teacher Scholarship Program
<http://www.nsf.gov/pubs/2010/nsf10514/nsf10514.htm>
- REESE: Research and Evaluation on Education in Science and Engineering
<http://www.nsf.gov/pubs/2010/nsf10586/nsf10586.htm>
- RDE: Research in Disabilities Education
<http://www.nsf.gov/pubs/2009/nsf09508/nsf09508.htm>
- STEP: Science Technology, Engineering, and Mathematics Talent Expansion
<http://www.nsf.gov/pubs/2008/nsf08569/nsf08569.htm>
- TCUP: Tribal Colleges and Universities Program
<http://www.nsf.gov/pubs/2010/nsf10501/nsf10501.htm>
- TUES: Transforming Undergraduate Education in STEM
<http://www.nsf.gov/pubs/2010/nsf10544/nsf10544.htm>

Glossary of EHR Activities

- TSL: Transforming STEM Learning
<http://www.nsf.gov/pubs/2010/nsf10602/nsf10602.htm>
- EASE: Excellence Awards in Science and Engineering [A composite activity representing the NSF Presidential Awards for Excellence in Math and Science Teaching (PAEMST) and the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring]
- Communicating Research to Public Audiences [Funded under Informal Science Education (ISE) program <http://www.nsf.gov/pubs/2010/nsf10565/nsf10565.htm>]
- PRIME: Promoting Research and Innovation in Methodologies for Evaluation
<http://www.nsf.gov/pubs/2010/nsf10615/nsf10615.htm>
- Fostering Interdisciplinary Research on Education (FIRE)
<http://www.nsf.gov/pubs/2010/nsf10541/nsf10541.htm>

Selected *Cross-Cutting* Programs with EHR Participation

- **ADVANCE** <http://www.nsf.gov/pubs/2010/nsf10593/nsf10593.htm>*
- **CAREER** <http://www.nsf.gov/pubs/2008/nsf08557/nsf08557.htm>*
- **Climate Change Education (CCE)** <http://www.nsf.gov/pubs/2010/nsf10542/nsf10542.htm>
- **Computing in the Cloud (CiC)** <http://www.nsf.gov/pubs/2010/nsf10550/nsf10550.htm>
- **Cyber-Enabled Discovery and Innovation (CDI)** <http://www.nsf.gov/pubs/2010/nsf10506/nsf10506.htm>
- **Cyberlearning Transforming Education** http://www.nsf.gov/publications/pub_summ.jsp?org=NSF&ods_key=nsf10620
- **Partnerships for International Research and Education (PIRE)** <http://www.nsf.gov/pubs/2009/nsf09505/nsf09505.htm>
- **Science of Learning Centers (SLC)** http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5567&org=NSF&sel_org=XCUT&from=fund
- **Graduate Research Fellowships (GRF)** http://www.nsf.gov/publications/pub_summ.jsp?WT.z_pims_id=6201&ods_key=nsf10604*
- **Integrative Graduate Education and Research Traineeships (IGERT)** <http://www.nsf.gov/pubs/2010/nsf10523/nsf10523.htm>*
- **Nanotechnology in Undergraduate Education in Engineering (NUE)** <http://www.nsf.gov/pubs/2010/nsf10536/nsf10536.htm>
- **Networking and Information Technology R&D**
- **Research Coordination Networks in Biological Sciences (RCN)** <http://www.nsf.gov/pubs/2010/nsf10566/nsf10566.htm>
- **International Research and Education (OIE)** <http://www.nsf.gov/pubs/2004/nsf04035/nsf04035.htm>
- **Science, Engineering and Education for Sustainability (SEES);** <http://www.nsf.gov/pubs/2011/nsf11022.jsp?org=NSF>
- **Regaining our ENERGY Science and Engineering Edge (RE-ENERGYSE)**http://www.nsf.gov/news/news_summ.jsp?cntn_id=116320