National Science Foundation STEM Education Grant Opportunities

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Program Director
Division of Undergraduate Education
Directorate for Education and Human Resources

Presentation Outline

- **American Competitiveness Initiative (ACI)**
- **National Science Foundation (NSF)**
- **Education and Human Resources (EHR) Directorate**
- **EHR Divisions: missions and programs**
- **Strategies and Participation**

ACI

- One of the great engines of our growing economy is our Nation's **capacity to innovate**.

- To build on our successes and remain a **leader in science and technology**...

- The American Competitiveness Initiative commits $5.9 billion in FY 2007 to increase investments in **research and development, strengthen education, and encourage entrepreneurship**.

- Over 10 years, the Initiative commits $50 billion to increase funding for **research** and $86 billion for **research and development** tax incentives.

- The bedrock of America's competitiveness is a **well-educated and skilled workforce**.

- As we increase **investments in research and development, strengthen education, and provide more flexible training for workers**

- ... In **partnership with the private sector, State and local governments, and colleges and universities**, the American Competitiveness Initiative will promote **new levels of educational achievement and economic productivity**. ...

Investing in America's Future
The *new* NSF Strategic Plan
FY 2006 - 2011

NSF VISION

Advancing discovery, innovation and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering.

NSF Strategic Outcome Goals

- **Discovery**
- **Learning**
- **Research Infrastructure**
- **Stewardship**

The ACI & The NSF Strategic Plan Are Aligned

- **_Discovery_**
  - Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

- **_Learning_**
  - Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

- **_Research infrastructure_**
  - Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.

- **_Stewardship_**
  - Support excellence in science and engineering research and education through a capable and responsive organization.

Today's young people face a world of increasing global competition. We depend on the excellence of U.S. schools and universities to provide students with the wherewithal to meet this challenge and to make their own contributions to America's future.

Dr. Arden L. Bement, Jr.
Director, NSF

Committee on Science, U.S. House of Representatives, Hearing on K-12 Science and Math Education Across Federal Agencies -- March 30, 2006

National Science Foundation
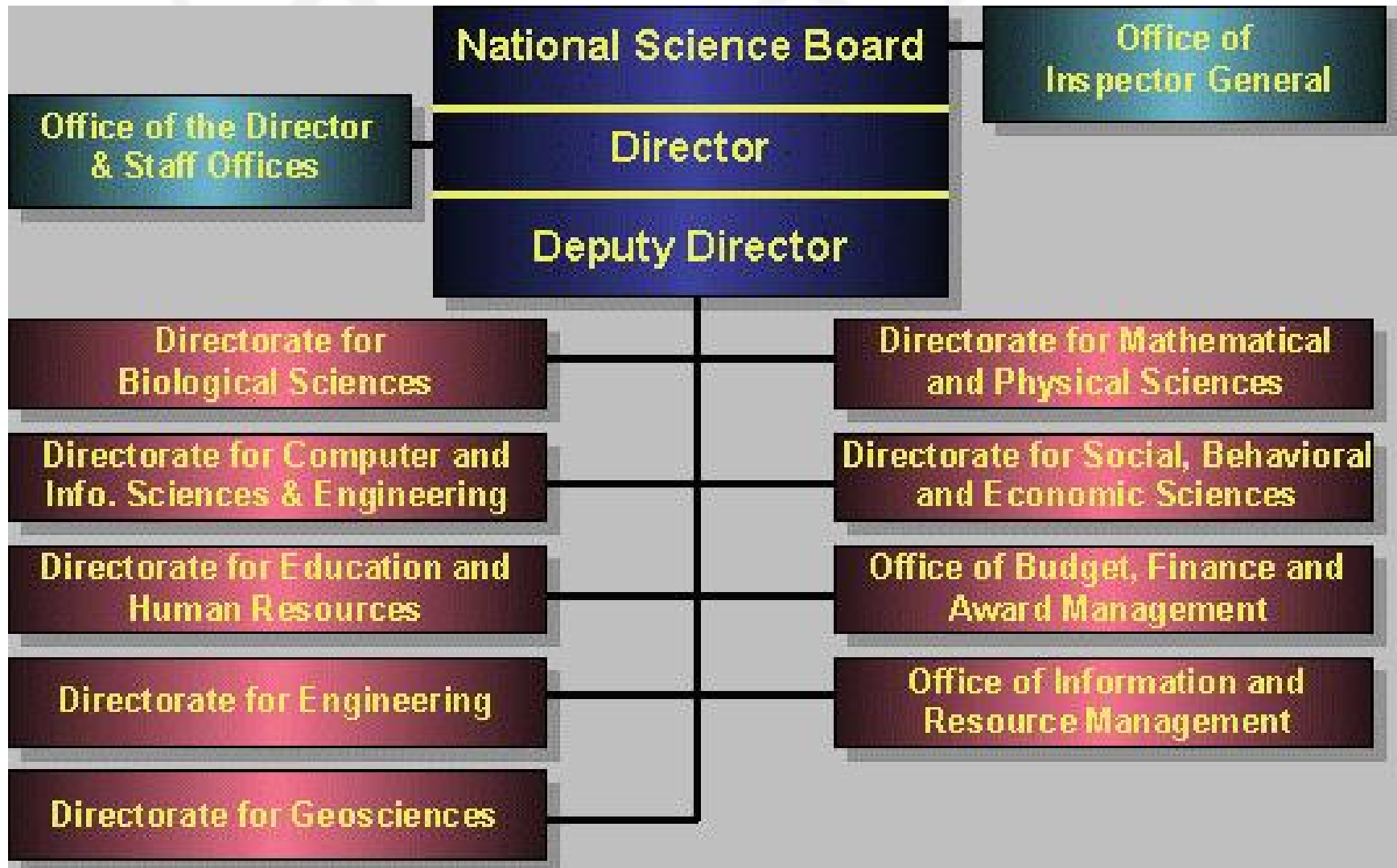
The Directorate for Education & Human Resources

EHR supports education, research, and infrastructure development in all STEM disciplines

EHR Mission

EHR promotes the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry who have access to the ideas and tools of science and engineering.

NSF/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 Divisions

- Division of Elementary, Secondary and Informal Education (ESIE)

- Division of Research, Evaluation and Communication (REC)

- Division of Undergraduate Education (DUE)

- Division of Graduate Education (DGE)

- Division of Human Resource Development (HRD)

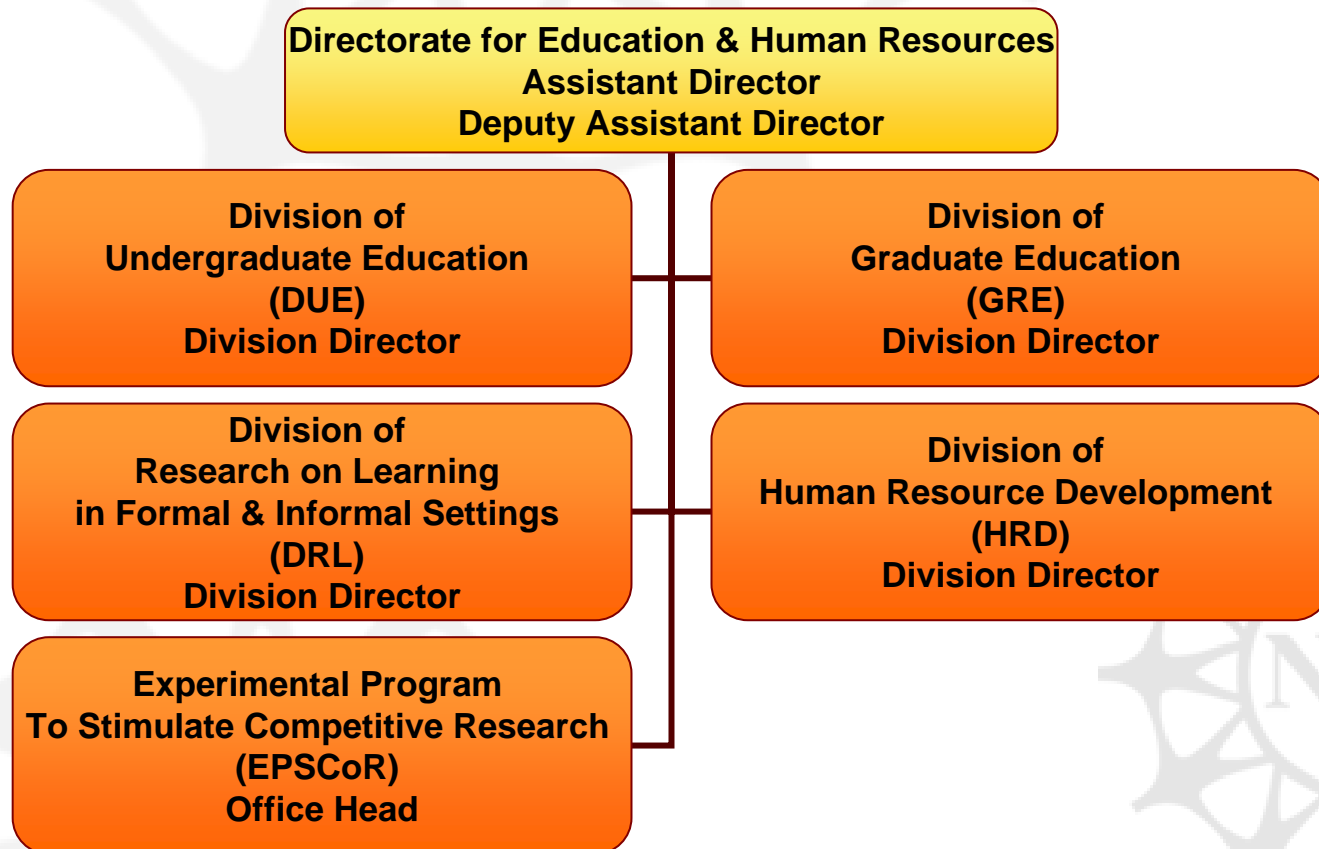- Experimental Program to Stimulate Competitive Research (EPSCoR)

EHR Proposed Realignment

- Division of Elementary, Secondary and Informal Education (ESIE)

- Division of Research, Evaluation and Communication (REC)

- Division of Undergraduate Education (DUE)

- Division of Graduate Education (DGE)

- Division of Human Resource Development (HRD)

- Experimental Program to Stimulate Competitive Research (EPSCoR)

EHR Proposed Realignment

- 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)

- Experimental Program to Stimulate Competitive Research (EPSCoR)

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The EHR Organization (New)

Directorate for Education & Human Resources
Assistant Director
Deputy Assistant Director

Division of
Undergraduate Education
(DUE)
Division Director

Division of
Graduate Education
(GRE)
Division Director

Division of
Research on Learning
in Formal & Informal Settings
(DRL)
Division Director

Division of
Human Resource Development
(HRD)
Division Director

Experimental Program
To Stimulate Competitive Research
(EPSCoR)
Office Head

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www.nsf.gov

EHR Divisions

EHR Divisions (e.g., DUE)

EHR Programs (e.g., ATE)

National Science Foundation
DIRECTORATE FOR
Education and Human Resources (EHR)

SEARCH

NSF Web Site

Undergraduate Education (DUE)

DUE Home

About DUE

Funding Opportunities

Awards

News

Events

Discoveries

Publications

Career Opportunities

Project Information Resource System

View DUE Staff

Advanced Technological Education (ATE)

CONTACTS

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PROGRAM GUIDELINES

05-530 Solicitation

DUE DATES

Full Proposal Deadline Date: October 12, 2006

SYNOPSIS

With an emphasis on two-year colleges, the Advanced Technological Education (ATE) program focuses on the education of technicians for the high-technology fields that drive our nation's economy. The program involves partnerships between academic institutions and employers to promote improvement in the education of science and engineering technicians at the undergraduate and secondary school levels. The ATE program supports curriculum development; professional development of college faculty and

Division of Elementary, Secondary and Informal Education (ESIE)

ESIE programs are designed to improve the educational experiences of all students in school settings — pre-K through the 12th grade — and to increase and improve the opportunities for all individuals to explore science, mathematics, and technology beyond the school setting.

ESIE Programs

Informal Education

- Informal Science Education (ISE)

- Communicating Research to Public Audiences

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ESIE Programs

K-12 Education

- Advanced Technological Education (ATE)

- Discovery Research K-12 (DRK-12)

  (TPC, IMD, CLT)

- Information Technology Experiences for Students and Teachers (ITEST)

- NSF Academies for Young Scientists (AYS)

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Division of Research, Evaluation, and Communication (REC)

REC contributes to the broad field of educational research and improvement by funding projects through grants, contracts, and cooperative agreements. It also provides conceptual and technical assistance to various EHR programs and principal investigators.

REC Programs

- Advanced Learning Technologies

- Research and Evaluation on Education in Science and Engineering (REESE) (ROLE, EREC, IERI)

Division of Undergraduate Education (DUE)

Mission: To promote excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students.

Goals:
- **Provide leadership**
- **Support curriculum development**
- **Prepare the workforce**
- **Foster connections**

(See DUE website for strategies associated with these goals.)

DUE Programs

Curriculum, Laboratory and Instructional Development

- Course, Curriculum and Laboratory Improvement (CCLI)
- National STEM Education Digital Library (NSDL)

DUE Programs

Workforce Development

- STEM Talent Expansion Program (STEP)

- Advanced Technological Education (ATE)

DUE Programs

Workforce Development – Scholarship Programs

- Federal Cyber Service: Scholarships for Service (SFS)

- Robert Noyce Scholarship Program (Noyce)

- NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)

DUE Programs

Realignment – New to DUE

Math and Science Partnership (MSP)

Excellence Awards in Science & Engineering (EASE)

- The Distinguished Teaching Scholars (DTS) Program
- The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) Program
- The Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM)

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DUE PIRS

Project Information Resource System

(PIRS), through which you can access updated information about DUE projects that is provided and maintained by individual principal investigators. A text search of these records will produce a "hit list" of projects that "match" your input.

Project Information Resource System (PIRS)

Welcome to the NSF Division of Undergraduate ~~Education~~ access updated information about
DUE projects that is provided and maintained by ~~~~ projects which "match" your input.

(This system employs a number of recent WW~~~~ity on your browser.)

Please enter specific words, e.g. **physics** *or* **Sr~~~~tton. Multiple words must be
connected by* **and** *or* **or** *, e.g.* **Biology and Ch~~~~sity of Massachusetts".

| Not Specified |
| Assessment of Student Achievement (ASA) |
| **Advanced Technological Education (ATE)** |
| Collaboratives For Excellence in Teacher Preparation (CETP) |
| Computer Science, Engineering and Mathematics Scholarships (CSEMS) |
| Course And Curriculum Development - ALL (CCD-ALL) |
| Calculus Reform Initiative in CCD |
| Course and Curriculum Projects in CCD |
| Chemistry Initiative in CCD |
| NSF Director's Award for Distinguished Teaching Scholars (DTS) |
| Institution-wide Reform Initiative in CCD |
| Leadership Projects in Laboratory Development |
| Mathematics Initiative in CCD |
| National SMETE Digital Library (NSDL) |
| Course, Curriculum and Laboratory Improvement (CCLI-ALL) |
| Adaptation And Implementation (A&I) |
| Education Materials Development (EMD) |
| National Dissemination (ND) |
| Instrumentation and Laboratory Improvement (ILI) |
| Federal Cyber Service: Scholarship for Service (SFS) |
| STEM Talent Expansion Program (STEP) |
| Undergraduate Faculty Enhancement (UFE) |
| Science, Technology, Engineering, and Mathematics Teacher Preparation (STEMTP) |
| Robert Noyce Scholarship Program |

[Execute Query] [Clear] [Tips for more adv~~~~]

Award Identification Number (e.g. 9650125)

Last Name of Principal Investigator (PI)

Institution Name

Key words in Title or Abstract of Project

Key words in Updated Project Description

NSF Program Name   Not Specified ▼

Fiscal Year Awarded (e.g. FY1997)   Not Specified ▼

Discipline   Not Specified ▼

State   Not Specified ▼

Description of Curricula affected

[Execute Query] [Clear] [Tips for more advanced searching] are available.

DISCLAIMER: *The information contained in any record that you access through this system is provided and maintained solely by an individual principal
investigator. NSF makes no claim as to its accuracy or completeness.*

We hope you find this system useful! Please send comments to ***undergrad@nsf.gov***.

Coverage in PIRS is continually expanding. Principal investigators for all active and completed projects supported by the Division of Undergraduate Education are invited to

Division of Graduate Education (DGE)

DGE programs promote the early career development of scientists and engineers by providing support at critical junctures of their careers through fellowships and traineeships.

DGE Programs

- <u>Graduate Research Fellowships</u>

- <u>NSF Graduate Teaching Fellows in K-12 Education</u> (GK-12)

- <u>Integrative Graduate Education and Research Traineeship</u> (IGERT)
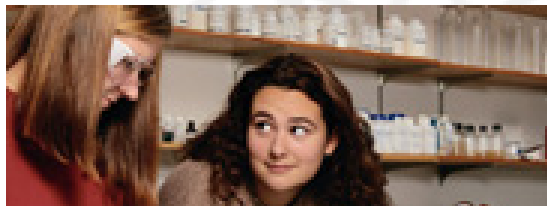
Division of Human Resource Development (HRD)

Two-fold Mission:

To increase the participation and advancement of underrepresented minorities and minority-serving institutions, women and girls, and persons with disabilities at every level of the science and engineering enterprise.

To serve as a focal point for NSF's agency-wide commitment to enhancing the quality and excellence of science, technology, engineering, and mathematics (STEM) education and research through broadening participation by underrepresented groups and institutions.

HRD Programs

Minorities and Minority Serving Institutions

- Alliances for Graduate Education and the Professoriate Program (AGEP)

- The Louis Stokes Alliance for Minority Participation Program (LSAMP) and Bridge to the Doctorate (BD) Program

- Centers for Research Excellence in Science and Technology (CREST)

- Historically Black Colleges and Universities Undergraduate Programs (HBCU-UP)

- Tribal Colleges and Universities Program (TCUP)

HRD Programs

Women and Girls

- Research on Gender in Science and Engineering (GSE)

Persons with Disabilities

- Research in Disabilities Education (RDE)

Tribal Colleges and Universities Program

(TCUP)

Then until now...

- TCUP established in 2001, at $10 million per year
- Now in Year 7
- 37 Implementation awards

Tribal Colleges and Universities Program (TCUP)

Implementation and Current Planning Sites

Ilisagvik College

University of Alaska Fairbanks
College of Rural Alaska
Kuskokwim Campus

Interior Aleutians Campus

Bristol Bay Campus

University of Alaska Fairbanks
College of Rural Alaska

University of Alaska Southeast
Sitka Campus*

Sheldon Jackson College

Northwest Indian C.

Blackfeet C.C.

Fort Belknap C.

Turtle Mountain C.C.

Salish Kootenai C.

Fort Peck C.C.

Fort Berthold C.C.

White Earth Tribal and C. C.

Leech Lake Tribal C.

United Tribes Tech. C.

Fond du Lac Tribal and C.C.

Little Big Horn C

Lac Courte Oreilles Ojibwa C. C.

Chief Dull Knife C.

Sitting Bull C.

Sisseton Wahpeton C.

College of Menominee Nation

Oglala Lakota C.

Sinte Gleska Univ.

Haskell Indian Nations Univ.

Crownpoint Institute of Technology

Southwestern Indian Polytechnic Institute

University of Hawai'i at Manoa

Kapi'olani C.C.

Maui C.C.

University of Hawai'i at Hilo

Cohort 1 Implementation (2001-2006)   8 sites
Cohort 2 Implementation (2002-2007)   5 sites
Cohort 3 Implementation (2003-2008)   4 sites
Cohort 4 Implementation (2004-2009)   8 sites
Cohort 5 Implementation (2005-2010)   4 sites
Cohort 5 Planning (2004-2005)   2 sites

* 2004-06

Program funded by the
National Science Foundation

Systemic Research, Inc. © 2005 (1-12)

As of October 2005 total 29 implementation sites
                          2 planning sites

TCUP funds support STEM infrastructure development

- **Funds allow colleges to offer better, more varied, and higher-level science, math, technology, and engineering instruction.**

This can take the form of:

- **Release time for faculty:**
  - **Develop courses**
  - **Revise/update courses**
  - **Develop new degree program**
- **Hiring faculty**
- **Equipping labs for new or updated courses**

It can also support…

- Student research projects
- STEM student support and internships
- Faculty development opportunities
- Faculty exchanges

Types of Support

- Planning grants from new colleges
- Phase I Implementation
- Collaborative Partnerships
- STEM Teachers of Excellence Education Projects (STEEP)
- Phase II
- Supplements
- Workshops

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Tribal Colleges and Universities Program (TCUP)

- **Program Solicitation: NSF 04-602**
- **Full Proposal Deadline(s):** October 18 annually
  - (due by 5 p.m. proposer's local time):
- **Cognizant Program Officer(s):**
  - Lura (Jody) Chase, Program Director,
  - NSF Room 815 N,
  - telephone: (703) 292-8682
  - fax: (703) 292-9018
  - email: lchase@nsf.gov

Experimental Program to Stimulate Competitive Research (EPSCoR)

EPSCoR promotes the development of the states' science and technology (S&T) resources through partnerships involving a state's universities, industry, and government, and the Federal research and development (R&D) enterprise.
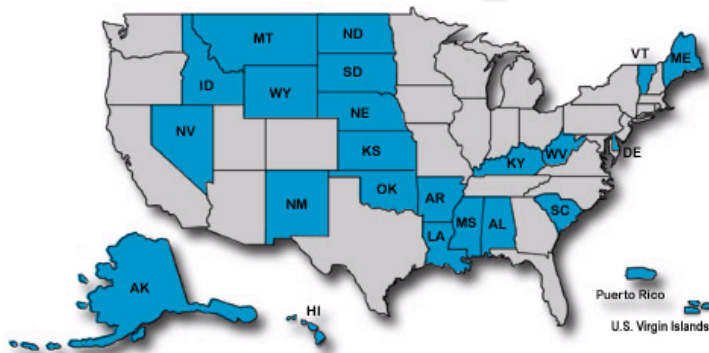
NSF-Wide/Crosscutting Programs with an Undergraduate Component

Program	Solicitation
Partnerships for Innovation (PFI)	NSF 06-550
Research Experiences for Undergraduates (REU)	NSF 05-592
Cooperative Activity with Department of Energy Programs for Education and Human Resource Development	NSF 06-522
Faculty Early Career Development (CAREER) Program	NSF 05-579

www.nsf.gov/funding/pgm_list.jsp?type=xcut

Interdisciplinary Funding Opportunities

- Information and Intelligent Systems: Advancing Human-Centered Computing, Information Integration and Informatics, and Robust Intelligence – NSF 06-572

- Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS) – NSF 06-559

- Nanotechnology Undergraduate Education (NUE) – NSF 06-538

- Cyber infrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) – NSF 06-548

- CISE Pathways to Revitalized Undergraduate Computing Education (CPATH) – NSF 06-608

NSF/EHR Capacity-Building Strategies

- Identify effective ways to prepare and support teachers and faculty who can inspire and challenge students in the STEM disciplines and to provide them with effective materials and strategies to promote and assess learning;

- Invest in research on learning, facilitating the translation of research into practice, and create supportive learning environments and STEM pathways by developing models of reform/systemic change at both institutional and multi-institutional levels through networking, partnerships, alliances and collaborations.

Capacity-Building Strategies...

- Ensure that the STEM community is broadly representative of the nation's individuals, geographic regions, types of institutions and STEM disciplines; and,

- Identify effective ways (formal and informal) to address the STEM knowledge requirements of adults so that they can be productive members of the workforce and informed and active citizens.

Criteria for Excellence

- Centrality to mission of NSF/EHR

- Responsiveness to societal needs and changing conditions

- Quality of efforts

- Impact on capacity building

- Broad participation

- Effectiveness at reasonable costs

- Partnerships for change and sustainability

- Use of evaluation and research for improvement and accountability

- Knowledge generation (and management)

Proposal Content: Reminders

The proposal should present:

- **Objectives** and scientific and/or educational significance of the proposed work
- **Suitability** of the methods to be used, including evaluation of outcomes
- **Qualifications** of the investigator and the grantee organization
- **Effect** of the activity on the infrastructure of science/education
- **Results** from prior support
- **Amount** of funding required (justify)

NSB Merit Review Criteria (NSF 04-23)

Intellectual Merit

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the nominee (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

NSB Merit Review Criteria (NSF 04-23)

Broader Impacts

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Getting Started

- Start *EARLY*

- Get acquainted with FASTLANE (www.FastLane.nsf.gov)

- Read the Program Solicitation and *follow the guidelines*

- Contact a program officer to discuss your idea; this provides useful information and often helps you to refine your idea; it may also prevent you from applying to the wrong program (*e-mail* is best)

- Become a NSF reviewer

- Subscribe to Custom News Services at NSF

www.nsf.gov

Contribute to the STEM community

Volunteer to review proposals

Contact your Program Officer today!

Thank you for your attention!

Any questions?

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AMERICAN COMPETITIVENESS INITIATIVE (ACI)
TECHNICAL SERVICE WORKSHOP
"Strengthening Math and Science Education"
28-29 Nov 06