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NSF Funding Opportunities for Learning and Teaching in the Mathematical Sciences

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www.nsf.gov

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NSF Funding Sources

- Cross-Directorate Programs
  - Research in Undergraduate Institutions
  - Research Opportunity Awards
- Directorate for Education and Human Resources
- Discipline Research Directorates

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NSF-wide Emphasis Areas

- Cyberinfrastructure
  http://www.nsf.gov/dir/index.jsp?org=OCI
- Science of Learning Centers
  (not accepting applications in 2006, check for 2007)

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NSF Directorate for Education and Human Resources (EHR)

- Division of Elementary, Secondary, and Informal Education (ESIE)
- Division of Research, Evaluation, and Communication (REC)
- Division of Undergraduate Education (DUE)
- Division Graduate Education (DGE)
- Division of Human Resource Development (HRD)

NOTE: ESIE and REC are being combined to form DRL – the **D**ivision of **R**esearch on **L**earning in Formal and Informal Settings

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CCLI: Course, Curriculum and Laboratory Improvement

- The Program was significantly revised for fiscal year 2006
- 3 Phases: All previous CCLI program tracks with some variations and extensions fit within the new solicitation.
- Phase 1: May 9-10, 2006
- Phases 2 & 3: January 10, 2007
- Program Announcement: 06-536
  http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06536

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CCLI: Organized cycle of innovation into 5 Components

- Conducting Research on STEM Teaching and Learning
- Creating Learning Materials and Teaching Strategies
- Developing Faculty Expertise
- Implementing Educational Innovations
- Assessing Learning and Evaluating Innovations

CCLI: 3 Phases in an Organized Cycle to Reach Goals of the Program

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- Phase 1 – *Exploratory Projects* *(05/9-10/2006)*
  Involve exploratory, initial investigation or adaptation in one of the component areas.
- Phase 2 – *Expansion Projects* *(01/10/2007)*
  Build on smaller scale but proven innovations, refine and test innovations on diverse users
- Phase 3 – *Comprehensive Projects* *(01/10/2007)*
  Several diverse institutions, evaluation or assessment activities–deep & broad, combine proven results and mature innovations from several component areas, sustainability, national dissemination, etc.

STEP (STEM Talent Expansion Program)

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Goal: to increase the number of students (U.S. citizens or permanent residents) *RECEIVING* associate or baccalaureate degrees in established or emerging fields within science, technology, engineering, and mathematics (STEM)

www.nsf.gov/pubs/2006/nsf06502/nsf06502.htm/

Deadline: February 9, 2006 and September 26,2006
Optional Letters of Intent: Jan. 5 and August 15, 2006

STEP

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- One proposal per institution
- $25 million available in FY06 and FY07
- Budgetary Limitations
  - $.5 M for up to 5,000 undergrad students
  - $ 1 M for 5,000-15,000 undergrad students
  - $2 M for >15,000 undergrad students

STEP

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Efforts might include:
- Bridge programs that enable additional preparation for students
- Programs that focus on the quality of student learning
  - high-caliber teaching in smaller classes
  - new pedagogical approaches
  - training of teaching assistants
- Programs to encourage undergraduate research
- Programs that provide financial incentives to students
- Many others

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

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- Goal: Provides institutions funds to provide scholarships to academically talented, but financial needy, students. Students can be pursuing associate, baccalaureate, or graduate degrees.
  http://www.nsf.gov/pubs/2006/nsf06527/nsf06527.htm
- Deadline: April 12, 2006
- Letter of Intent: March 15, 2006

Watch DUE website for new announcement.

S-STEM

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- Major Features
  - Eligible disciplines extended to include biology, physical and mathematical sciences, computer and information sciences, geosciences, and engineering
  - Maximum scholarships increased to $10,000 (but still based on financial need)
  - Grant size increased to $500,000 with 7% allowed for administration and 8% for student support
  - One proposal per constituent school or college that awards degrees (also schools within institutions)
  - About $50 million available in FY'06

ADVANCED TECHNOLOGICAL EDUCATION

- FY2007
  - Preliminary Proposals   April 25, 2006
  - Formal Proposals   October 12, 2006
- About $45 million for FY06

  http://www.nsf.gov/pubs/2006/nsf05530/nsf05530.htm

  This will run in FY 2008. Watch for similar deadlines in April and October 2007.

Purpose of ATE

The ATE program promotes improvement in the education of science and engineering technicians at the undergraduate and secondary school level and the educators who prepare them, focusing on technicians for high-technology fields that drive the nation's economy.

Advanced Technological Education Program

- Projects that focus on one or more aspects of:
  - ☒ Program Improvement;
  - ☒ Professional Development for Educators;
  - ☒ Curriculum and Educational Materials Development;
  - ☒ Teacher Preparation;
  - ☒ Research on Technician Education; or
  - ☒ Institution-Level Reform of Technician Education
- Centers of Excellence – National, Regional, Resource
  - http://www.ATECenters.org

Noyce Scholarship Program

- Encourage STEM disciplinary majors to pursue pre-K to 12 teaching careers
- Support career changers with STEM backgrounds to pursue pre-K to 12 teaching
- Recipients must teach in a "high-need" setting for two years for every one year of support
- Funds provided to colleges and universities with strong teacher preparation programs to provide scholarships for prospective teachers
- Scholarships based on academic merit, consideration of financial need, and increasing the participation of minority populations in the teaching

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Noyce Scholarship Program

- Award size: Up to $500,000 over 3-4 year duration
- At least 85% of funds are for scholarships
- FY 2006 Deadlines:
  - Letters of Intent (optional): February 28, 2006
  - Proposals: April 3, 2006

Expect similar dates for FY 2007 Deadlines

Noyce Scholarship Awards

Model Projects include—
- Recruitment strategies
- Exemplary programs leading to certification
- Requirement for 2-years of service in high need school district for each year of support
- Mechanism for monitoring recipients and evaluating project

Division of Elementary, Secondary and Informal Education (ESIE)

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

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ESIE Programs

- Instructional Materials Development (IMD)
- Teacher Professional Continuum (TPC)
- Centers for Learning and Teaching (CLT)
- Information Technology Experiences for Students and Teachers (ITEST)
- Informal Science Education (ISE)
- Advanced Technological Education (ATE)

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DRL = ESIE + REC

The Division of Research on Learning in Formal and Informal Settings will combine the two divisions of ESIE and REC (Research on Evaluation and Communication) and their programs.

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DRL Programs

- Discovery Research K-12 (DRK12)
- Research and Evaluation on Education in Science and Engineering (REESE)
- Advanced Learning Technologies (ALT)
- Information Technology Experiences for Students and Teachers (ITEST)
- Informal Science Education (ISE)

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DRK12 Program

- This will implement much of what fell within the former TPC, IMD and CLT programs
- NSF will invest $104 million in Discovery Research K-12 that aims to strengthen K-12 science, technology, engineering, and mathematics education. They will refocus efforts on a vital cluster of research in three well-defined grand challenges:
  - Developing more effective science and mathematics assessments for K-12;
  - Improving science teaching and learning in the elementary grades; and
  - Introducing cutting-edge discoveries into K-12 classrooms.

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REESE Program (NSF 06-537)

- *Synthesis Research and Evaluation proposals:* identify areas where knowledge base in evaluation or research is robust to support scientific claims, identify areas of importance to education research and practice, and propose rigorous methods for synthesizing findings and drawing conclusions.
- *Empirical Research and Evaluation proposals:* identify areas with potential for advancing discovery and innovation at the frontiers of STEM learning. These will be based in the STEM disciplines and be theoretically and methodologically strong with the potential of contributing to theory, methodology, and practice.
- Areas of interest: behavioral, cognitive, social, and technological aspects of learning and education; learning in formal and informal settings; diffusion, implementation, and the role of context in educational and learning innovations; and theoretical, methodological, and statistical issues of importance in advancing research and evaluation.

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ALT Program (NSF 06-535)

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- Deadline: April 25, 2007
- Support research that
  - (1) enables radical improvements in learning through innovative computer and information technologies, and
  - (2) advances research in computer science, information technology, learning, and cognitive science through the unique challenges posed by learning environments and learning technology platforms.
- Integrative research that builds across disciplines and establish tight linkages among theory, experiment, and design are strongly encouraged. Technology goals may include systems for tutoring or assessment, modeling and sensing of cognitive or emotional states, context awareness, natural language interfaces, collaboration, knowledge management, and non-traditional goals that redefine the roles of technology in learning.

ITEST Program (NSF 05-621)

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- Increase the opportunities for students and teachers to learn about, experience, and use information technologies within the STEM context, including Information Technology (IT) courses.
- Direct response to concern about shortages of information technology workers in the United States
- Projects must provide opportunities for both school-age children and for teachers to build skills and knowledge to advance their study, and to function and contribute in a technologically rich society.
- ITEST has two components
  - (a) youth-based projects
  - (b) comprehensive projects for students and teachers.

GK-12: NSF Graduate Teaching Fellows in K-12 Education (DGE)

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- Fellows work with teachers in K-12 schools, where they can improve communication and teaching skills while enriching STEM instruction in K-12 schools
- The GK-12 program provides IHE's an opportunity to make permanent change in graduate programs by including partnerships with K-12 schools in a manner that is of mutual benefit to their faculties and students
- Expected outcomes
  - **for Fellows:** improved communication, teaching and team building skills**;**
  - **for K-12 teachers:** professional development opportunities**;**
  - **for K-12 students:** enriched learning; and
  - strengthened partnerships **between IHE's and local school districts**.

WAYS TO PARTICIPATE

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- Grant Holder
  - Principal Investigator
  - Member of Project Team
  - Member of a coalition
  - Member of an Advisory Board
  - Test Site
- User of Products
- Participant in Workshops and Symposium
- Reviewer of Proposals