



**National Science Foundation**  
**4201 Wilson Boulevard**  
**Arlington, Virginia 22230**

Title: Research and Evaluation on Education in Science and Engineering (REESE)

Date: 10/01/08

Research and Evaluation on Education in Science and Engineering (REESE)

Dear Colleague:

On behalf of the Division of Graduate Education (DGE) in the Directorate for Education and Human Resources (EHR) we call your attention to an opportunity to request support for research and evaluation projects focused on graduate education. This opportunity is embedded in the Research and Evaluation on Education in Science and Engineering (REESE) program managed by the Division of Research on Learning in Formal and Informal Settings (DRL) in EHR. The REESE Program Solicitation (NSF 08-585) can be viewed at:

<http://www.nsf.gov/pubs/2008/nsf08585/nsf08585.htm>

DGE seeks proposals that have the potential to strengthen research on graduate education in science, technology, engineering, and mathematics (STEM). As examples, we encourage proposals that can contribute to our knowledge about how to successfully broaden participation in graduate-level education programs and proposals that investigate the effectiveness of new trends and challenges in graduate STEM education. Successful proposals will demonstrate expertise in both the disciplines being studied and research methodology. In principle this can be achieved by selecting a team of co-PIs that bridge knowledge of STEM disciplines with expertise in education research or social science research methods.

We seek to build a research community that can more effectively address current issues, trends and questions in STEM graduate education, such as:

- How can we improve the retention and graduation rates of STEM graduate students?
- What is the impact of increased mentoring on the success of graduate students?
- What are the implications for student learning that emerge from STEM research fields, particularly cross-disciplinary ones?
- What changes in skills are expected for STEM professionals and how these are communicated to graduate programs?
- How do advanced degree earners make career choices within academia, industry, government sectors, and entrepreneurial endeavors?
- What are the effects on graduate education of growing international cooperation in research and education?
- What are uses of new technologies (including new cyber infrastructure developments) in both education and research?

- What factors influence the speed of diffusion of new methods of graduate education or the diffusion of new programs in emerging STEM disciplines?
- How can we advance the understanding of the causes and effects of progress in and barriers to broadening participation in STEM graduate education?

The following four recent REESE projects are representative of the current education research portfolio in graduate STEM education:

1. **Daniel Denecke, Council of Graduate Schools, "Defining Criteria and Good Practice to Facilitate Graduate International Collaborations,"** DRL 0841399:

Graduate deans and STEM faculty seek clear best practice guidelines on both internal (intra-institutional) and external (inter-institutional) processes to ensure quality and sustainability in international collaborations. To that end, this project is designed to generate a clearer understanding of what is currently known and what is valued, what the current gaps in our understanding are, and what areas call for enhanced clarification in international collaborations between institutions of higher education ranging from joint and dual degree programs to certificates and student and faculty exchange programs.

2. **Maresi Nerad, University of Washington, "Forces and Forms III Workshop,"** DRL 0814452:

Currently many institutions around the world are open to innovation in designing STEM PhD education. This openness has the potential for supporting the creation of a better, future-oriented PhD. To realize this potential, we need to understand the relationship of national and local policy actors to globalizing and internationalizing forces and the outcomes of current reforms in STEM doctoral education. At the University of Washington, the Center for Innovation and Research in Graduate Education (CIRGE) has created a international network of doctoral education researchers and policy makers known as the "Forces and Forms of Change in Doctoral Education Worldwide" (F&F) network. F&F network members have identified three critical topics influencing the globalization of STEM doctoral education which they are committed to investigating: (1) internationalization and inequality in intellectual capital, (2) diversity in doctoral education, and (3) preserving the role in doctoral education of intellectual risk-taking (i.e., the capacity to conduct research outside the mainstream or with uncertain outcomes). This synthesis research project is building on the expertise and prior research collaborations of the F&F network to generate policies for addressing these three critical issues.

3. **Sandra L. Laursen, University of Colorado, "Professional Socialization and Career Selection in Ph.D. Science Education: An Empirical Research Study,"** DRL 0723600:

This project is examining the professional socialization and career choices of scientists through an in-depth, qualitative investigation of professional socialization in science Ph.D. programs, employing an embedded case study design. This design is structured as a comparative, ethnographic study of science graduate students, faculty, and staff to address the question: "What are the elements and processes of professional socialization- both manifest and latent - by which science graduate students come to understand their profession and their own fit within it, and how do these shape their career selection.

4. **Terrence Russell, Association for Institutional Research, "International Workshop on the Status and Participation of Women in STEM Disciplines and Careers,"** DRL 0702433:

This project is organizing and conducting two 3-day workshops, scheduled approximately one year apart, to review the existing international knowledge base and exemplary policies and programs designed to enhance the status and participation of women in science, technology, engineering, and mathematics (STEM) disciplines and careers. In brief, the primary goals of the workshops are to: (1) systematically review relevant international research literatures to enhance understanding of the barriers and challenges to the full participation of all women in STEM disciplines and careers; and (2) identify reliable and credible data sources and data gaps. Using international comparative data, the effects of the intersections of gender and race/ethnicity, commonalities and differences among women in STEM, and strategies, policies, and programs that are effective in enhancing women's participation in STEM will be identified. Senior consultants to this project are Daryl Chubin and Shirley Malcom of the American Association for the Advancement of Science (AAAS), and Cheryl Leggon and Willie Pearson of the Georgia Institute of Technology.

We encourage knowledge diffusion proposals (e.g., research syntheses) for durations of one to two years not to exceed \$250,000, empirical projects for durations of up to three years with project budgets up to \$1 million, and large empirical projects for durations of five years and project budgets up to \$2 million. The synthesis projects will permit investigators to develop rigorous research designs, techniques, and methods and to forge partnerships with researchers representing appropriate disciplines and areas of expertise. Applicants should review the REESE Program Solicitation to ensure that eligibility requirements are met.

For further information: (703) 292-8650 or [DRLREESE@nsf.gov](mailto:DRLREESE@nsf.gov)

We look forward to reviewing innovative and competitive proposals.

Sincerely,

Carol Stoel, Acting Director  
Division of Graduate Education  
National Science Foundation