

Research on Gender in Science and Engineering (GSE)

Program Solicitation

NSF 07-501

Replaces Document(s):

NSF 05-614



National Science Foundation

Directorate for Education & Human Resources
Division of Human Resource Development

Preliminary Proposal Due Date(s) (required):

January 08, 2007

Research Proposals - Preliminary

January 08, 2007

Extension Services Proposals - Preliminary

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

April 02, 2007

Research Proposals

April 02, 2007

Extension Service Proposals

April 02, 2007

Outreach and Communication Proposals

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the [NSF FastLane](#) system. In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be

submitted via the [NSF FastLane](#) system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

Dissemination proposals have been renamed Outreach and Communication proposals to better reflect the intent of the proposal competition.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Research on Gender in Science and Engineering FY 2007 (GSE)

Synopsis of Program:

The program seeks to broaden the participation of girls and women in all fields of science, technology, engineering, and mathematics (STEM) education by supporting research, dissemination of research, and extension services in education that will lead to a larger and more diverse domestic science and engineering workforce. Typical projects will contribute to the knowledge base addressing gender-related differences in learning and in the educational experiences that affect student interest, performance, and choice of careers; and how pedagogical approaches and teaching styles, curriculum, student services, and institutional culture contribute to causing or closing gender gaps that persist in certain fields. Projects will disseminate and apply findings, evaluation results, and proven good practices and products.

The Research on Gender in Science and Engineering program has been funding these objectives since 1993, under the prior names "Program for Women and Girls" (PWG), "Program for Gender Equity in Science, Mathematics, Engineering and Technology" (PGE), and "Gender Diversity in STEM Education" (GDSE).

Cognizant Program Officer(s):

- Jolene Jesse, Program Director, 815 N, telephone: (703) 292-7303, fax: (703) 292-9018, email: jjesse@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 22 to 27 grants per year; a mix of Research Awards, Outreach and Communication Awards, and Extension Services Awards. Research grants will be up to 3 years, Outreach and Communication grants will be up to 2 years. Extension Services grants are for five years, with years 4 and 5 depending on performance.

Anticipated Funding Amount: \$5,000,000 for new grants in all tracks, pending availability of funds.

Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable

- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.

- **Full Proposals:**
 - Full Proposals submitted via FastLane: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.

 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/>)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.

- **Indirect Cost (F&A) Limitations:** Not Applicable

- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposal Due Date(s) (required):**

January 08, 2007

Research Proposals - Preliminary

January 08, 2007

Extension Services Proposals - Preliminary

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

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Research Proposals

April 02, 2007

Extension Service Proposals

April 02, 2007

Outreach and Communication Proposals

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria apply.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Standard NSF reporting requirements apply

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I. INTRODUCTION

One of the National Science Foundation's (NSF) key strategic goals is to cultivate a world-class, broadly inclusive science

and engineering workforce, and expand the scientific literacy of all citizens. Investments are directed at programs that strengthen scientific and engineering (S&E) research potential and education programs at all levels. These outcomes are essential to the Nation as we progress toward an increasingly technological job market and a scientifically complex society.

The Division of Human Resource Development (HRD) manages a portfolio of programs that aims to broaden the participation of traditionally underrepresented groups in science, technology, engineering and mathematics (STEM) learning and in the STEM workforce. Programs are in place to address the learning, interest and participation of women, underrepresented minorities (African-American, Hispanic, Native American), and persons with disabilities, at all levels.

The program for Research on Gender in Science and Engineering seeks to build resources - developing the Nation's knowledge capital, social capital, and human capital -- toward the goal of broadening the participation of girls and young women in STEM education from kindergarten through undergraduate education.

- **Research projects:** investigate factors behind the under-representation of girls and women in STEM education; societal, formal and informal educational systems' interaction with individuals that encourage or discourage interest and persistence in study or careers in certain fields.
- **Outreach and Communication projects:** make known education program evaluation results and research findings to significant national audiences, especially to the broader education community.
- **Extension Services:** provide consulting services to educators and institutions, to enable them to adopt and embed proven gender-inclusive policies and practices in pedagogy, the design of curriculum materials, student support programs, educator and faculty development.

II. PROGRAM DESCRIPTION

A. BACKGROUND

The Issues underlying the need for the Research on Gender in Science and Engineering Program include:

- Our society--as experienced in education through parents, the media, educators, faculty and others--tends to reinforce traditional assumptions about the capabilities, interests, and career options for girls and women, steering them away from STEM classes, majors and careers. (See Jacobs et. al. 2005, Steinke 1997, Tiedemann 2002, Valian 1998, Etzkowitz et. al. 2000 and Clewel and Cambell 2002)
- At the same time, the demand for science and technology literacy on the part of all citizens has never been higher, and the demand for domestic workforce capacity in engineering and computer fields is projected to exceed supply. (See National Science Board 2003, Congressional Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development 2000, National Academy of Sciences 2005).
- The history of S&E design suggests that optimal performance of S&E in the service of society is enhanced by inquiry, discovery, and design that are informed by diverse points of view and diverse research questions. If significant populations are not represented, the results may range from being simply inadequate to potentially dangerous to some subpopulations. Margolis and Fisher (2002) outline many of the design problems that stemmed from all (or predominately) male design teams, including voice recognition systems that could not "hear" women's voices, video conferencing systems that ignored women for the same lack of "hearing," automotive airbags designed for male-sized humans that injured and even killed many women, and artificial heart valves sized for the male heart.
- Gender biases are still evident in gender gaps at many stages of the STEM educational continuum. While both boys and girls now appear to enroll in elective and advanced high school courses to prepare for college at about the same frequency, girls are less likely to report liking math or science. In some fields, such as computer science, boys accounted for 86 percent of those taking the Advanced Placement exam in 2002, and received higher average scores than their female counterparts. (Freeman 2004)
- While young women are attending college at higher rates than ever before and make up somewhat over half of the undergraduate populations at many colleges and universities, differential course taking and the preference for non-STEM fields in high school has led to significant differences between men and women in terms of education and career aspirations. Young college-age women are less likely to express interest in STEM majors at the undergraduate level, and the retention of female students in some STEM fields during undergraduate and graduate study is significantly

lower than male students. This has led to fewer women graduating with degrees in the fields of the greatest national need (e.g., science and engineering fields), and those women who make it through the education system with STEM degrees leave the science and engineering workforce at one and a half to two times the rate if their male counterparts. (See Preston 2004, Clewell and Campbell 2002, and Freeman 2004)

- Socially projected stereotypes about who should be scientists and engineers pose artificial limits on the participation of talented students. Gender is only one of the characteristics that shape personal and group identity. Other characteristics such as race, ethnicity, economic status, religion, and disability also bear on whether students are encouraged, neglected, or discouraged from developing certain skills and ambitions. Our educational systems must seek to develop talent and interest in science, mathematics, and technology in all children.

Statistical profiles of STEM participation, with analyses, are documented in *Trends in Educational Equity of Girls and Women* (Catherine E. Freeman, National Center for Education Statistics, U. S. Department of Education, NCEES 2005-016) and the biannual publication *Women, Minorities, and Persons with Disabilities in Science and Engineering* (National Science Foundation, NSF 04-317) among others.

B. GOALS

The goal of Research on Gender in Science and Engineering (GSE) is to advance participation of women and girls in STEM fields where they continue to be underrepresented, in accord with NSF's goal of developing a diverse science and engineering workforce. In the context of that overarching goal, the GSE program supports activities that address the following types of objectives.

Research

- To discover and describe gender-based differences and preferences in learning science and mathematics in K-16 and factors that affect interest, performance, and choice of STEM study and careers in fields where there are significant gender gaps;
- To discover and describe how experiences and interactions in informal and formal educational settings inhibit or encourage interest and performance of students based on gender;
- To increase the knowledge about organizational models that lead to more equitable and inviting STEM educational environments in K-16;
- To increase the knowledge of the process of institutional change required to achieve more equitable and inviting STEM educational environments in K-16.

Outreach and Communication

- To extend to significant audiences awareness and information about research-based and demonstrated strategies and practices to increase the participation of girls and women in STEM education and workforce, in order to inform educational practice;
- To catalyze new thinking and future action among educational institutions by convening conferences, workshops, or symposia that are not possible at regular meetings of professional societies.

Extension Services

- To integrate various findings about gender in science and engineering into a unified program of change; to facilitate the interpretation of research knowledge into practice;
- To provide consulting services within a certain geographic region or within a community of practice, explaining in simple language the practical meaning and benefits of adopting programs, tools, or approaches that enhance the interest and persistence of female students in STEM studies through the undergraduate level, in those fields where they are underrepresented;
- To show educators how to adapt exemplary projects, research-based learning tools, pedagogical approaches, and service or support programs.
- To communicate back to researchers the problems that practicing educators find most urgent or troublesome in adopting the new methods or tools. (cf. Wilson & Daviss, 1994, pp. 17-20)

The goals of the GSE program, which originated in 1993 under the name "Program for Women and Girls" (PWG), parallel those of many other education and diversity programs at NSF except that they emphasize gender aspects.

C. DESCRIPTION - RESEARCH PROPOSALS

Proposals in the Research area may seek to enhance the multidisciplinary understanding of STEM learning to the extent that differences are evident based on gender. Behavioral, cognitive, affective, and social differences may be investigated using methods of sociology, psychology, anthropology, economics, and statistics disciplines.

Successful proposals will incorporate relevant advances in research methodologies and theoretical models. They should capitalize on the development of new instrumental, computational or statistical methods, models, and tools of observation and analysis.

Proposals for research projects should include a discussion of the theory or theories grounding the research and outline testable hypotheses. The results should be expected to be of sufficient significance to merit peer review and publication. Proposals should present the disciplinary and conceptual framework for the study. If a population sample is used, the proposal should describe the sample, rationale for sample selection, and the project's access to the sample population. The proposal should address whether the design is premised on special needs and interests due to educational level, race, ethnicity, economic status, or disability, in addition to gender, and to what extent data will be disaggregated for multiple characteristics.

The effort should provide a research foundation for educational approaches, curriculum, and technological tools that are already developed or can be developed in the future, bridging research and educational practice in settings such as classrooms, informal learning sites, and technological learning environments. The research foundation is assumed to provide a strong base of support for sustained improvement in STEM educational practice. Strong research designs will produce rigorous, cumulative, reproducible, and usable findings.

Investigators might:

- Investigate whether students have gender-based learning differences that are not accommodated by traditional approaches to teaching science and mathematics. For example, different conceptual strengths and weaknesses in learning certain math skills, different timing needs, different retention patterns, different preferences among computer interface features, interests in social interaction while learning, and interests in the social relevance and application of science experiments.
- Explore whether social and psychological behavior patterns of boys or girls in our society affect learning.
- Explore the socialization of males and females in our society that precludes or inhibits access, encouragement, support, and acceptance for interest in math and science topics. For example, assumptions or "gender schema" about appropriate careers, assumptions about the use of tools and technology, assumptions about the difficulties of embarking on or succeeding in a science or technology career.

Research proposals should address communicating findings to a national audience, **particularly to education practitioners**. Since the goal of the program is to contribute to a national knowledge base, it is important to show that the investigator is aware of appropriate channels -- specific peer-reviewed journals, publications, web sites, professional association conferences -- and is committed (including allocating resources) to make sure that the investment in the project leads to this contribution and that peers in the community will benefit.

D. DESCRIPTION – OUTREACH AND COMMUNICATION PROPOSALS

Outreach and Communication projects provide a mechanism for informing a wider audience about issues, research findings, and strategies for changing educational practice. Proposals for outreach and communication must justify a significant investment to reach a regional audience or national attention.

Investigators might:

- Organize a multidisciplinary meeting to consolidate knowledge about educational practice related to male or female students in K-16 STEM at a certain educational level. A workshop on recruitment and retention in undergraduate engineering departments, or a symposium on strategies for strengthening recruitment of students into computer science would be examples.
- Develop a media presentation (e.g., radio, TV, video, web) that educates the public about girls' or boys' education in STEM and factors contributing to interest, performance, or choice of careers.
- Significantly enhance distribution of an educational product (e.g., book, curriculum guide, seminar

manual, web site) using economically and technologically strategic methods given the target audience.

- Target subgroups of educational practitioners, e.g. heads of science departments, deans, heads of research groups, teachers or faculty in a particular field.

Outcomes. Outreach and Communication proposals should address how they will assess whether the method and content were successful, and budget for some assessment. Examples of measures are:

- A significant audience is reached and their knowledge and attitudes are changed
- The audience acquires new knowledge
- The audience plans to adopt new institutional policies and practices related to gender and diversity
- New information products are developed by the project team or participants to further advance dissemination (e.g., synthesis, topical summary, review of research)

E. DESCRIPTION - EXTENSION SERVICES PROPOSALS

Extension Services will offer proactive dissemination, consulting, implementation assistance, and reporting on experience in the field. They will be a conduit for understanding of research and for adoption of research-based approaches on the participation of women in science and engineering.

The Services will concentrate access to the knowledge base so that they provide expert knowledge. They will integrate various findings into a unified program of change, and communicate it in simple language to educators within a specified region or within a specific community of practice. The word “Center” is intentionally not used, so as to indicate that the “Services” must meet the business standards of the best customer services: proactive, responsive, quality, timely, customized for educators in the region, and informed by feedback. (See Wilson & Daviss, 1994, pp. 17-20)

“Proactive” means that there is an explicit, communicated, ambitious plan for leading change. The plan should be developed following business best practices, for example, involving the customer. The “quality” aspect means that the services will show sophistication and credibility in advancing “a unified program of change.” They will utilize the latest peer-reviewed research and draw on the knowledge of researchers who have produced the knowledge base. “Responsive” means the services understand educators and methods of effective professional development of educators. “Customized” means that the services are in touch with the culture of the regional community and take advantage of opportunities and other resources unique to the region. “Informed by feedback” means the services are evaluated and improved continuously.

Investigators might:

- Create a coherent and credible “unified program of change” drawing on tested approaches with a specialized theme, for example, informal educational programs for middle school students, high school, undergraduate, K-12 teacher professional development, or a content such as engineering or information technology or mathematics learning.
- Initiate seminars, workshops, online courses, tutorials or other curriculum and approaches to introduce the target population to the wealth of research and research-based resources.
- Promote a regional or common-interest-based learning community with web-based support to change organizational commitment, policy, and action. Tie the learning to actions and action research.
- Collect, digest, and provide information about the range of resources now available on gender in science and engineering.
- Visit implementation projects as consulting partners and allies, to assist with parts of the promoted program.

The target community may be a mix of teachers, counselors, parents, community leaders, administrators, faculty, and others. (Since the aim of the services is to change educational systems, direct services to students are not in scope.) The target community should be described, especially if the design of the services is premised on special needs and interests based on educational level, race, ethnicity, economic status, and disability, in addition to gender. The target community may be comprised of members of educational institutions or departments having common characteristics.

Dissemination. The Extension Services have a strong mandate to disseminate information to a regional community. In addition, there should be some plans to network with other educational improvement efforts and professional associations.

Outcome Measures. The goal of the Extension Services is not to prove a new model for dissemination or implementation. In the spirit of good management they should address methods for collecting formative feedback and for evaluating and reporting on the success of the services. It is strongly recommended that Extension Services have an external evaluator to assess the overall effectiveness of the effort.

Summary of Key Characteristics. Extension Services are characteristically different from the other tracks in the following ways:

- The scope of services is clear and specific; there is a “unified program for change” developed from the latest knowledge.
- The marketing of best practices is based on rigorous and explicit criteria for defining a “best” practice, and awareness and leveraging of related efforts to define and identify “best” practices. The program takes advantage of dozens of products, guides, handbooks, tutorials, videos, and curricula already developed.
- The selected models or approaches that are promoted are based on evidence of effectiveness or success (especially for female students) and the evidence is cited.
- The services have credibility for providing the best information available in education research and social science research from multiple sources.
- The team includes experts (research producers and education practitioners) in gender in science and engineering on the staff as well as through a network or partnerships. The expert credentials for peer-reviewed research and experience with programs, materials, or approaches are clear and relevant.
- The proposal shows awareness of the community and the region to be reached, its unique characteristics, and special opportunities for cooperation and leverage. The Extension Service is integrated into the geographically-based community to be served.
- The team includes expertise in consulting and customer service, and shows awareness of business standards for excellence.
- If there is a specialization or theme to the Extension Services, the rationale and resources are described.
- The scale of potential impact is proportional to the funding level.

F. PROGRAM EVALUATION

Periodically, NSF evaluates the impact of the entire GSE program. The program evaluation will assess the GSE portfolio in meeting national needs, advancing practice based on rigorous research, and the effective use of networks and partnerships. Individual projects are expected to cooperate with third-party program evaluation and respond to inquiries, interviews and other approaches for collecting evaluation data across individual grants. Research projects should respond to process and outcome data elements that may be summarized across projects. The project-level evaluation of the Outreach and Communication projects should assess the quality of new products.

G. REFERENCES

Clewell, Beatriz Chu and Patricia B. Campbell (2002). Taking stock: Where we've been, where we are, where we're going. *Journal of Women and Minorities in Science and Engineering* 8:255-284.

Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (2000). *Land of Plenty: Diversity as America's competitive edge in science, engineering and technology*.

Dietz, James S., Bernice Anderson, and Conrad Katzenmeyer (2002). Women and the Crossroads of Science: Thoughts on Policy, Research, and Evaluation. *Journal of Women and Minorities in Science and Engineering*, 8(3&4), 395-408.

Etzkowitz, Henry, Carol Kemelgor and Brian Uzzi (2000). *Athena Unbound: The Advancement of Women in Science and Technology*. New York, NY: Cambridge University.

Freeman, Catherine E. (2004). *Trends in Educational Equity of Girls and Women*. Washington, DC: National Center for Educational Statistics (NCES 2005-016).

Jacobs, Janis E., Pamela Davis-Kean, Martha Bleeker, Jacquelynne S. Eccles, and Oksana Malanchuk (2005). "I can, but I don't want to": The impact of parents, interests and activities on gender differences in math. In Ann Gallagher and James Kaufman, eds. *Gender Differences in Mathematics*, New York, NY:

Cambridge University Press.

Margolis, Jane and Allan Fisher (2002). *Unlocking the Clubhouse: Women in Computing*. Cambridge, MA: MIT Press.

National Academy of Sciences (2005). *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Future*. Washington, DC: National Academy Press.

National Science Board (2003). *The Science and Engineering Workforce: Realizing America's Potential*. Arlington, VA: (NSF 03-69)

National Science Foundation (2003). *New Formulas for America's Workforce: girls in science and engineering*. Arlington, VA, 2003 (NSF 03-207 printed book, NSF 03-208 brochure+CD).

National Science Foundation (2004). *Women, Minorities and People with Disabilities in Science and Engineering*. Arlington, VA (NSF04-317).

Preston, Anne E. (2004). *Leaving Science: Occupational exit from scientific careers*. New York, NY: Russell Sage Foundation.

Steinke, Jocelyn (1997). A portrait of a woman as a scientist: breaking down barriers created by gender-role stereotypes. *Public Understanding of Science* 6:409-428.

Tiedemann, Joachim (2002). Teachers' gender stereotypes as determinants of teacher perceptions in elementary school mathematics. *Educational Studies in Mathematics* 50:49-62.

Valian, Virginia (1998) *Why so slow?: The advancement of women*. Cambridge, MA: MIT Press

Wilson, Kenneth G. and Bennett Daviss (1994). *Redesigning Education*.

H. INFORMATION ABOUT PREVIOUS AWARDS

HRD's web site provides links to abstracts for and other information about awards made by this program under prior names [See the HRD web site](#). Historically, the program has been called "Program for Women and Girls" (PWG), "Program for Gender Equity in Science, Mathematics, Engineering, and Technology" (PGE), and "Gender Diversity in STEM Education" (GDSE).

NSF's web site provides the ability to search awards using custom queries:

- Element Code: 1544

To find more specific awards, it is possible to narrow the search:

- Element Code: 1544 and Keyword: mentoring
- Element Code: 1544 and Keyword: "learning community"
- Element Code: 1544 and Keyword: AZ
- Element Code: 1544 and Keyword: "middle school"

A compendium of profiles of projects funded in the first decade of the program, with a comprehensive index, is available as a printed book, CD-ROM, and, as an online PDF file using one of the publication numbers [See NSF online document system](#).

National Science Foundation (2003). *New Formulas for America's Workforce: Girls in Science and Engineering*. Arlington, VA, 2003 (NSF 03-207 printed book, [NSF 03-208 brochure+CD](#))

III. AWARD INFORMATION

Anticipated funding for new grants in all tracks in FY 2007 is \$5,000,000 pending the availability of funds.

Research proposals may request up to a total of \$500,000 for up to three years, pending availability of funds. The proposal should include a budget for each year and a summary budget if there are multiple years. (Awards may be fully funded in the first year.)

Outreach and Communication proposals may request up to a total of \$200,000 for up to 24 months, pending availability of funds.

Extension Services proposals may request up to a total of \$2.5 million for an average of \$500,000 each year for five years, pending availability of funds. Continued funding in years four and five are contingent on satisfactory performance and availability of funds. Continued funding will be reduced if performance is not satisfactory.

NSF expects to fund 10-12 Research proposals, 10-12 Outreach and Communication proposals, and 2-3 Extension Services proposals, depending on the quality of the submissions and availability of funds.

The proposed start dates should be at least seven months from the full proposal deadline.

Funds should be budgeted for the principal investigator to attend a two-day grantees' meeting in the Washington, D.C. area, each award year (March/April time frame).

A limited equipment request (<10% of total budget) is allowed for projects intensive in educational technology, for development. Equipment for participants in student or educator demonstration programs, and office equipment for project staff are expected to come from other sources.

Research proposals and Research projects are eligible for REU (Research Experiences for Undergraduates) supplements, which expressly support the participation of undergraduate students on the project research team, if funds are available. Please see the REU solicitation for complete parameters and the method for making a request for an REU supplement (see <http://www.nsf.gov/home/crssprgm/reu/start.htm>). Proposers should consult the Program Director in advance of a request for REU supplements.

IV. ELIGIBILITY INFORMATION

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the [Grant Proposal Guide](#), Chapter I, Section E.

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals(*required*):

A preliminary proposal is applicable for Research and Extension Services proposals. It is required prior to the submission of a full proposal. It will be reviewed by NSF staff and/or external reviewers to provide input for developing a full proposal. A full proposal will be Encouraged or Discouraged based on the review of the preliminary.

The preliminary proposal must be submitted via Fastlane. See Section V.D. below. The Grants.gov option only applies to Full Proposals submitted under this solicitation

Cover Sheet: Be sure to check the **PRELIMINARY PROPOSAL box**. Select the program name "Research on Gender in Science and Engineering" in the Education and Human Resources Directorate, Human Resource Development.

PROJECT SUMMARY: A short abstract (one page or less, single spaced) that clearly identifies the major features of the project. Address each NSF criterion separately: intellectual merit and broader impacts.

PROJECT DESCRIPTION: The narrative is limited to 5 pages in length. It should sketch, in broad terms, the essential features of the project:

RESEARCH

1. What is the research question? What is the theoretical basis for the research?
2. What findings are expected?
3. What is the contribution to the knowledge base? Reference prior related work and explain the value added and the national benefit of the work.
4. What is the study population and the plan to reach the population?
5. Describe the conceptual or disciplinary framework and methods to be used.
6. Identify key team members, consultants, and advisors. Relate their qualifications and skills to specific components of the proposed work in one or two sentences.
7. Describe plans for broad dissemination.

EXTENSION SERVICES

1. What is the scope of the service, in terms of geography, community, and intellectual specialization?
2. Briefly describe a unified program of change to be extended. How will "best" practices, products, or curriculum be chosen as part of the program? What is the evidence for effectiveness of the selected models or approaches?
3. What is the relationship between the extension service and the community to be served?
4. What research and practitioner expertise are on the extension team?
5. Describe the methods for extension -- how will the service reach leaders in education. What activities and products are planned for this community?
6. What is the potential impact given this scope?

BIOGRAPHICAL SKETCH: A biographical sketch of the PI and co-PI's is required.

BUDGET: No budget pages are required; a requested total amount on the cover sheet is sufficient. Supplemental materials or appendices are NOT permitted for preliminary proposals.

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National

Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (<http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

On the **COVER SHEET**, select the program name "Research on Gender in Science and Engineering" in the Education and Human Resources Directorate, Human Resource Development.

The **TITLE** should be prefaced with an abbreviation identifying the GSE goal supported by the proposal:

- GSE/RES - for research proposals
- GSE/COM - for Outreach and Communication proposals
- GSE/EXT - for extension services proposals

The **PROJECT SUMMARY** should:

- Name and describe the proposed activity (what and how)
- Describe the research question (or hypothesis) or audience impact or service impact
- Describe the target research subjects or audience (who) or community
- State the organizations involved (who)
- Especially highlight the contribution to knowledge, social, or human capital (why)
- **Address each NSF review criterion in a separate statement: INTELLECTUAL MERIT and BROADER IMPACTS**

The **Research PROJECT DESCRIPTION** should address:

- What is the research question? What is the theoretical basis for the research?
- What is the study population and the plan to reach the population?
- What hypotheses will be tested? What findings are expected?
- What is the contribution to the knowledge base? Reference prior related work and explain the value added and the national benefit of the work.
- Describe the conceptual or disciplinary framework and methods to be used.
- Identify key team members, consultants, and advisors. Relate their qualifications and skills to specific components of the proposed work.
- For prior grantees, a discussion of the results of prior work.

Common weaknesses in research proposals (according to Dietz, et al, 2002) are:

1. Poor formulation of research questions
2. Poor articulation of research design, theory, hypotheses or methods
3. Failure to recognize multiple studies have been conceived as a single study
4. Failure to situate the study or its potential findings within prior work and literature
5. Failure to situate the study or its potential findings within a framework or theory
6. Weak links between research goals and proposed methodology

The **Outreach and Communication PROJECT DESCRIPTION** should address:

- What will be disseminated?
- What is the goal of the dissemination, and what is the justification for the dissemination (meeting or media product)?
- What audience will it reach and what is the desired impact on the audience?
- What is the context of the dissemination; what other projects, events, or products exist and how does this project contribute national benefits?
- Describe the management plan and timeline.
- Describe the qualifications of key team members and suitability for their role in the project.
- A list of advisory committee members and description of their level of involvement, if an advisory committee is proposed.
- For prior grantees, a discussion of the results of prior work.

The **Extension Services PROJECT DESCRIPTION** should address:

- What is the scope of the service, in terms of geography, community, and intellectual specialization?
- What is the rationale for this scope? (Why this scope? What are advantages, benefits, strengths?)
- Describe a unified program of change to be extended. How will "best" practices, products, or curriculum be chosen as part of the program? What is the evidence for the effectiveness of the selected models or approaches?
- What is the relationship between the extension service and the community to be served?
- What research and practitioner expertise are on the extension team? How are they suited to the proposed scope of the service and what are their roles?
- Describe the methods for extension -- how will the service reach leader-practitioners in education. What activities and products will be provided to the community?
- Describe the business practices for providing good extension services to the community.
- What is the potential impact of this particular service over 3-5 years?
- Describe how the services will be networked with other educational improvement efforts or professional associations.
- Describe how the service will collect formative feedback and evaluate its success.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

Other Budgetary Limitations:

Research budgets may be up to \$500,000.

Outreach and Communication budgets may be up to \$200,000.

Extension Services budgets may be up to \$2,500,000.

Funds should be budgeted for the principal investigator or a project member to attend a two-day grantees' meeting in the Washington, D.C. area, each award year, in March/April. A limited equipment request (<10% of total budget) may be allowed. (See Section IV.)

C. Due Dates

- **Preliminary Proposal Due Date(s) (required):**

January 08, 2007

Research Proposals - Preliminary

January 08, 2007

Extension Services Proposals - Preliminary

- **Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):**

April 02, 2007

Research Proposals

April 02, 2007

Extension Service Proposals

April 02, 2007

Outreach and Communication Proposals

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (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?

What are the broader impacts of the proposed activity?

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?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the

Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

Special Award Conditions:

Extension Services awards will be made for up to five years. Funding for years four and five is contingent on performance and availability of funds, as evaluated from annual reports and site visit reports. If performance is not satisfactory, then continued funding will be reduced.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and

complete.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Jolene Jesse, Program Director, 815 N, telephone: (703) 292-7303, fax: (703) 292-9018, email: jjesse@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Gloria Strothers, Lead Program Assistant, 815 N, telephone: (703) 292-4718, fax: (703) 292-9018, email: gstrothe@nsf.gov
- Toni Edquist, Program Assistant, 815 N, telephone: (703) 292-4649, email: tedquist@nsf.gov
- Victoria A. Smoot, Program Specialist, 815 N, telephone: (703) 292-4677, fax: (703) 292-9018, email: vsmoot@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center): (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**
 - Send an e-mail to: pubs@nsf.gov
 - or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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