

Gender Diversity in Science, Technology, Engineering and Mathematics Education (GDSE)

Program Solicitation

NSF 03-502

Replaces Document 01-130



National Science Foundation

Directorate for Education and Human Resources

Division of Human Resource Development

Letter of Intent Due Date(s) *(optional)*:

December 20, 2002

Elementary and Middle School, Informal Education (K-12)

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

January 23, 2003

High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies

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

January 31, 2003

Elementary and Middle School, Informal Education (K-12)

April 11, 2003

High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies. By invitation only based on review of preliminary proposal.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Gender Diversity in Science, Technology, Engineering and Mathematics Education (GDSE)

Synopsis of Program:

The program seeks to broaden the participation of girls and young women in all fields of science, technology, engineering, and mathematics (STEM) education by supporting research, demonstration, and dissemination projects that will lead to change in education policy and practice. Typical projects will investigate gender-related differences in learning; gender-related differences in educational experience, interest, and performance; and pedagogical approaches and teaching styles that are gender-neutral or encouraging to female students. The findings and outcomes of the program will lead to understanding, for example, how to maintain the interest of students in science after middle school, how to bring more students into elective high school mathematics and advanced placement science courses, and how to increase enrollments in undergraduate studies in STEM, particularly in physical sciences, engineering and computer sciences. Large requests that will engage many student or educator participants are expected to involve multiple partner institutions. Proposals are received on two different deadlines during the year, depending on areas of emphasis. The Gender Diversity in STEM program has been funding this scope since 1993, under the prior names "Program for Women and Girls" (PWG) and "Program for Gender Equity in Science, Mathematics, Engineering and Technology" (PGE).

Cognizant Program Officer(s):

- Margrete S. Klein, Program Director, Elementary and Middle School, Informal Education (K-12), Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-4671, fax: (703) 292-9018, email: mklein@nsf.gov
- Ruta P. Sevo, Program Director, High School, Undergraduate, Teacher and Faculty Development, and Educational Tech, Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-4676, fax: (703) 292-9018, email: rsevo@nsf.gov

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

- 47.076 --- Education and Human Resources

Eligibility Information

- **Organization Limit:**

For the "Elementary and Middle School, Informal Education (K-12)" competition, an organization may submit one full proposal as the primary performer, or may be included as a collaborator on one full proposal submitted by one other organization, but may not do both.

For the "High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies" competition, an organization may submit one full proposal as the primary performer, or may be included as a collaborator on one full proposal submitted by one other organization, but may not do both. Organizations may submit multiple preliminary proposals.

- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 15 - 20 grants per year; a mix of research, demonstration, dissemination, and planning for demonstration or planning for research. The duration of these grants will be from 1 to 3 years.
- **Anticipated Funding Amount:** \$2,500,000 For new grants, pending availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is optional. Please see the full funding opportunity document for further information.
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full funding opportunity document for further information.
- **Full Proposal Preparation Instructions:** The program announcement/solicitation contains supplements to the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full funding opportunity document for further information.

C. Due Dates

- **Letters of Intent (*optional*):**
December 20, 2002
Elementary and Middle School, Informal Education (K-12)
- **Preliminary Proposals (*required*):**
January 23, 2003
High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies
- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
January 31, 2003
Elementary and Middle School, Informal Education (K-12)
April 11, 2003
High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies. By invitation only based on review of preliminary proposal.

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **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 invest in People: to develop a diverse, internationally competitive and globally-engaged workforce of scientists, engineers and well-prepared citizens (see <http://www.nsf.gov/od/gpraplan/gpraplan.htm>). Thus investments are directed at programs that strengthen scientific and engineering (S&E) research potential, and S&E education programs at all levels and in all S&E fields. 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 aim 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 Gender Diversity in Science, Technology, Engineering, and Mathematics Education 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** in the area of gender-based barriers or incentives to learning science and mathematics are intended to advance our knowledge of how girls learn science and mathematics, in informal and formal educational settings, and what factors increase their interest to engage and persist in STEM studies. Planning for full research proposals is also supported.
- **Demonstration projects** apply research findings about girls' learning preferences in the design of new curriculum materials, services, pedagogy, or instructor development programs, which can be institutionalized and replicated if they are proven successful. In particular, teacher and faculty development demonstrations test new ways to integrate the understanding and awareness of gender-inclusive practices into pre-service and in-service professional development programs and into professional standards and policies. It is anticipated that participants in demonstration projects will benefit from the learning experience and assimilate new behaviors. Large complex proposals are expected to involve multiple partner institutions. Planning for full demonstration projects is also supported.
- **Dissemination projects** take material or model approaches or information to significant national audiences, especially to the broader education community.

II. PROGRAM DESCRIPTION

A. ISSUES

Issues of concern underlying the need for the Program include:

- Girls tend to lose interest in science during middle school;
- Relatively fewer girls enroll in elective and advanced high school science and mathematics courses to prepare for college;
- Relatively fewer girls enter undergraduate studies in STEM disciplines, particularly in physical sciences, computer sciences, and engineering;
- Disproportionately few of the young women who graduate in STEM disciplines continue on to attain graduate degrees in physical sciences, computer sciences, and engineering.

Statistical profiles of participation, with analyses, are documented in **Trends in Educational Equity of Girls and Women** (National Center for Education Statistics, U. S. Department of Education, NCEES 2000-030) and the biannual publication **Women, Minorities, and Persons with Disabilities in Science and Engineering** (National Science Foundation, NSF 00-327), among others. (See <http://www.nsf.gov/sbe/srs/nsf00327/start.htm>.)

B. GOALS

The goal of Gender Diversity in STEM Education (GDSE) is to advance participation of women and girls in STEM, in accord with NSF's goal of a diverse science and engineering workforce. In the context of that overarching goal, the GDSE 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, K-16;
- To discover and describe barriers to female students' interest in and performance of science and mathematics skills in informal and formal educational settings;
- To increase the knowledge of organizational models that lead to more equitable and inviting STEM educational environments, K-16;
- To increase national research capacity in the field of gender and STEM education by encouraging new researchers and research-oriented education practitioners.

Demonstration

- To develop and evaluate research-based learning tools, pedagogical approaches and service or support programs that enhance the interest and persistence of female students in STEM studies through the undergraduate level;
- To evaluate methods of introducing instructional methodologies and teaching behaviors which research indicates may be particularly gender-equitable or female-friendly among informal science education providers, pre-service and in-service K-12 teachers, as well as pre-service or in-service undergraduate faculty;
- To evaluate methods of introducing research-based gender-equitable and non-traditional education and career counseling among adults, i.e., instructors, counselors, parents, etc., who influence students in formal and informal educational settings.

Dissemination

- 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.

Planning for complex demonstration or research projects is also supported.

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

C. DESCRIPTION

RESEARCH

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

Many educational approaches, curriculum materials, and technological tools to mediate the learning process have been developed without the benefit of a strong research foundation, and without the benefit of considering gender differences. Competitive 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 testable hypotheses and carry the expectation that the results obtained will be of sufficient significance to merit peer review and publication. They 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 effort should serve to provide a research foundation for educational approaches, curriculum materials, 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 (e.g., non-academic technological education). The research foundation is assumed to provide a strong base of support for sustained improvement in science and mathematics educational practice. Strong research designs will produce rigorous, cumulative, reproducible, and usable findings.

Investigators might:

- Investigate whether boys or girls have 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 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.

Planning Grants for Research. Available for activities required prior to development of a full research project. The maximum award size is \$30,000 with award duration up to 18 months. Planning Grant proposals are to be written in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG).

DEMONSTRATION

Proposals for Demonstration projects will build on research findings and employ methods to determine the effectiveness of new learning tools, pedagogies, professional development programs, or student programs and services in order to produce outcomes. All applicants should review the section Outcome Measures (below).

Investigators might:

- Design informal and formal educational experiences that intervene and reverse traditional patterns of low participation; encourage girls' interest, enthusiastic participation, and election of continued study in math and science; increase confidence; and give girls positive images of math and science learning and careers.
- Design seminars, workshops, online courses, tutorials or other curriculum and approaches to teaching adults in the K-16 educational setting about the issues and interventions that are available. For example, adding modules to pre-service teacher education, developing standards for gender and multicultural teaching competency, conducting workshops combined with applied learning in student service programs for in-service teachers, holding seminars for pre-service and in-service undergraduate faculty, or mentoring between adults in order to assimilate new concepts and apply them in teaching practice.
- Work to integrate awareness of gender bias in educational environments, and change organizational commitment, policy, and action to remedy underrepresentation through student and faculty programs, for example, undergraduate departments in engineering, physical science, or computer science making a concentrated effort to increase recruitment and retention.
- Revise or produce new courses and curriculum that are gender-neutral or appeal particularly to girls and young women. For example, ways of teaching math that utilize girls' verbal skills, sequencing material in computer science to introduce real-world applications of technology before intricacies of programming languages, teaching young girls principles of engineering design and invention in everyday life.

Proposals should articulate the "model" to be demonstrated particularly in terms of its benefit to others who might copy or replicate the experimental program. What is the new approach, why is it new, and who, or what community, will potentially benefit from adopting or adapting it to their educational setting?

Commitment and Collaboration Between Partners. Larger, complex proposals are expected to involve collaborations between departments within an institution or between the submitting institution and others. Evidence of commitment from the submitting institution may be reflected in programmatic participation, contribution of resources, or provision of special services. Evidence of commitment from collaborating partner institutions may be reflected in letters of commitment and resource contributions. In the case of large collaborations, it is useful to describe roles and relationships, and the management structure for the project. Plans to sustain all or part of a proposed program might be included.

Planning Grants for Demonstration. Available for activities required prior to development of a full demonstration or "model" project proposal. Planning Grants may include activity planning, selection of evaluation methods to determine effectiveness, development of collaborations, etc. The maximum award size is \$30,000 with award duration up to 18 months. Planning Grant proposals are to be written in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG).

DISSEMINATION

Dissemination projects provide a mechanism for informing a wider audience about issues, research findings, and strategies for changing educational practice. Proposals for dissemination 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. For example, a workshop on recruitment and retention in undergraduate engineering departments, a symposium on strategies for strengthening recruitment of students into computer science.
- 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 underrepresentation of girls.
- 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.

D. COMMON THEMES ACROSS TYPES OF PROPOSALS

Innovation. Proposals are expected to make a case for innovation by reference to other research findings, other demonstration projects, and other dissemination activities. They should exhibit a thorough awareness of previous relevant work. Whenever feasible, projects should utilize and innovatively build from successful strategies, materials, courses, and methods that have been developed through other grants funded by GDSE (under prior program names), as well as other exemplary resources not supported by NSF. Proposers may contact the Principal Investigators (PIs) of exemplary projects to explore the possibilities for adapting materials, receiving guidance, or collaborating in other ways.

Dissemination. All projects (research, demonstration, and dissemination) should include a dissemination plan to communicate findings and evaluation results to a national audience. 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 -- journals, publications, web sites, professional association conferences -- and is committed (including allocating resources) to making sure that the investment in the project leads to this contribution and that peers in the community will benefit.

Target Populations. Target populations in research, demonstration, or dissemination projects may be a mix of students, teachers, counselors, parents, community leaders, administrators, teacher-educators, faculty, student and adult mentors, and others. The target population - whether subjects or participants - should be described, especially if the project design is premised on special needs and interests based on educational level, ethnicity, rural/urban environment, and physical disabilities. Proposals addressing gender issues will be stronger if they also address other characteristics.

Leverage. Frequently a proposed project will leverage other initiatives or efforts, for example, build on a pilot or preliminary study or project. It is desirable to leverage related work. The investigator should make a clear distinction between prior investments, including funding, and the proposed work. The proposed work should be significantly different in innovation -- a new concept. If it appears that the proposal is simply continuing an effort (which may have run out of funding), then it does not meet the criterion of innovation. Scaling up a prior pilot project or study must be rationalized in the research or demonstration design. The program will not fund the replication of a prior demonstration project mainly to benefit a larger number of participants. For example, it is within our scope to support testing a curriculum which was developed for a narrow target age-economic-ethnic group by taking it to a different target group. It is not within our scope to take a summer program for girls proven to be effective in a given state to three other states.

Review Criteria. As reviewers apply the review criteria established by the National Science Board, they will also consider the extent to which the proposed project addresses the objectives of the program in all of Section II.

E. OUTCOME MEASURES

The effort required for developing a research and evaluation plan and collecting, measuring, and reporting appropriate outcome data should be supported in the proposal budget justification. The following outcome measures are *illustrative*. See <http://oerl.sri.com> for evaluation resources collected for the benefit of NSF grantees.

Research

- Findings on gender-based differences and preferences in learning

- Findings on barriers to girls' interest and performance in learning
- Findings on organizational/institutional change to incorporate gender-inclusive policies and practices
- Development of human capacity (researchers in this field)

Demonstration

Institutionalization/continuation

- Changed Policies and Practices
- Continuing Partnerships
- Continued Funding from Other Sources

Replication

- Demonstration activities or policies are adopted outside the project

K-12 Student Outcomes

- Change in Test Scores in Math and Science
- Change in Grades
- Student Confidence
- Student Interest in STEM Study
- Post-High School Plans
- Post-High School Status
- Student Perceptions about the Role of Females in STEM
- Parents' Report of Student Confidence
- Parents' Report of Student Interest

K-12 Adult Outcomes

- Improved Teaching
- Teacher Perceptions about the Role of Females in STEM
- Parents' Support for STEM Learning

Post-Secondary Student Outcomes

- Change in College Grades
- Student Confidence
- Degree Attainment
- Postgraduate Plans
- Postgraduate Status
- Student Perceptions about the Role of Females in STEM

Post-Secondary Faculty Outcomes

- Improved Teaching
- Faculty Perceptions about the Role of Females in STEM

Dissemination

- Audience Reach and Impact on Knowledge or Attitudes
- New Knowledge
- New Institutional Policies and Practices Related to Gender and Diversity

F. REFERENCES

American Association of University Women (2000). **Tech-Savvy: Educating Girls in the New Computer Age.**

Clewell, Beatriz Chu, Bernice Taylor Anderson, Margaret E. Thorpe (1992). **Breaking the Barriers: Helping Female and Minority Students Succeed in Mathematics and Science.** Jossey-Bass Publishers.

Committee on Equal Opportunities in Science and Engineering (2000). **Biennial Report to the United States Congress.**

Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (September 2000). **Land of Plenty, Diversity as America's Competitive Edge in Science, Engineering and Technology.**

Davis, Cinda-Sue, Angela Ginorio, Carol Hollenshead, Barbara Lazarus, Paula Rayman, et al (1996). **The Equity Equation: Fostering the Advancement of Women in the Sciences, Mathematics, and Engineering.** Jossey-Bass Publishers.

Ginorio, Angela and Michelle Huston (2001). **Si, Se Puede! Yes, We Can: Latinas in School.** AAUW Education Foundation.

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

National Center for Educational Statistics (2000). **Entry and Persistence of Women and Minorities in College Science and Engineering Education.** NCES 2000-601

National Center for Educational Statistics (2000). **Trends in Educational Equity of Girls and Women**. NCES 2000-030

National Council for Research on Women (2001). **Balancing the Equation: Where Are Women and Girls in Science, Engineering and Technology?** Written by Mary Thom.

G. 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 (<http://www.ehr.nsf.gov/ehr/hrd/>). Historically, the program has been called "Program for Women and Girls (PWG)" and "Program for Gender Equity in Science, Mathematics, Engineering, and Technology (PGE)."

NSF's web site provides the ability to search awards using custom queries (<https://www.fastlane.nsf.gov/a6/A6AwardSearch.htm>). To retrieve only GDSE-related awards, use the query:

- 1544

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

- 1544 and mentoring
- 1544 and "learning community"
- 1544 and AZ
- 1544 and "middle school"

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

Research or demonstration grants may be up to \$900,000 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.

A planning proposal for a large research or a large demonstration effort may be up to \$30,000 for up to 18 months. A planning grant does not imply an NSF commitment beyond the planning period. Planning grantees are expected to submit a proposal for a large grant subsequent to completion of the planning grant, within two competition years after award.

Dissemination proposals may request up to \$100,000 for up to 18 months.

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 Washington, D.C. area, each award year (February/March time frame).

A limited equipment request 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.

GDSE 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 announcement for complete parameters and the method for making a request for an REU supplement (see <http://www.nsf.gov/pubs/2001/nsf01121/nsf01121.htm>). Proposers should consult the Program Directors in advance of a request for REU supplements.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (*optional*):

A letter or email of intent is only applicable for the Elementary and Middle School, Informal Education (K-12) competition, and, it is optional.

Preliminary Proposals (*required*):

A preliminary proposal is only applicable for the High School, Undergraduate, Professional Development, and Education Technology competition. 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 invited based on the review of the preliminary.

The preliminary or preproposal must be submitted via Fastlane.

There is no organizational limit for preliminary proposals. An organization may submit multiple preliminary proposals but only one full proposal for the High School, Undergraduate, Professional Development, and Education Technology competition.

Cover Sheet: Be sure to check the PREPROPOSAL box. Select the program name "EHR ACT FOR WOM & GIRLS IN SEM" in the Education and Human Resources Directorate, Human Resource Development.

Project Summary: A 100-word abstract that clearly identifies the major features of the project. Be explicit about the intent: research study, student or teacher programs, dissemination, or planning for research or demonstration.

Project Description: The narrative is limited to six pages in length. It should sketch, in broad terms, the essential features of the project:

1. What is the educational or research or dissemination need being met
2. What is the major goal of the project, anticipated outcomes or findings, the target population or sample or audience, and the plan to reach that population or sample or audience
3. What is the innovation introduced by this work Reference prior related work and explain the value added and the national benefit of the work. If similar work was already funded by the Gender Diversity/STEM Education program or by NSF, contrast and differentiate the proposed scope of work by referring to specific projects.

4. Describe the design of the project, identifying major components and including a timeline.
5. Describe briefly critical aspects of the evaluation or research methodology or dissemination method. Describe the overall plan, and special evaluation or research or dissemination resources (people and things).
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 and any products to be developed.
8. Enter an estimated total budget in the Year 1 budget in Fastlane.

Supplemental materials or appendices are NOT permitted for preproposals.

Full Proposal Instructions:

Proposals submitted in response to this program announcement/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/cgi-bin/getpub?gpg>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

On the **COVER SHEET**, select the program name "EHR ACT FOR WOM & GIRLS IN SEM" in the Education and Human Resources Directorate, Human Resource Development.

The **Title** should be prefaced with an abbreviation identifying the GDSE goal supported by the proposal:

- RES - social science or other SMET-discipline-based research on learning
- DEM - curriculum, pedagogy, educational program (informal or formal), or teacher enhancement demonstration
- DIS - dissemination (meeting, media product)
- RES/PLN or DEM/PLN - planning activity

The **Project Summary** should:

- Name and describe the proposed activity (research, demonstration, dissemination, planning)
- Describe the target research subjects, participants, audience
- State the institutions involved
- Describe expected findings (or hypothesis), impact (and outcome measures), or audience feedback
- Especially highlight the innovation and the broader impact on knowledge, social, or human capital

The full proposal **Project Description** should address:

- Project goals, outcome objectives, and a timeline for proposed activities.

- An indication of anticipated findings (research projects), impact and outcome measures (demonstration projects), or impact and audience reach (dissemination).
- What is the innovation introduced by this work Reference prior related work and explain the value added and the national benefit of the work. If similar work was already funded by the Gender Diversity/STEM Education program or by NSF, contrast and differentiate the proposed scope of work by referring to specific projects.
- The basis or context or need for the proposed activity: what is the research base for the design of the proposed research or the proposed demonstration; or, what is the justification for a dissemination meeting or media product.
- 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 collaborations, a management plan and descriptions of the roles of collaborating partners.
- For demonstrations, plans for recruiting and selecting participants.
- For research, the sample population and your access to it.
- A dissemination plan to deliver outcomes to professional peers and the education community.
- For prior grantees, a discussion of the results of prior work.

Institutions that are or have been award recipients of NSF programs in education should explain the relationship between the proposed work and prior funded work. For example, recipients of grants to broaden participation of minorities or persons with disabilities should describe why funding for gender aspects is sought separately. Recipients of grants to develop curriculum should describe why incorporating gender-fair features requires separate funding. Prior grantees of the GDSE program (under its prior names) should emphasize the results of prior grants and describe the innovation, complementarity, and value added by the proposed work.

If the project depends on significant cooperation or collaboration with other organizations, letters of commitment may be included in the **Supplementary Documentation** section of Fastlane.

SELECTION OF DEADLINE

Proposals should be submitted to a competition based on the target age group and the type of proposed project. In cases where the scope of a proposal crosses age groups and combines types across the competitions described below, we encourage you to consult with the program directors for clarification as to which deadline would be more suitable.

JANUARY 31st full proposals: ELEMENTARY and MIDDLE SCHOOL, INFORMAL EDUCATION (K-12)

Contact Dr. Margrete S. Klein for consultations. (Contact information is in Section VIII.) The scope is:

* Informal programs, K-12 (includes high school)

- museum programs
- after school programs

- summer programs
- career awareness
- mentoring

* Curriculum, K-8 (*except intensive applications of education technology*)

* Pedagogy, K-8

* Studies of learning and gender

* Dissemination with focus on any topic in this group

APRIL 11th full proposals:

HIGH SCHOOL, UNDERGRADUATE, TEACHER and FACULTY DEVELOPMENT, and EDUCATIONAL TECHNOLOGIES

Contact Dr. Ruta Sevo for consultations. (Contact information is in Section VIII.) The scope is:

* Curriculum and programs

- advanced science/math/technology in high school
- transitions from high school to undergraduate
- career awareness
- undergraduate
- workforce preparation
- transitions from undergraduate to graduate study

* Application of educational technologies K-16

- online learning for girls, young women, and adults
- web-based environments for girls

* Professional development of adults (in-service and pre-service)

- K-12 teacher education and enhancement
- Counselor training
- Faculty professional development

* Studies of organizational and institutional change to incorporate gender inclusive values

* Dissemination with focus on any topics in this group

Proposers are reminded to identify the program announcement/solicitation number ((03-502)) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations:

Research or demonstration budgets may be up to \$900,000, pending availability of funds. Dissemination budgets may be up to \$100,000, pending availability of funds. Planning (for a future full research or demonstration project) budgets may be up to \$30,000, pending availability of funds. Funds should be budgeted for the principal investigator to attend a two-day grantee's meeting in Washington, D.C. area, each award year, in February/March. A limited equipment request may be allowed. (See Section IV.)

C. Due Dates

Proposals must be submitted by the following date(s):

Letters of Intent (optional):

December 20, 2002

Elementary and Middle School, Informal Education (K-12)

Preliminary Proposals (required):

January 23, 2003

High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies

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

January 31, 2003

Elementary and Middle School, Informal Education (K-12)

April 11, 2003

High School, Undergraduate, Teacher and Faculty Development, and Educational Technologies. By invitation only based on review of preliminary proposal.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed

instructions for proposal preparation and submission via FastLane are available at: <http://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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). 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 he/she 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 Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual 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.

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 Division

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.A. 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 (NSF-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 agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Margrete S. Klein, Program Director, Elementary and Middle School, Informal Education (K-12), Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-4671, fax: (703) 292-9018, email: mklein@nsf.gov
- Ruta P. Sevo, Program Director, High School, Undergraduate, Teacher and Faculty Development, and Educational Tech, Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-4676, fax: (703) 292-9018, email: rsevo@nsf.gov

For questions related to the use of FastLane, contact:

- Gloria Strothers, Lead Program Assistant, Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-8632, fax: (703) 292-9018, email: gstrothe@nsf.gov
- Victoria A. Smoot, Program Specialist, Directorate for Education & Human Resources, Division of Human Resource Development, 815 N, telephone: (703) 292-8640, fax: (703) 292-9019, email: vsmoot@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF *E-Bulletin*, which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's *Custom News Service* (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

The Gender Diversity in STEM Education is among those that promote the participation of underrepresented groups and foster innovation in education for all students through research and demonstration projects. For a complete list of programs in Education and Human Resources see <http://www.ehr.nsf.gov/prog.asp>. For a complete list of programs in the Division for Human Resource Development see <http://www.ehr.nsf.gov/ehr/hrd/>.

The following programs in particular might be of interest:

- ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers ([NSF 02-121](#))
- Activities in Science, Engineering, and Mathematics for Persons with Disabilities ([NSF 02-025](#))
- Research on Learning and Education (ROLE) ([NSF 02-023](#))
- Evaluative Research and Evaluation Capacity Building ([NSF 02-34](#))
- Societal Dimensions of Engineering, Science and Technology ([NSF 02-152](#))
- Information Technology Workforce ([NSF 01-33](#) and [NSF 02-170](#)) National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL) ([NSF 02-054](#))
- Course, Curriculum, and Laboratory Improvement (CCLI) ([NSF 02-043](#))
- Instructional Materials Development (IMD) ([NSF 02-067](#))
- Information Technology Experiences for Students and Teachers (ITEST) ([NSF 02-147](#))
- Math-Science Partnerships (MSP) ([NSF 02-061](#))

- Centers for Learning and Teaching (CLT) ([NSF 02-038](#))
- CISE Educational Innovation Program ([NSF 02-082](#), [NSF 02-079](#))
- Bridges for Engineering Education (BEE)([NSF 02-092](#))
- Engineering Education Program ([PD 01-1340](#))
- Vertical Integration of Research and Education in Mathematical Sciences (VIGRE) ([NSF 02-120](#))
- Research Experiences for Undergraduates (REU) Supplements and Sites ([NSF 01-121](#))
- Advanced Technological Education Program (ATE) ([NSF 02-035](#))
- Computer Science, Engineering, and Mathematics Scholarships (CSEMS) ([NSF 01-62](#))
- NSF Graduate Teaching Fellows in K-12 Education (GK-12) ([NSF 02-042](#))

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter 11, Section D.2 for instructions regarding preparation of these types of proposals.

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: (301) 947-2722

- **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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). 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 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

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