

**NSF POSTDOCTORAL
FELLOWSHIPS IN SCIENCE,
MATHEMATICS, ENGINEERING
AND TECHNOLOGY EDUCATION
(PFSMETE)**

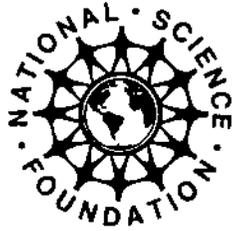
***Guidelines for Submission of Applications
FY 1997 Announcement***

**DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
NSF-POSTDOCTORAL FELLOWSHIPS IN SCIENCE, MATHEMATICS,
ENGINEERING AND TECHNOLOGY EDUCATION (PFSMETE)**

DEADLINE FOR SUBMISSION OF APPLICATIONS: *April 14, 1997*



NATIONAL SCIENCE FOUNDATION



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Postdoctoral Fellowships in Science, Mathematics, Engineering and Technology Education (PFSMETE)

Guidelines for Submission of Proposals

The National Science Foundation recognizes that in a rapidly changing world, Ph.D. graduates in science, mathematics, engineering and technology (SMET) must help the Nation in addressing the challenges of SMET education across the broad spectrum of institutions. These challenges span the full range of education levels (K-12, undergraduate and graduate) and include the need for education reforms and an understanding of learning processes, knowledge transfer, student assessment and evaluation techniques, and uses of technology. NSF anticipates that these graduates will increasingly assume leadership roles in contributing to the Nation's SMET enterprise at all levels. Academic and educational institutions will benefit from the contributions of professionals who will have a thorough understanding of topics in education such as how scientific knowledge can be communicated to diverse learners in a variety of settings, how teaching and learning can be assessed, how new disciplinary knowledge can be used in curriculum development, how technology can be used to advance the teaching of SMET education, and how best to carry out program evaluation of complex educational systems.

As a means of preparing individuals with these skills, the Foundation announces a competition for Postdoctoral Fellowships in Science, Mathematics, Engineering and Technology Education (PFSMETE). The Foundation hopes to support approximately 20, two-year PFSMETE fellowships in FY 1997. This program is aimed at recent Ph.D. graduates in science, mathematics or engineering and seeks to draw broadly on the diversity of talent available in the U.S. population.

Program Objectives

The primary objectives of the program are:

- to prepare Ph.D. graduates in science, mathematics and engineering with the necessary skills to assume *leadership roles* in Science Education in our Nation's diverse educational institutions, and
- to provide opportunities for outstanding Ph.D. graduates to *develop expertise* in a facet of science education research that would qualify them for the new range of educational positions that will come with the 21st century.

Eligibility

To be eligible for a PFSMETE fellowship, individuals must: 1) be citizens, nationals, or permanent residents of the United States at the time of application; and 2) have received a doctoral degree (Ph.D. or equivalent) in one of the fields of science or engineering supported by NSF on or after January 1, 1994 but no later than October 1, 1998. Because this program is intended to broaden the skills of Ph.D. graduates in SMET disciplines, **individuals who hold SMET education degrees are not eligible for this program.**

Plan of Study and/or Research

PFSMETE Fellows have flexibility in the design of a research plan which would be uniquely suited to their professional interests. Disciplinary research that is integral to and supportive of the science education plan may be part of this plan. However, it is expected that the principal focus of the Fellows' time will be spent on research that can contribute significantly to augment the knowledge base in some area of science, mathematics, engineering or technology (SMET) education, or on projects that result in the development of new tools or materials that improve the teaching and learning of SMET. It is also desirable that PFSMETE Fellows spend time developing new sets of skills that will prepare them for future positions with strong emphasis in education. SMET research may be in a broad range of critical areas of SMET education at any level (K-12, undergraduate or graduate) and may include but is not limited to:

- **Cognitive processes in learning.** Disciplinary knowledge may be used to conduct research on how people learn, how cognition is affected by learning styles, how students acquire facts, concepts and skills, how to apply cognitive principles to facilitate effective learning, and what kinds of learning tasks are best suited to different kinds of students.
- **Knowledge transfer.** Projects may be centered on how the content of SMET can be communicated to different learners (e.g. different ages, diverse cultural backgrounds, or various learning styles) and how cognitive processes can be used to design course curriculum.

- **Uses of technology as teaching and learning tools.** Research may be focused on how advanced technologies can be used in teaching and learning the changing content of SMET, taking into account the different ways people think, learn and solve problems. The outcome of this kind of research may be of immediate use and application in assisting teachers with the use of computers, newly developed software and other technologies in the classroom. Research can also be conducted on the development of materials and tools that significantly improve the teaching and learning of SMET or on the development of intelligent systems that may be useful in all facets of education, including informal and self-directed learning.
- **Student Assessment.** Emphasis may be placed on investigating various approaches to measuring student achievement or assessing program impact and effectiveness. Studies on the relationship between assessment and instructional practices may also be conducted. Other topics may include the development of strategies and tools for evaluating student performance.

PFSMETE awards may not be used primarily for the preparation of a textbook. Limited undergraduate teaching may be conducted. It is expected that the host institution will provide additional compensation to the fellows for such services (see below under Conditions). Consistent with postdoctoral fellowship programs, PFSMETE Fellows will work under the guidance of one or more principal advisors during fellowship tenure, functioning as their SMET mentors. The mentors' names and qualifications should be included in the application, with evidence of their willingness to serve in such a capacity. It is important that each mentor's knowledge and experience in SMET education (e.g. areas listed above) be described in the proposal.

Location of Work

PFSMETE fellowships will be awarded for research or study at academic institutions that offer a baccalaureate, master's or doctoral degree in a field supported by NSF. PFSMETE Fellows may also work in an institution where major science education projects are currently being developed, disseminated or evaluated. Because of the nature of the program, PFSMETE Fellows are encouraged to establish collaborative arrangements with other institutions to conduct their activities (e.g. community colleges, technical or vocational institutions, K-12 schools, non-profit institutions, museums). Applicants will be required to submit with their application acceptable evidence of support by their chosen institutions (see Application Procedures, item 7 below).

Stipends and Allowances

The stipend for PFSMETE Fellowships will be \$3,000 per month. In addition, the Foundation will provide a research allowance to the Fellow of \$500 per month to be used at the discretion of the Fellow for scientific or educational supplies, special travel, publication costs and other research-related expenses. The Foundation will also provide an institutional allowance of \$750 per month of fellowship tenure to aid in defraying the costs of hosting the Fellow. Although this allowance is expendable at the discretion of the institution, the Foundation strongly encourages that an appropriate portion of this allowance be used to provide health insurance and similar benefits for the Fellows.

Fellowship Duration

PFSMETE Fellowships will be given for a total of 24 months. A recipient of a PFSMETE Fellowship may begin his or her fellowship no later than the beginning of the 1998-1999 academic year.

At the successful conclusion of the fellowship activities and contingent upon the availability of funds, the Foundation will consider an extension of support for an additional 12 months. The extension may be in the form of another 12 months of continued fellowship support, or a starter research grant not to exceed \$50,000 to enable the Fellow to initiate an appropriate research program. The latter option would be appropriate for Fellows who have secured a position in an organization in which the knowledge and experience obtained during the PFSMETE fellowship can be applied. The formal proposal for a starter research grant will originate from the employing organization. Funds under such a grant may not be used for the academic-year salary of the Fellow. Further information about the format of a starter research grant proposal will be communicated to Fellows electing that option at a later date. In any case, a recommendation for a third year of support will be made after an internal review based on progress to date and/or the proposed use of the time and funds involved.

Application Procedures

The PFSMETE application consists of 6 complete sets of the application materials (signed original, plus 5 copies), 1 copy of the Supplementary Nominee Information (NSF Form 1225B) attached to the original application only, and 3 reference letters. Applications should be typewritten. Typestyles should be no smaller than 10 point font size. Margins may not be smaller than 2.5 cm, except where margins are established on forms. Failure to comply with application procedures will disqualify an application from eligibility for merit review.

The applicant's name and the heading of each section listed below should appear at the top of each page. Each set of a PFSMETE application should be stapled and ordered as follows:

1. PFSMETE cover sheet (NSF- form 1383)

2. Abstract of Doctoral Dissertation (Limit: 1 page)

This page should include a brief description of the doctoral dissertation research.

3. Abstract of Proposed Plan of Study and/or Research (limit: 50 words)

This page should include a brief description of the study and/or research plan to be conducted during the period of the fellowship.

4. Proposed Plan of Study and/or Research (Limit: 3 pages)

This section should describe in detail the study and/or research plan to be undertaken during the time of the fellowship and the approaches that will be followed to accomplish it. It should include a description of the career goals of the applicant with respect to research and science education with comments about how the proposed plan will enhance the applicant's potential to pursue a career with a strong science education component. The applicant should comment on the reasons for selecting the institution(s) and mentor(s).

5. Biographical Sketch (Limit: 3 pages)

This should include a brief sketch showing the applicant's name and current position; educational background including dates of conferred degrees; professional accomplishments, including employment history in reverse chronological order, honors, awards, a list of publications, mentoring activities, current and pending grant support; and other relevant information related to the PFSMETE fellowship.

6. Mentor's Statement (Limit: 2 pages)

A statement from the mentor(s) indicating how the applicant's plan will fit into the mentor's program and what role the mentor will play in assisting the applicant in accomplishing the PFSMETE objectives. A brief biographical sketch including the mentor's experience and specific activities conducted in science education should also be included. The mentor(s) name and position should be clearly stated.

7. Institutional Support (Limit: 1 page)

A statement of support from the institution(s) where the applicant expects to conduct his/her activities should be included with the application. Any financial commitment or additional support for the applicant from the fellowship institution should be described.

8. Reference Letters

Three reference letters are required, including one from the thesis advisor if possible. It is important to send referees a copy of the proposed study and/or research plan for their review and comments. Letters should be addressed to the NSF PFSMETE Review Committee and specifically address at least one of the standard NSF review criteria (Grant Proposal Guide, NSF 95-27) and one of the additional criteria listed below. **One original letter and five copies** must be collected from each referee by the applicant. Letters should be sent to the applicant in sealed envelopes. Applicants should instruct their referees to mark both sides of the envelope "TO BE OPENED ONLY BY NSF." The envelopes should be addressed to:

NSF- PFSMETE Program
C/O Name of Applicant
Applicant's address
City, State, Zip Code

Envelopes should include the Referee's Name, Street Address, City, State, and Zip Code on the upper left hand corner.

Letters in sealed envelopes should be included in the application package. **References that are sent to NSF separately from the application material will be omitted from the review process.**

Deadline for Submission of Applications

All application submissions must be postmarked by April 14, 1997. All sets of materials, forms and reference letters should be submitted as a single unit in a large envelope and addressed:

NSF- PFSMETE Program
National Science Foundation, Suite 907N
4201 Wilson Blvd.
Arlington, VA 22230

Awards are expected to be announced in late summer, 1997.

Evaluation and Selection

Panels of SMET experts including science educators will evaluate PFSMETE proposals. Disciplinary Program Directors at NSF will be invited to the panel meeting to observe the PFSMETE review and selection process. In addition to the criteria described in the *Grant Proposal Guide* (NSF 95-27), Section III A, the following additional criteria will be taken into account:

1. Potential for the proposed plan of study and/or research to achieve the objectives of the PFSMETE program and potential for contributing to SMET education knowledge.
2. Potential for successful completion of the proposed research by the applicant and continued contributions in the SMET field.
3. Credentials of the mentor(s) for guiding the research and assisting with the professional development of the applicant.
4. Appropriateness of the institutional setting for carrying out the proposed plan of study and/or research.

PFSMETE Fellows will be selected by the National Science Foundation on merit and will be based primarily on the advice of the external panel using the Foundation's review criteria and the additional factors cited above .

Conditions of Appointment

PFSMETE Fellows will be required to devote full time to the plan proposed in the application. Fellowships will start upon request by the Fellow after acceptance of an award offer, but no later than October 1, 1998.

A Fellow may not receive remuneration from another fellowship, scholarship, or similar award, or from another Federal grant or contract during the tenure of the award. Institutions may supplement fellowship stipends, without prior permission from the Foundation, up to a maximum of 20 percent of the Fellow's stipend. Such supplementation must be in accord with established institution policies. It may be given without any requirement for duties in addition to normal fellowship activities, or it may involve limited teaching or research duties, provided these are compatible with the approved research and study plan of the Fellow.

Prior Foundation approval is required in all cases in which an institution proposes to supplement in any amount larger than the above established guidelines. Approval will be given only for compelling reasons. It is the Fellow's responsibility to notify the Foundation of all supplementation in any amount as soon as the supplementation has received institutional approval.

It is expected that Fellows will carry out their plans of research or study as proposed in their applications. Major departures therefrom must receive prior approval by the National Science Foundation. Any change in course of study, duration of the fellowship, or fellowship institution will require approval by the National Science Foundation.

Results of research carried out by the Fellows during their PFSMETE fellowships should be made available to the public without restriction unless such is required in the interest of national security of the United States. PFSMETE fellows are fully responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for such findings or their interpretation.

At the completion of the PFSMETE fellowship, Fellows are required to submit a final report (NSF Form 98A) to the NSF-PFSMETE program officer. The report should contain the results of the Fellow's activities. This is particularly important if an extension of the fellowship or a starter research grant is requested. The Foundation will also measure and evaluate the effectiveness and outcomes of the program at intermediate points during the PFSMETE fellowship.

Program Effectiveness Indicators

At some appropriate time after the first round of awards, NSF will convene a meeting of the PFSMETE Fellows and their mentors to exchange ideas, to learn about the activities the Fellows will be conducting, and to discuss ways of measuring progress along the way. This group will reconvene later to determine the effectiveness of PFSMETE in preparing the Fellows for leadership careers and to plan additional strategies for accomplishing program goals.

Possible indicators of program and project effectiveness that might be considered include: development of creative teaching methods, development of innovative teaching materials for new concepts, development of quality education products (e.g. refereed publications, presentations to professional societies and end-users, educational technologies, statistical tools, evaluation, methodologies), and utility to the education community as evidenced by sponsored studies of school systems and evaluations of higher education programs.

Inquiries

General inquiries regarding the PFSMETE program may be addressed to Postdoctoral Fellowships in Science Education, National Science Foundation, Suite 907N, 4201 Wilson Blvd., Arlington VA 22230. The telephone number is (703) 306-1697, fax number (703) 306-0468. Request for information via the INTERNET may be addressed to PFSMETE@nsf.gov.

Copies of this or any other NSF publication, may be obtained from the NSF Publications Unit. The PFSMETE announcement number is NSF 97-42.

**FELLOWSHIP
APPLICATION
FORM**

National Science Foundation
Postdoctoral Fellowships in Science, Mathematics,
Engineering and Technology Education (PFSMETE)

Please type, if possible

NAME

Surname

Given Names

Other Names Used

SOCIAL SECURITY NO. _____ - _____ - _____

MAILING ADDRESS for correspondence. It is imperative that you keep NSF informed of a current mailing address.

CURRENT POSITION

Department _____

Institution _____

Title of Position _____

Date this position started _____

Source of support _____

PROPOSED FELLOWSHIP INSTITUTION including department and address

PROPOSED MENTOR including title

BRIEF TITLE of your proposed research

**APPLICATION
FORM
page 2**

National Science Foundation
Postdoctoral Fellowships in Science, Mathematics,
Engineering and Technology Education (PFSMETE)

DOCTORAL DEGREE

Department and Institution _____

Date awarded or anticipated date of receipt _____

REFERENCES (do not use your mentor)

	Name	Department	Institution	Phone
Ph.D. Advisor	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

EXPECTED STARTING DATE OF FELLOWSHIP _____ 1, _____
month year

OTHER SUPPORT

Have you applied for any other fellowships or similar appointments for all or part of the tenure herein requested? _____

If so, name of agency or program: _____

Have you ever received an NSF Postdoctoral Fellowship? _____

If yes, when and from what program? _____

TELEPHONE NUMBER(S) where you can be reached during daytime hours until awards are announced.

FAX NUMBER

E-MAIL ADDRESS

I have read the program announcement in detail and have noted its conditions.

Signature of applicant _____

Date _____

THIS APPLICATION IS NOT COMPLETE WITHOUT YOUR SIGNATURE.

Certifications

National Science Foundation
Postdoctoral Fellowships in Science, Mathematics,
Engineering and Technology Education (PFSMETE)

There are three certifications which, by law, must be made before the National Science Foundation can authorize funds for a fellowship award. These concern (1) controlled substances, (2) delinquency on Federal debt, and (3) debarment and suspension.

I certify that:

I will not engage in unlawful manufacture, distribution, dispensing, possession or use of a controlled substance in the control of any activity with this fellowship award;

I am not delinquent on repayment of any Federal debt; and

To the best of my knowledge and belief,

I am not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any Federal department or agency.

I have not within a three-year period preceding my application been convicted of or had a civil judgment rendered against me for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

I am not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission or any of the offenses enumerated in paragraph 3.(b) of this certification; and

I have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.

Date

Signature

**Supplementary
Information**

National Science Foundation
Postdoctoral Fellowships in Science, Mathematics,
Engineering and Technology Education (PFSMETE)

Submit only ONE copy of this form. Leave the back of the page blank. Do not include this form with any of the other copies, as this may compromise the confidentiality of the information. Please check the appropriate answers to each questions for the applicant:

1. Is this person
Female
Male
2. Is this person a
U.S. Citizen
Permanent Resident
Other non-U.S. Citizen
3. Which one of these categories best describes this person's ethnic/racial status? (if more than one category applies, use the category that most closely reflects the person's recognition in the community.)
American Indian or Alaskan Native
Asian
Black, not of Hispanic Origin
Hispanic
Pacific Islander
White, not of Hispanic Origin
4. Does this person have a disability* which limits a major life activity?
Yes
No

Check here if this person does not wish
to provide some or all of the above information.

Required: Check here if this person is currently serving (or has previously served) as PI, CO-PI, or PD on any Federally funded project.

American Indian or Alaskan Native: A person having origins in any of the original peoples of North America, and who maintains cultural identification through affiliation or community recognition.

Asian: A person having origins in any of the original peoples of East Asia, Southeast Asia and the Indian subcontinent. This area includes, for example, China, India, Indonesia, Japan, Korea and Vietnam.

Black, not of Hispanic Origin: A person having origins in any of the black racial groups of Africa.

Hispanic: A person of Mexican, Puerto Rican, Cuban, central or South American or other Spanish culture or origin, regardless of race.

Pacific Islander: A person having origins in any of the original peoples of Hawaii; the U.S. Pacific Territories of Guam, American Samoa, and the Northern Marianas; the U.S. Trust Territory of Palau; the islands of Micronesia and Melanesia; and the Philippines.

White, not of Hispanic Origin: A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

*Disabled: A person having a physical or mental impairment that substantially limits one or more major life activities; who has a record of such impairment; or who is regarded as having such impairment.

WHY THIS INFORMATION IS BEING REQUESTED: The Federal Government has a continuing commitment to monitor the operation of its review and award processes to identify and address any inequities based on gender, race, ethnicity or disability of the nominee. To gather information needed for this important task, you should submit a single copy of this form, however, submission of the requested information is not mandatory and is not a precondition of award. Any individual not wishing to provide the information should check the box provided for this purpose. (the exception is information about previous Federal support, the last question above.) Information from this form will be retained by Federal agencies as an integral part of their Privacy Act Systems of Records in accordance with the Privacy Act of 1974. These are confidential files accessible only to appropriate Federal agency personnel and will be treated as confidential to the extent permitted by law. Data submitted will be used in accordance with criteria established by the respective Federal agency for awarding grants for research and education, and in response to Public Law 99-383 and 42 USC 1885c.

The Foundation provides awards for research and education in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research and education related programs described here. 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 subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

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 projects. See the program announcement or contact the program coordinator at (703) 306-1636.

Privacy Act and Public Burden. The information requested on the application materials is solicited under the authority of the National Science Foundation Act of 1950, as amended. It will be used in connection with the selection of qualified applicants and may be disclosed to qualified reviewers and staff assistants as part of the review process; to the institution, the nominee, applicant or fellow is attending or is planning to attend or is employed by for the purpose of facilitating review or award decisions, or administering fellowships or awards; to government contractors, experts, volunteers, and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. Information from this system may be merged with other computer files to carry out statistical studies, the results of which do not identify individuals. Disclosure may be made of awardees' names, home institutions, and fields of study for public information purposes. For fellows or awardees receiving stipends directly from the government, information is transmitted to the Department of the Treasury to make payments. See Systems of Records, NSF-12, "Fellowships and Other Awards," 60 Federal Register 4449 (January 23, 1995). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

Public reporting burden for this collection of information is estimated to average 12 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Herman G. Fleming, Reports Clearance Officer, Contracts, Policy, and Oversight, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230.

The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing impairment to communicate with the Foundation about NSF programs, employment, or general information. To access NSF TDD dial (703) 306-0090; for FIRS, 1-800-877-8339.

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