

Geospace Environment Modeling (GEM)

Program Solicitation

NSF-02-122

DIVISION OF ATMOSPHERIC SCIENCES

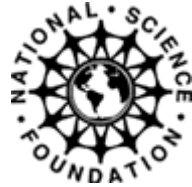
FULL PROPOSAL TARGET DATE(S):

October 15 of each year for proposals other than post-doctoral proposals.

May 1 of each year for post-doctoral proposals.



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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: Geospace Environment Modeling (GEM)

Synopsis of Program: GEM is a broad-based, community-initiated research program on the physics of the Earth's magnetosphere and the coupling of the magnetosphere to the atmosphere and to the solar wind. The purpose of the GEM program is to support basic research into the dynamical and structural properties of geospace, leading to the construction of a global Geospace General Circulation Model (GGCM) with predictive capability. This GGCM model will be modularized and will complement parallel developments of magnetohydrodynamic models. The strategy for achieving GEM goals is to undertake a series of campaigns, in both theory and observational modes, each focusing on particular aspects of the geospace environment. The awards are to include scientific grants for established investigators and one or two awards each year for post-doctoral research positions.

Cognizant Program Officer(s):

- Kile Baker, Magnetospheric Physics, Program Director, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8519, e-mail: kbaker@nsf.gov.
- Robert Robinson, Upper Atmosphere Facilities, Program Director, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8529, e-mail: rmrobins@nsf.gov.

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

- 47.050 --- Geosciences

ELIGIBILITY INFORMATION

- **Organization Limit:** None
- **PI Eligibility Limit:** None
- **Limit on Number of Proposals:** None

AWARD INFORMATION

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 8 to 12 per year
- **Anticipated Funding Amount:** \$ 750 K in fiscal year 2003 for new awards, pending availability of funds.

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

- **Full Proposals:** Supplemental Preparation Guidelines
 - 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 program announcement/solicitation for further information.

C. Deadline/Target Dates

- **Letters of Intent (*optional*):** None
- **Preliminary Proposals (*optional*):** None
- **Full Proposal Target Date(s):**

October 15 of each year for proposals other than post-doctoral proposals.

May 1 of each year for post-doctoral proposals.

D. FastLane Requirements

- **FastLane Submission:** Required
- **FastLane Contact(s):**
 - Ruth Joel, Program Assistant, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8522, e-mail: rjoel@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply. Please see the full program announcement/solicitation for further information.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

I. INTRODUCTION

The Geospace Environment Modeling (GEM) program is the second in order of inception of three programs in Upper Atmospheric Research (CEDAR, GEM, and SHINE) designed to address the question of how the sun influences geospace and the upper atmosphere. The primary goal of GEM is to understand how energy, mass, and momentum flow in the solar wind is coupled into the Earth's magnetosphere and in turn how the magnetosphere is coupled to the Earth's atmosphere. A critical component for understanding global change is the development of general circulation models (GCMs) that can be used to study the physical processes by which global change takes place.

To facilitate concentrated research efforts on specific topics of relevance to the GEM goals, the GEM program is organized into a set of campaigns, with each campaign focusing on a specific region of the magnetosphere. Each campaign runs from four to five years and two to three campaigns run simultaneously. In addition to the regular research campaigns, the development of modules for a Geospace General Circulation Model is done as a continuing campaign. An annual workshop is held for one week each summer to provide a forum for investigators to present and discuss recent results, exchange information, plan future experiments, and improve and develop modules and full models for the GGCM. The directions for the GEM program are set by ATM program officers with advice from the GEM steering committee and the general space physics community. Members of the GEM steering committee are appointed to 3-year terms by the ATM/MAG program officer. The day-to-day operations are performed by a set of GEM coordinators who manage the electronic and print communications and the GEM workshops.

II. PROGRAM DESCRIPTION

The Geospace Environment Modeling (GEM) program is a broad-based, community-initiated research program on the physics of the Earth's magnetosphere and the coupling of the magnetosphere to the atmosphere and to the solar wind. The purpose of the GEM program is to support basic research into the dynamical and structural properties of geospace, leading to the construction of a global Geospace General Circulation Model (GGCM) with predictive capability. This GGCM model will be modularized and will complement parallel developments of magnetohydrodynamic models. The strategy for achieving GEM goals is to undertake a series of campaigns, in both theory and observational modes, each focusing on particular aspects of the geospace environment. The awards include scientific grants for established investigators and one or two awards each year for post-doctoral research positions.

The long-term goal of the GEM program is the development of one or more general circulation models (GCMs) that would describe the global dynamics of the magnetosphere and how the magnetosphere interacts with the solar wind and the ionosphere. The success of the program will ultimately be measured by its ability to encode the results of its studies in a Geospace General Circulation Model which can be used by the entire space physics community to accurately simulate magnetospheric convection, magnetic storms and substorms. For the purposes of the GEM program, the magnetosphere includes not only the region bounded by the magnetopause and the ionosphere, but includes the bow shock, magnetosheath and boundary layers as well.

The activities within this program that will lead toward a realization of the GEM goal include observations and data analysis as well as theory and modeling. Observational data may come from ground-based instrumentation as well as from satellites, and may include both in situ data and remote sensing. In order to provide a strong focus for GEM research, this program defines a series of campaigns, each of which focuses on one region or aspect of the Geospace environment. Each campaign is expected to run for approximately five years, with the precise beginning and end determined by the GEM Steering Committee. Two to three campaigns run simultaneously. In addition to the regular campaigns, the effort to create a GGCM is considered an ongoing campaign that interacts with the other campaigns. Information about past campaigns and the currently active campaigns can be found at <http://www-ssc.igpp.ucla.edu/gem/Welcome.html>. Proposals submitted to the GEM program should be pertinent to one or more of the current GEM campaigns or should be directly related to the development of a GGCM. The program description in the proposal should make it clear which GEM campaign (or campaigns) is being targeted.

Normally, GEM awards are made for a duration of three years, but applicants may request from one to five years of funding provided the requested duration is adequately justified.

In addition to the competition for research grants, up to two two-year awards will be made for post-doctoral research support for recent Ph.D. graduates. The types of studies the candidates will be expected to perform include: analyzing existing GEM campaign data, taking an active role in one of the current GEM campaigns, and developing modules for use in a GGCM. The tenure of these awards may be at the institution or facility of the applicant's choice, and either the applicant or a suitable advisor at the performing institution may be designated as principal investigator.

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

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. The typical award size is approximately \$80,000 per year with a duration of three years. Applicants may request from one to five years of funding provided the requested duration is adequately justified. The maximum award size is \$150,000/yr. Post-doctoral research awards are two-year awards and provide a stipend of \$40,000 per year plus appropriate amounts for benefits, travel, publishing expenses and indirect costs.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal:

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 Web Site at: <http://www.nsf.gov/cgi-bin/getpub?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.

Proposal titles should begin with the word "GEM".

Proposals should include a description of the relevance of the research to the currently active GEM campaigns. Information about the currently active GEM campaigns can be obtained from the cognizant Program Officers.

Proposers are reminded to identify the program solicitation number (NSF-02-122) 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 is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations: Post-doctoral awards will be for two years at a stipend level of \$40,000 per year plus any allowable employee benefits and institutional overhead. Post-doctoral awards may also include travel expenses for participation in the GEM workshops, as well as appropriate publication costs and other direct expenses directly related to the research effort.

C. Deadline/Target Dates

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

Full Proposals:

October 15 of each year for proposals other than post-doctoral proposals.

May 1 of each year for post-doctoral proposals.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program 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 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 two 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 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.

Additional Review Criteria

The proposal should describe the relevance of the proposed activity to the overall goals of the GEM program and should describe how the proposed activity relates to the currently active GEM campaigns. Information on the currently active GEM campaigns can be obtained from the cognizant Program Officers.

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 identities of 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.

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 Mail and/or 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.

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 closing date of an announcement/solicitation or the date of proposal receipt (whichever is later). 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 one's 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 Web site at http://www.nsf.gov/home/grants/grants_gac.htm. 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 is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site 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 Web site 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. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the 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.

NSF has implemented an electronic project reporting system, available through FastLane. 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 Geospace Environment Modeling should be made to:

- Kile Baker, Magnetospheric Physics, Program Director, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8519, e-mail: kbaker@nsf.gov.
- Robert Robinson, Upper Atmosphere Facilities, Program Director, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8529, e-mail: rmrobins@nsf.gov.

For questions related to the use of FastLane, contact:

- Ruth Joel, Program Assistant, Geosciences, Atmospheric Sciences, 775, telephone: 703-292-8522, e-mail: rjoel@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](http://www.nsf.gov/home/ebulletin), which is updated daily on the NSF web site 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) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

There are two other programs related to the Geospace Environment Modeling program. The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) program (see NSF 02-070) is handled through the Aeronomy Program in the Atmospheric Sciences division and the Solar, Heliospheric and INterplanetary Environment (SHINE) program (see NSF 01-143) is handled through the Solar-Terrestrial Research Program in the Atmospheric Sciences division.

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 (unless otherwise specified in the eligibility requirements for a particular program).

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 program announcement/solicitation for further information.

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 or 800-281-8749, FIRS-1-800-877-8339.

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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.

Pursuant to 5 CFR 1320.5(b), 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, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 17th Street, N.W. Room 10235, Washington, D.C. 20503.

OMB control number: 3145-0058.