

National Science Foundation

4201 Wilson Blvd.
Arlington, VA 22230

**Environmental Molecular Science Institutes (EMSI):
Special Research Opportunity (NSF 97-135)**

15 July 1997

Dear Colleague:

The National Science Foundation (NSF) Directorate for Mathematical and Physical Sciences and U. S. Department of Energy (DOE) Office of Energy Research (ER) announce a one-time opportunity for support of Environmental Molecular Science Institutes (EMSI) aimed at increasing fundamental understanding of natural and industrial processes and their interaction at the molecular level. NSF and DOE encourage cohesive, interdisciplinary, university-industry group efforts in basic research on fundamental issues that underpin the amelioration of environmental problems caused by societal activities such as manufacturing and utilization activities that are energy- and pollution-intensive.

This funding opportunity will establish one to three Environmental Molecular Science Institutes. Five year requests in the range of \$0.5 million to \$2 million per year are appropriate. Up to \$2.0 million per year from NSF will be made available beginning in FY98, subject to availability of funds. In addition, approximately \$2.0 million from DOE in FY98, subject to availability of funds, will support specific activities within Institutes appropriate to DOE interests, such as elaborated in the supplementary information section below. This announcement is being made jointly by DOE and NSF to ensure that the strongest possible programs are supported with the limited funds available, to minimize multiple submissions to the two agencies, and to concentrate resources to realize measurable progress in focused research areas.

An Institute should serve as a national model and resource for excellence in collaborative environmental research and in dissemination of results for solution or amelioration of environmental problems. To strengthen the probability that the proposed basic research focus will contribute in the future to improved technologies and processes, it is expected that proposals will include working collaborations with appropriate and relevant industries. Understanding the molecular behavior of complex, dynamic environmental systems is expected to require interdisciplinary approaches involving scientists from multiple departments. An Institute must have a focused research theme and specific goals. The organization and management structure must be designed to enable these goals to be met. An Institute should not be a collection of existing projects. Rather proposers are invited to take a fresh look at environmental challenges to develop a unified activity. Examples of appropriate research areas include, but are not limited to: chemical and materials synthesis or processing for pollution prevention; integrated understanding of

speciation, sorption, transport, and bioavailability in a specified environment; response of a specific environment to chemical perturbations caused by human activities. The proposed activities, as an ancillary benefit, should help to integrate research and education and provide broadened experience to students. Strong institutional support for programmatic reinforcement of the educational activities will be considered positively.

Proposal Submission

Eligibility is limited to colleges, universities, and other not-for-profit institutions in the U.S. and its territories, as described in detail in the *Grant Proposal Guide* (NSF 95-27). Potential applicants are required to submit a brief preliminary proposal. All preliminary applications must reference this document (NSF 97-135) and five copies must be received by **October 15, 1997**. The preliminary proposal should include a project summary; a three-page project description that outlines goals, research plans, and roles of collaborators; biographical sketches limited to two pages per investigator; one budget page for the total funding requested (institutional signature is not required). Other general guidance and forms are provided in the NSF *Grant Proposal Guide* (NSF 95-27).

Proposals must be sent to:

EMSI (NSF 97-135)
NSF - Room P60 - PPU
4201 Wilson Boulevard
Arlington, VA 22230

Preliminary proposals will be evaluated by NSF and DOE staff from relevant disciplines in order to advise Principal Investigators on responsiveness to goals and priorities described above and on the likelihood of successful competition with other proposals in the merit review process. Those submitting will be informed of the result of this review by **November 15, 1997**.

Full proposals (15 copies including the original, prepared in accordance with the NSF Grant Proposal Guide) must be received by **February 1, 1998**. These will be evaluated by appropriate mechanisms, which may include *ad hoc* mail review, panel review, or site visits. In addition to the published new NSF criteria, other factors will be considered, such as the potential for significant contributions to environmental chemistry, the strength of the collaborations planned, the value to education, and the potential for national leadership among the constituency interested in the research theme. Proposals involving industrial collaboration will receive preference over those of equal scientific merit that lack such collaboration. Activities considered for funding by DOE will be reviewed for excellence of the science and relevance to the mission of the Department and its technology programs. Below is Additional Information on scope, format, and review criteria.

Grants awarded as a result of this announcement will be administered in accordance with the terms and conditions of NSF GC-1 (10/95) or FDP-III (u/1/96), *Grant General*

Conditions. Copies of these documents are available on www.nsf.gov under “Grants and Awards.” NSF encourages, but does not require, organizations responding to this announcement to contribute to the costs of the project beyond the minimum one-percent statutory cost-sharing requirement. However, any additional cost-sharing specified in the proposal will be referenced and included as a condition of any award resulting from this announcement.

Janet G. Osteryoung
Director, Division of Chemistry
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230
josteryo@nsf.gov
703-306-1845

Robert S. Marianelli
Director, Chemical Sciences Division
Office of Basic Energy Sciences
Office of Energy Research
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874-1290
robert.marianelli@mailgw.er.doe.gov
(301) 903-5808

ADDITIONAL INFORMATION ON SCOPE OF INSTITUTES AND FULL PROPOSAL FORMAT

This letter broadly describes the nature and scope of an institute and is not intended to be unnecessarily prescriptive. There are many models and variations that may be considered, including the traditional understanding of an institute at a specific location, as well as regional or more widely distributed institutes. Proposals should include information that defines the institute, describes the planning process, defines mission and goals, describes how the desired goals will be achieved and how it will be determined that these goals have been accomplished. The proposing groups are encouraged to construct the appropriate organization and structure that will maximize the effectiveness and impact of their strengths and resources.

The leadership of an institute should be provided by a small group, including a director and, as appropriate for the size of the institute, an associate director and an external advisory committee. The director of an institute should be a respected scientist with demonstrated organizational, managerial, and leadership ability. An institute's scientific guidance should be provided by a committee of scientists from the participating institutions. Although a multi-institutional consortium may be involved, a single entity must accept overall management responsibility in dealing with NSF.

The NSF *Grant Proposal Guide (GPG)*, NSF 95-27, describes the format required for proposals. The Project Description in the full proposal will be subject to the page limitations **for each section** described below. Proposals not adhering to these limits will be returned without review.

- Detailed description of the intellectual focus and rationale for the institute, its overall goals, and expected impact (**3 pages, maximum**);
- Planned scientific activities, including a five-year plan for phasing activities in or out, and the roles of the various partners (**15 pages, maximum**);
- Plans for human resource development, including involvement of undergraduate, graduate and postdoctoral students and members of under-represented groups (**2 pages, maximum**);
- Description of planned outreach activities and dissemination (**2 pages, maximum**);
- Description of goals and outcomes expected and how the impact will be demonstrated and evaluated (**2 pages, maximum**);
- Description of the organizational structure of the institute, clearly outlining the proposed management structure, mechanisms for focusing institute activities, methods for selecting and integrating research emphases, criteria for selection of participants, allocating funds and equipment, and managing the involvement of other groups (**4 pages, maximum**).

Each biographical sketch, limited to two pages, should include a brief summary of results of prior NSF support. Please note that letters describing collaborative arrangements significant to the proposals should be included under "supplementary documentation." Only letters of commitment are permitted; "endorsement" letters may **not** be included. No appendices are permitted. Additional sources of financial support for the institute should be identified.

MERIT REVIEW PROCESS

Proposals submitted in response to this announcement will be subject to the *NEW* merit review criteria approved by the National Science Board on March 28, 1997 (NSB97-72). Additional information on NSF's new merit review criteria is available in the *Merit Review Task Force Final Report* at www.nsf.gov/cgibin/getpub?nsbmr975. The new merit review criteria are:

What is the intellectual merit and quality of the proposed activity?

The following are suggested questions that the reviewer will consider in assessing how well the proposal meets this criterion. Each reviewer will address only those questions which he/she considers relevant to the proposal and for which he/she is qualified to make judgments.

How important is the proposed activity to advancing knowledge and understanding within its own field and 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 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?

The following are suggested questions that the reviewer will consider in assessing how well the proposal meets this criterion. Each reviewer will address only those questions which he/she considers relevant to the proposal and for which he/she is qualified to make judgments.

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, 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?

Additional Criteria Specific to this Activity

In addition to these generic review criteria, reviewers will be asked to use the following additional criteria when reviewing proposals that respond to this announcement. These criteria are as follows:

- Quality of the scientific activities and their potential for leadership and impact on environmental chemistry and solutions to environmental problems;
- Extent of interdisciplinarity and the extent to which communication and interaction with other areas of science and engineering are fostered by linkages and partnerships among university research groups, industry, national laboratories, etc.;
- Capabilities of the institute leadership, including managerial and organizational ability of the director and of the proposed leadership team;
- Quality and anticipated effectiveness of the management plan, including plans for interaction among institute staff and institutional partners and for operation of the institute, including selection of activities and participants;
- Quality of the institute's education and training components, especially plans to attract, involve and mentor students and under-represented groups;
- Quality and effectiveness of proposed outreach activities and dissemination of results;
- Clarity of mission and goals and quality of the evaluation plan;
- Level and quality of the commitment to the institute by the lead institution and its partners.

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

SUPPLEMENTARY INFORMATION ON TOPICAL WORKSHOPS SPONSORED BY NSF AND DOE

NSF and DOE have co-sponsored two interdisciplinary workshops to help define priorities for research in two areas that have been identified as activities responsible for complex and intransigent environmental problems. These are: (1) Vehicular Transportation and (2) Reducing Energy Consumption and Pollution from Energy and Pollution Intensive Processes.

A critical issue identified for the 21st Century is the balancing of industrial activity and environmental stewardship; more knowledge is needed to make choices to achieve that balance. There are seven industries that consume 80 percent of the energy and produce over 90 percent of the wastes in the manufacturing sector. These seven industries are chemicals, petroleum refining, forest products, steel, aluminum, glass, and metal casting. Those aspects of the workshop reports that deal with fundamental molecular science and the crosscutting issues identified in the reports are particularly relevant to proposals in response to this announcement.

Copies of the workshop reports entitled "Basic Research Needs for Environmentally Responsive Technologies of the Future" and "Basic Research Needs for Vehicles of the Future" can be obtained from

Princeton Materials Institute
Bowen Hall
Princeton University
70 Prospect Avenue
Princeton, New Jersey 08544-522.

The reports can also be found on the World Wide Web at <http://pmi.princeton.edu>.

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. The information requested on proposal forms 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 proposals and may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees; to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts,

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volunteers, and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. See Systems of Records, NSF 50, Principal Investigators/Proposal File and Associated Records, and NSF-51, 60 Federal Register 4449 (January 23, 1995). Reviewer/Proposal File and Associated Records, 59 Federal Register 8031 (February 17, 1994).

Public Burden. Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

The 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 or any other aspect of this collection of information, including suggestions for reducing this burden, to Gail A. McHenry, Reports Clearance Officer, Information Dissemination Branch, National Science Foundation, 4201 Wilson Boulevard, Suite 245, 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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P.T. 34,
K.W. 1003000,

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