

INTEGRATED RESEARCH CHALLENGES IN ENVIRONMENTAL BIOLOGY

Special Competition Announcement

DIRECTORATE FOR BIOLOGICAL SCIENCES

LETTER OF INTENT:

NOVEMBER 30 EACH YEAR THROUGH 2001

PROPOSAL DEADLINE:

FEBRUARY 9, 1999

YEARS 2000 THROUGH 2002 — 2ND MONDAY IN JANUARY



NATIONAL SCIENCE FOUNDATION

INTRODUCTION

Many important issues in environmental biology can only be addressed by research that involves interactions among multiple organisms, multiple species, multiple levels of organization, and multiple biological, chemical, physical, and evolutionary processes. To do this well requires a holistic approach and a clear, integrated conceptual framework for analysis. Integrated research of this kind is integrated formally and a priori, rather than by relying on a posteriori or ad hoc analysis of results collected at different times and places. Integrated research projects typically require large budgets, multiple investigators, and often long time periods to achieve their goals. These large, complex, high-cost proposals require a novel mechanism for effective support.

The Divisions of Environmental Biology, Integrative Biology and Neuroscience, and Biological Infrastructure announce a special competition to stimulate and facilitate this type of integrated research in environmental biology. For the purposes of this competition, environmental biology is broadly defined to include research fields of systematic biology, population biology, ecology, ecosystem studies, ecological and evolutionary physiology, and animal behavior. Information on these core programs may be found at <http://www.nsf.gov/bio>. This competition is designed to meet a growing need for larger, explicitly integrated research projects that address major issues within or across these fields of ecology and evolution. The competition especially seeks to enable the kinds of synergisms and intellectual leveraging that result from integrated and synoptic approaches to key questions from differing perspectives and scales.

This competition supports the contemporary interpretation of NSF's statutory mission, described in the report NSF in a Changing World: The NSF Strategic Plan (NSF 95-24) located at <http://www.nsf.gov/cgi-bin/getpub?nsf9524>, which emphasizes the stewardship role of the Foundation in promoting the discovery, integration, dissemination, and employment of new knowledge in service to society. Extraordinary creativity, originality, and potential impact on both science and society are strongly encouraged. The core questions addressed in the competition must be clearly identifiable as environmental biology as described above. The research may also require input from other natural science, social science, mathematical or engineering fields.

DESCRIPTION

Proposals to this competition are expected to address a complex scientific problem that is best approached with a multifaceted, integrated research design. Proposal preparation thus presents significant organizational as well as intellectual challenges to participating investigators. It is expected that the research design will have multiple components, typically involving multiple processes, organisms, and/or sys-

tems. All parts of the research design must be justified in the context of a set of overall questions or hypotheses that advance understanding beyond what is possible through separate, independently-conducted projects.

Plans for integration should thus be emphasized in the proposals. The integration is rooted in the simultaneous and/or compatible collection of diverse kinds of data; it may be achieved by direct comparison of data sets collected at different scales of time, space, or complexity; by examination of a single phenomenon across multiple levels of organization; by simulation modeling and extrapolation with appropriate tests of predictions; or by other means described by the investigators in their proposals. It is also required that proposals will include plans for meaningful integration of research with education, outreach, or broad dissemination of research results.

The inclusion of an overall conceptual model linking each part of the work to the overall goals is essential. Proposals may involve experimentation and/or simulation modeling, but neither is a requirement. All aspects of each project must be scientifically sound, but some of the parts may not be particularly new or innovative in themselves: the value of these is in the context of the overall project and its conceptual model.

It is expected that achievement of the research goals will require multiple investigators with diverse and complementary skills. Proposals must include a management plan that describes how coordination among investigators will be achieved and how priorities are set.

Examples of how knowledge is advanced by the integrated approach include:

- Ecological and evolutionary linkages among diverse processes, populations or taxa are clarified within a common conceptual and methodological framework; or
- Scaling up in complexity, space, or time is facilitated when data at different scales are collected as part of one activity with interdependent team members; or
- Chains of cause and effect are traceable among research components, with a minimum of assumptions or data transformations.

Examples of research NOT appropriate for this program include:

- General programs of research on a common theme that does not feature a priori integration;
- Compendia of projects related only in their use of a common site, method, or group of organisms;

- Single, large projects that are expensive but focused on a narrow suite of measurements, techniques or investigator skills;
- Modeling or similar efforts to synthesize research data that was collected piecemeal rather than within the framework of an integrated design; (The NSF has other mechanisms for funding this class of research. For example, the NSF supports a National Center for Ecological Analysis and Synthesis whose mission is to advance the state of ecological knowledge through the search for general patterns and principles and to organize and synthesize ecological information in a manner useful to researchers, resource managers, and policy makers addressing important environmental issues. More information can be found at the center's web site, <http://www.nceas.ucsb.edu/fmt/doc/?nceas-web/center>.)
- Studies that are strictly concerned with ecotoxicology or bioremediation of anthropogenic materials.

WHO MAY SUBMIT

Proposals under the Integrated Research Challenges in Environmental Biology (IRC-EB) competition are accepted from U.S. institutions that are eligible for awards from the National Science Foundation, including colleges, universities, and other non-profit research institutions such as botanical gardens, freshwater institutes, and natural history museums (see the *Grant Proposal Guide*, (*GPG*), NSF 99-2, Chapter I, Section D). The *GPG* is available on the NSF Documents Online system located at <http://www.nsf.gov/cgi-bin/getpub?nsf992>. When consortia of eligible individuals or institutions submit a proposal, a single principal investigator must be designated as the project director and a single institution must accept overall management responsibility. When appropriate, collaborating scientists at foreign institutions, and those associated with entities such as national laboratories, state agencies, and Federally Funded Research and Development Centers, can be accommodated through consultant or subcontract mechanisms administered by the submitting U.S. institution, within the limits imposed by applicable legislation and regulations. Federal employees may not receive salaries or in other ways augment their agency's appropriations through grants made by this program.

NSF's Directorate for Biological Sciences does not support research with disease-related goals, including work on the etiology, diagnosis, or treatment of physical or mental disease, abnormality, or malfunction in human beings or animals. Studies of animal models for such conditions, the design and testing of drugs or other procedures for their treatment are also not eligible for support. NSF does not normally support technical assistance, pilot plant efforts, research re-

quiring security classification, the development of products for commercial marketing, or market research for a particular project or invention.

AWARDS

The competition in IRC-EB is expected to be held annually for 4 years beginning in FY 1999, pending availability of funds. NSF expects to make approximately 5-10 awards from a total annual budget of \$10M-12M. The maximum award size will be approximately \$3M, with a funding period of 3-5 years. Awards may include support for tool or shared-resource development, surveys, and research collections as appropriate in the context of the larger integrated studies. IRC-EB expects to recommend awards in July of each Fiscal Year.

PROPOSAL FORMAT AND CONTENT

Inquiries: Potential applicants are strongly encouraged to contact IRC-EB program officer to explore whether their questions, and their approaches for answering these questions within an integrated design, fit within the parameters of this competition. Inquiries can be made to the program by phone at (703) 306-1480 or via e-mail to irec@nsf.gov.

Letter of Intent: The PI should send a short electronic message of intent to submit a proposal to ircbrev@nsf.gov on or before November 30. The purpose of the message of intent is to help NSF plan for the review process by giving the Foundation an estimate of the number and topical scope of proposals expected. The message should be no more than 500 words long (approximately one page of single-spaced text), and should touch on the following topics: 1) the question(s) to be addressed; 2) the integrated nature of the research as described in this announcement; 3) key elements of the research approach (methods, sites, organisms); and 4) the identity of the investigators, institutions and facilities. Acknowledgments will be sent by email on or about 1 December 1998. Please note that messages of intent are for information purposes only. Proposal review and funding recommendations will be based on the full proposals.

Full Proposals: Proposals to Integrated Research Challenges in Environmental Biology (IRC-EB) require electronic submission via the NSF FastLane system in accordance with the guidelines provided in the "Instructions for Proposal Preparation" found in the *GPG*, Chapter II. The *GPG* is available on the NSF Web Site at the URL <http://www.nsf.gov/cgi-bin/getpub?nsf992>. Include in proposals to IRC-EB the components listed in *GPG*, Chapter II, Section D. State information in each component as clearly

and concisely as possible for merit review. Take special care in adhering to the requirements for page limitations, font size, and margins (see *GPG*, Chapter II, Section C). Proposals not strictly adhering to the requirements of the *GPG* and these guidelines are returned without review. Instructions and guidelines for the FastLane submission of proposals are detailed in *Instructions for Preparing and Submitting a Standard Proposal via FastLane* located at <https://www.fastlane.nsf.gov/a1/newstan.htm>. Also, see the “Proposal Submission” section below.

The following exceptions and additions apply to proposals submitted to IRC-EB:

- **Cover Sheet (NSF Form 1207):** In the NSF FastLane system follow instructions on proposal preparation. When completing the Cover Sheet click on the “Add Org Unit” button. Highlight “DIRECT FOR BIOLOGICAL SCIENCES” and click “OK”. Scroll down and highlight “Integrated Research Challenges in Environmental Biology”. Clicking “OK” designates this program as the NSF organizational unit of consideration.

Multi-institutional proposals must identify a lead institution and must be submitted as a single proposal. Be sure to check the group proposal box on the cover page (see *GPG*, Chapter II, Section D.12(b)). Only the lead institution should submit the proposal cover sheet (NSF Form 1207) via FastLane.

- **Project Description — including Results from Prior NSF Support (maximum 25 pages):** The FastLane single PDF file should have separate sections that include the Project Description, Management Strategy and Results from Prior Support sections.

Project Description section: This section may not exceed 18 pages, including figures and Tables.

Management Strategy section: The Management Strategy may not exceed 2 pages. Include in the Management Strategy plans for coordinating the activities of the collaborators, and describe the responsibilities of each collaborator, including a designated team leader.

It is expected that either the Project Description or the Management Strategy will include a research timetable and a clear statement of project priorities.

Results from Prior Support section: The Results from Prior Support section for key personnel, must appear as a separate section and may not exceed 5 pages in length.

- **Special Information and Supplementary Documentation:** Include letters of support in the FastLane submission by scanning the documents and adding them at the end of the Project Description file, or mail 15 collated copies of all materials to the IRC-EB activity at the same time that the signed cover sheet and certification page, and BIO proposal classification form are sent (see the Proposal Submission section below). This information is not counted as part of the 25 page limit of the Project Description.
- **Budget (NSF Form 1030):** Provide a budget for each year of support requested. If there are subcontracts, separate budget(s) must be included for each subcontractor.
- **BIO Proposal Classification Form (PCF):** Complete the BIO PCF, available on the NSF FastLane system. The PCF is an on-line coding system that allows the Principal Investigator to characterize his/her project when submitting proposals to the Directorate for Biological Sciences. Once a PI begins preparation of his/her proposal in the NSF FastLane system and selects a division, cluster, or program within the Directorate for Biological Sciences as the first or only organizational unit to review the proposal, the PCF will be generated and available through the Form Selector screen. Additional information about the BIO PCF is available in FastLane at <http://www.fastlane.nsf.gov/a1/BioInstr.htm>.

PROPOSAL SUBMISSION

The deadline for submitting applications to Integrated Research Challenges in Environmental Biology is 5:00 p.m., submitter’s local time, on February 9, 1999. From the year 2000 through 2002, the deadline for submitting proposals is 5:00 p.m., submitter’s local time, on the Second Monday in January. Proposals for this solicitation must be submitted electronically via NSF FastLane.

In order to use NSF FastLane to prepare and submit a proposal, you must have the following software: Netscape Navigator 3.0 or above, or Microsoft Internet Explorer 4.01 or above; Adobe Acrobat Reader 3.0 or above for viewing PDF files; and Adobe Acrobat 3.X or Aladdin Ghostscript 5.10 or above for converting files to PDF.

To use FastLane to prepare the proposal your institution needs to be a registered FastLane institution. A list of registered institutions and the FastLane registration form are located on the FastLane Home Page. To register an organization, authorized organizational representatives must complete the registration form. Once an organization is registered, PIN for individual staff are available from the organization’s sponsored projects office.

To access FastLane, go to the NSF Web site at <http://www.nsf.gov>, then select “FastLane,” or go directly to the FastLane home page at <http://www.fastlane.nsf.gov/>. Please see “Instructions for Preparing and Submitting a Proposal to the NSF Directorate for Biological Sciences” located at <http://www.fastlane.nsf.gov/a1/BioInstr.htm>. Additionally, read the “PI Tipsheet for Proposal Preparation” and the “Frequently Asked Questions about FastLane Proposal Preparation,” accessible at <https://www.fastlane.nsf.gov/a1/A1Prep.htm>.

Mail the following materials directly to Integrated Research Challenges in Environmental Biology:

- a paper copy of the cover sheet, including the certification page (page 2 of 2) signed by the PI and an institutional representative;
- the BIO classification form;
- An alphabetical list of all of the persons with whom senior personnel on the proposal have conflicts of interest. Please send a single list; i.e. not a separate list for each co-PI. Please use the following format: LASTNAME, FIRSTNAME; and
- fifteen (15) collated copies of the Special Information and Supplementary Documentation material only if the PI has opted to send in hard copy instead of inserting scanned copies at the end of the Project Description file in the FastLane submission.

The mailed material must be received no later than five (business) days after the proposal submission deadline. Send materials to:

Integrated Research Challenges in Environmental Biology (IRC-EB) — NSF 99-12
Division of Environmental Biology
National Science Foundation
4201 Wilson Boulevard
Room 635
Arlington, VA 22230

Do not mail copies of the proposal. NSF will make the appropriate number of copies of the proposal.

IMPORTANT NOTE: For technical assistance with FastLane, please send an e-mail message to biofl@nsf.gov. If you have inquiries regarding other aspects of proposal preparation or submission, please send an e-mail message to irec@nsf.gov before the deadline date for submission.

PROPOSAL REVIEW

Review 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. Special care is taken to ensure that reviewers have no immediate and obvious conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority serving institutions, adjacent disciplines to that principally addressed in the proposal, first time NSF reviewers, etc.

Proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

Proposals to Integrated Research Challenges in Environmental Biology (IRC-EB) will be evaluated by ad hoc (mail) reviewers as well as by a multidisciplinary panel.

1. What is the intellectual merit of the proposed activity?

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? 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?

2. 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, 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?

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 learner perspectives. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

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. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

Additional Review Criteria

In addition to the criteria stated above, reviewers will be asked to judge each proposal on the following criteria:

- 1) adherence to the integrated nature of the research as described in this announcement;
- 2) creativity and intellectual leveraging in the ideas;
- 3) the degree to which the proposal integrates its component parts and the soundness of the proposed approach;
- 4) the robustness of plans for synthesis and project management; and
- 5) the strength of the team and facilities.

GRANT AWARD AND 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 de-

clined 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.

B. Grant Award Conditions

Grants awarded as a result of this announcement are administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions," or FDP-III, "Federal Demonstration Project General Terms and Conditions," depending on the grantee organization. Copies of these documents are available at no cost from the NSF Clearinghouse, P.O. Box 218, Jessup, Maryland 20794-0218, telephone (301) 947-2722, or via e-mail to pubs@nsf.gov. More comprehensive information is contained in the NSF *Grant Policy Manual* (NSF 95-26), available on the NSF OnLine Document System located at <http://www.nsf.gov/>, or for sale through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

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 expiration of a grant, 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 the PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project reporting system, available through FastLane, which 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. Reports will continue to be required annually and after the expiration of the grant, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

Effective October 1, 1998, PIs are required to use the new reporting format for annual and final project reports. PIs are strongly encouraged to submit reports electronically via FastLane. For those PIs who cannot access FastLane, paper

copies of the new report formats may be obtained from the NSF Clearinghouse as specified above. NSF expects to require electronic submission of all annual and final project reports via FastLane beginning in October, 1999.

D. New Awardee Information

If the submitting organization has never received an NSF award, it is recommended that the organization's appropriate administrative officials become familiar with the policies and procedures in the NSF *Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 97-100) includes information on: Administration and Management Information; Accounting System Requirements and Auditing Information; and Payments to Organizations with Awards. This information will assist an organization in preparing documents that NSF requires to

conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at <http://www.nsf.gov/cgi-bin/getpub?nsf97100>.

OTHER INFORMATION

NSF publications, including guidelines, eligibility, and deadlines are available on the NSF Documents OnLine System at <http://www.nsf.gov>. Copies of publications are also available at no cost from the NSF Clearinghouse, P.O. Box 218, Jessup, Maryland 20794-0218, telephone (301) 947-2722, or via e-mail to pubs@nsf.gov. Information about programs relevant to the Directorate for Biological Sciences is available at <http://www.nsf.gov/bio>.

GENERAL INFORMATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees 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. 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 program announcement or contact the program coordinator at (703) 306-1636.

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 regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090; FIRS at 1-800-877-8339.

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 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.

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: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

The program described in this announcement is in the category 47.074 (BIO) of the Catalog of Federal Domestic Assistance.

YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF-funded activity. Information concerning Year 2000 activities can be found on the NSF Web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

NATIONAL SCIENCE FOUNDATION
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