Microbial Genome Sequencing Program FY 2007

Program Solicitation

NSF 07-531

Replaces Document(s):
NSF 06-513

National Science Foundation

Directorate for Biological Sciences
Emerging Frontiers

USDA Cooperative State Research, Education and Extension Service

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

March 08, 2007

Due by 5 PM submitter's local time

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the NSF FastLane system.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Microbial Genome Sequencing Program

Synopsis of Program:

As a collaborative, interagency effort, the National Science Foundation (NSF), and the Cooperative State Research, Education, and Extension Service (CSREES) of the U.S. Department of Agriculture invite research proposals (i) to support high-throughput sequencing of the genomes of microorganisms (including viruses, bacteria, archaea, fungi, oomycetes, protists and agriculturally important nematodes) and (ii) to develop and implement strategies, tools and technologies to make currently available genome sequences

more valuable to the user community. The availability of genome sequences provides the foundation for understanding how microorganisms function and live, and how they interact with their environments and with other organisms. The sequences are expected to be available to and used by a community of investigators to address issues of scientific and societal importance including:

- novel aspects of microbial biochemistry, physiology, metabolism, development and cellular biology;
- the diversity and the roles microorganisms play in complex ecosystems and in global geochemical cycles;
- the impact that microorganisms have on the productivity and sustainability of agriculture and natural resources (e.g., forestry, soil and water), and on the safety and quality of the nation's food supply; and
- the organization and evolution of microbial genomes, and the mechanisms of transmission, exchange and reshuffling of genetic information.

A Microbial Genomics Workshop is held annually; all current awardees in this interagency program are expected to attend.

Cognizant Program Officer(s):

- Ronald Weiner, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7183, fax: (703) 292-9061, email: rweiner@nsf.gov
- Matthew Kane, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7186, fax: (703) 292-9061, email: mkane@nsf.gov
- Patrick Dennis, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7145, fax: (703) 292-9061, email: pdennis@nsf.gov
- Richard McCourt, Division of Biological Infrastructure, 615 N, telephone: (703) 292-8470, fax: (703) 292-9063, email: rmccourt@nsf.gov
- Ann Lichens-Park, National Program Leader, CSREES, U.S. Department of Agriculture, telephone: (202) 401-6460, fax: (202) 401-6488, email: apark@csrees.usda.gov
- Daniel Jones, National Program Leader, CSREES, U.S. Department of Agriculture, telephone: (202) 401-6854, email: djones@csrees.usda.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 20 to 30

Anticipated Funding Amount: $15,000,000 Approximately $15 million is anticipated ($10 million of NSF and $5 million of USDA funds), pending availability of funds, with most awards ranging between $100,000 to $2,500,000 total, for periods of up to three years.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Organization Limit:

NSF Eligibility Criteria:

Proposals are invited from U.S. academic institutions, U.S. non-profit research organizations and consortia of such organizations with appropriate research and educational facilities. A proposal from a multi-organizational consortium must be submitted by the lead organization as a single proposal (see the Grant Proposal Guide (GPG) Section II.D.3). When a consortium of eligible individuals or organizations submits a proposal, a single principal investigator must be designated as the project director (PD) and a single organization must accept overall management responsibility, including the management of intellectual property, that may result from the proposed research. Proposals may also be submitted by federal agencies or State Agricultural Experiment Stations; however, these proposals would be eligible for funding only by the USDA.

Simultaneous submission of proposals to this program and another federal agency is permissible with prior written approval of the appropriate program officers at each agency involved. Proposers are encouraged to establish international collaborations where appropriate. It is anticipated that foreign agencies will support the offshore activities of these programs. Under most circumstances, the NSF component of this program will not make awards or allow subcontracts to non-U.S. institutions.

CSREES Eligibility Criteria:

The source of CSREES funds for the FY 2007 Microbial Genome Sequencing Program is the National Research Initiative (NRI) Competitive Grants Program. Except where otherwise prohibited by law, State agricultural experiment stations, all colleges and universities, other research institutions and organizations, Federal agencies, national laboratories, private organizations, or corporations, and individuals are eligible to apply for and to receive a competitive grant. Faculty at small and mid-sized academic institutions with limited institutional success and faculty at institutions in USDA Experimental Program for Stimulating Competitive Research (EPSCoR) entities are encouraged to apply (for definitions of small and mid-sized institutions and for EPSCoR eligibility see Part II, C., 2.(c) of the FY 2007 NRI Request for Applications at http://www.csrees.usda.gov/funding/rfas/nri_rfa.html. Applications from scientists at non-U.S. organizations will not be accepted. Award recipients may subcontract to organizations not eligible to apply, provided such organizations are necessary for the conduct of the project.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.

- Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF or by CSREES in proposals submitted under this Program Solicitation.

- **Indirect Cost (F&A) Limitations:**

  The applicant should submit a proposal using their Federally negotiated indirect cost rate.

  NSF Policy

  Standard NSF policy regarding indirect cost rates applies to proposals funded by the NSF. The CSREES policy regarding indirect cost rates is described below.

  CSREES Policy

  Section 709 of the FY 2006 Consolidated Appropriations Act (Public Law 109-97) limits indirect costs to 20 percent of the total Federal funds provided under each award. Therefore, when preparing budgets, applicants should limit their requests for recovery of indirect costs to the lesser of their institution's official negotiated indirect cost rate or the equivalent of 20 percent of total Federal funds awarded. Another method of calculating the maximum allowable is 25 percent of the total direct costs. Please note that if the 2007 Appropriation Act contains a different indirect cost limitation CSREES will contact each successful applicant to apply the correct rate prior to the award of a grant.

  To accommodate differences in allowable indirect costs between CSREES and NSF, the proposer may be required at the time of award to submit a separate budget with indirect cost rates appropriate to each agency.

- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

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

  March 08, 2007

  Due by 5 PM submitter's local time

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

TABLE OF CONTENTS

Summary of Program Requirements

I. Introduction

II. Program Description

III. Award Information

IV. Eligibility Information

V. Proposal Preparation and Submission Instructions
- A. Proposal Preparation Instructions
- B. Budgetary Information
- C. Due Dates
- D. FastLane/Grants.gov Requirements

VI. NSF Proposal Processing and Review Procedures
- A. NSF Merit Review Criteria
- B. Review and Selection Process

VII. Award Administration Information
- A. Notification of the Award
- B. Award Conditions
- C. Reporting Requirements

VIII. Agency Contacts

IX. Other Information

I. INTRODUCTION

Microorganisms dominate the planet in terms of total biomass. They represent a vast array of species with enormous genetic, metabolic, structural, physiological and behavioral diversity. Despite their ubiquity, beyond human pathogens, a few model organisms, and a few broad surveys, little is known about their fundamental properties, the range in their diversity, how they interact with each other, with more complex life forms and with their environment, and the roles they play in global biogeochemical cycles. Future progress toward filling these knowledge gaps can be advanced significantly by the availability of whole genome sequences and by more complete and accurate information about the contents of sequenced genomes.

The Microbial Genome Sequencing Program is a collaborative interagency activity of the National Science Foundation (NSF) and the Cooperative State Research, Education, and Extension Service (CSREES) of the U.S. Department of Agriculture. The program supports (i) high-throughput sequencing of the genomes of a broad range of microorganisms (including viruses, bacteria, archaea, fungi, oomycetes, protists and agriculturally important nematodes) and (ii) the development and implementation of strategies, tools and technologies to make currently available genome sequences more valuable to the user community. The newly acquired sequences are expected to be made available and used by a community of investigators to address issues of scientific and societal importance including:

- novel aspects of microbial biochemistry, physiology, metabolism, development and cellular biology;
- the diversity and the roles microorganisms play in complex ecosystems and in global geochemical cycles;
- the impact that microorganisms have on the productivity and sustainability of agriculture and natural resources (e.g., forestry, soil and water), and on the safety and quality of the nation's food supply; and
- the organization and evolution of microbial genomes, and the mechanisms of transmission, exchange and reshuffling of genetic information.

The development and implementation of strategies, tools and technologies are expected to significantly enhance the value of existing sequences by unambiguously assigning functions to previously unannotated ORFs.

This program is part of The Microbe Project, a coordinated effort of multiple federal agencies to promote genome-enabled microbial science. (See http://www.microbeproject.gov.)

II. PROGRAM DESCRIPTION

This program supports (i) the high-throughput sequencing of the genomes from a wide range of microorganisms (including viruses, bacteria, archaea, fungi, oomycetes, protists and agriculturally important nematodes) that are either of fundamental biological interest, are important to the national interest, to the productivity and sustainability of agriculture and forestry, or to the safety and quality of the nation's food supply and (ii) the development and implementation of strategies, tools and technologies to make currently available genome sequences more valuable to the user community. The results will be partial or whole genome sequence data, more extensive and reliable annotation and whole genome mapping or scaffolding information. Proposals are encouraged to incorporate teaching, training, or outreach components within the scope of the project to facilitate the dissemination of knowledge and the education of students and the public. Taxon-based functional genomics studies are not within the scope of the Microbial Genome Sequencing Program unless they involve the development and implementation of strategies, tools and technologies to make genome sequences more valuable to user communities. Taxon-based functional genomics studies are supported by other Programs offered by NSF and CSREES; e.g., activities within the NSF Division of Molecular and Cellular Biosciences (http://www.nsf.gov/div/index.jsp?div=MCB) and the CSREES National Research Initiative's Microbial Genomics Program, Microbial Biology Program, and the Animal Protection and Biosecurity Program (http://www.csrees.usda.gov/funding/rfas/nri_rfa.html).

All microorganisms, except strict human pathogens that are not related to food safety, are candidates for genome sequencing under this program. Proposers should justify organism selection on the basis of biological interest or agricultural importance, as well as community involvement, education and training, and societal impact. Factors to consider include metabolic potential, novel biochemical, structural or developmental features, phylogenetic affiliation, ecological or evolutionary significance, economic importance, and relevance to national security.

Proposals to sequence the genomes of agriculturally important nematodes will be accepted in the competition; such proposals will be eligible for funding by CSREES but not by NSF.

Projects will also be considered that include, for example, the sequencing of (i) eukaryotic expressed sequence tag (EST) libraries, (ii) clones from mixed environmental microbial populations, or (iii) homologous genes (orthologs and paralogs), islands, plasmids or regions from the genomes of multiple organisms.

Complete coverage is generally the most desirable end-point for whole genome sequencing. However, the choice and justification of complete versus draft coverage is dependent on the nature and scope of the proposed project. For example, the genomes of some protozoa and fungi are relatively large and their sequencing may not easily be completed under the support of a single grant. Similarly, sequencing of prokaryotic genomes for comparative purposes or from environmental samples may not require or generate complete coverage. The outcome of all draft sequencing projects is expected to include generation of high quality sequence data, organization of the sequence reads into contiguous sequences (contigs), correlation with physical maps when appropriate, annotation of open reading frames, and **deposition of all information into a publicly accessible, preexisting database**. Investigators who choose to create their own database must ensure accessibility and justify why preexisting databases are not suitable. Investigators should indicate how accessibility to the databases will be maintained after the award period. When the future goal is complete coverage, plans for completing the sequence should be outlined.

For large genome projects, investigators are encouraged to seek partners, either in the form of consortia or support from other sources, so that the complete sequence, if appropriate, can be obtained in a reasonable time frame. If parallel support from another agency is under consideration or being planned, investigators should inform the cognizant NSF and CSREES program officer in advance and indicate in the proposal how the NSF or CSREES funded activity will be organized and coordinated within the larger project. The limited ability to decipher the information content of sequenced genomes has seriously hindered the full experimental exploitation of this valuable resource.

The Microbial Genome Sequencing Program encourages the development and implementation of strategies, tools and technologies to make currently available genome sequences more valuable to the user community through enhancements in functional annotation. Proposals that contain activities directed toward the rigorous and unambiguous assignment of function to genes or coding regions will be considered. An important component of proposals in this area should be a clear statement of how the information generated will be disseminated and used to update existing genome annotations.

The program will entertain proposals to support finishing (closure) of draft genomes under limited circumstances. The resources for finishing and annotation will be directed toward organisms for which there is a large community of dedicated experimentalists, where the organism is unique, amenable to biochemical experimentation and genetic manipulation and provides a valuable new perspective on a biological question or phenomenon, and where the proposal is cost effective.

An important activity of this interagency program is an annual Microbial Genomics Workshop for current awardees. This workshop is intended to highlight the breadth of the program and to facilitate exchange of scientific and technical information

between awardees and projects.

Organism strains that are being targeted in other, already funded, sequencing projects should be avoided, unless the sequence information from these other projects is incomplete or will not be in the public domain. If one strain of a species has been or is being sequenced, the proposer should provide strong justification as to why the sequencing of other strains should be undertaken. Examples of microbial genome sequencing projects are available at the following sites:

http://www.tigr.org/tdb/mdb/mdb.html
http://genome.jgi-psf.org/mic_home.html
http://www.niaid.nih.gov/dmid/genomes/default.htm
http://www.sanger.ac.uk/Projects/
http://www.genome.wisc.edu
http://www.genome.wustl.edu/
http://hgsc.bcm.tmc.edu/
http://194.214.212.50/CAZY/
http://www.broad.mit.edu/annotation/

The NSF and CSREES will determine which agency will support each award. These decisions will be based on the mission of the agency (NSF, fundamental scientific and national interest; CSREES, food and agricultural relevance) and the availability of funds. Proposers may request funding for up to three years. The requested duration should be consistent with the goals of the project. Detailed information on (i) the organisms chosen, (ii) the coordination, management and organizational plan, (iii) the method of library preparation and all other pertinent methodological information, and (iv) the method for disseminating data and interfacing with the broader scientific community and the public, should be provided. All cloning and sequencing technologies and strategies, particularly ones that are novel, and the mechanisms to assess validity and accuracy of the data must be described in the proposal. Rapid and inexpensive, high throughput DNA sequencing technologies are beginning to come on line. Proposers should consider how new technologies might be exploited to achieve the aims of their projects. Current industry standards result in costs below one dollar per lane and read lengths of 800 nucleotides or more. A reasonable cost per megabase of finished, non-problematic sequence is now about $20,000 - $25,000; this includes library preparation, template production, sequencing, closure, assembly, automated annotation, personnel, and indirect costs. When sequencing costs exceed this benchmark, an explanation and justification should be provided. Additional activities such as manual annotation, and integral education and outreach are appropriate for inclusion in the project; when included, full justification and a description of the appropriateness within the context of the project is required. Factors resulting in additional costs (e.g., resulting from methodological complexity, non sequencing personnel, education and outreach, community integration, resource storage and management, etc.) should be clearly identified and rationalized. It is unlikely that awards will be made in excess of $2,500,000. In judging the merits of a proposal, the speed, level of accuracy, and cost effectiveness of the proposed work and the identification and involvement of an active community of experimental users will be among the evaluation criteria.

Awards will be made in the form of grants to be determined at the time of the award. Each participating agency will obligate funds separately and any particular award may be funded by one or both of the participating agencies. The exact amount of an award will depend on the advice of the reviewers, agency priorities and the availability of funds. In FY 2006 the award sizes ranged from $300,000 to $2,000,000. Further information on awards made in this program during FY 2006 is available at the following links:

NSF Awards

USDA/CSREES Awards

III. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. Between 20 and 30 awards are anticipated in this program in FY 2007, and will be made as standard or continuing grants, with most budgets ranging from $100,000 to $2,500,000 for durations up to three years.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Organization Limit:

NSF Eligibility Criteria:

Proposals are invited from U.S. academic institutions, U.S. non-profit research organizations and consortia of such organizations with appropriate research and educational facilities. A proposal from a multi-organizational consortium must be submitted by the lead organization as a single proposal (see the Grant Proposal Guide (GPG) Section II.D.3). When a consortium of eligible individuals or organizations submits a proposal, a single principal investigator must be designated as the project director (PD) and a single organization must accept overall management responsibility, including the management of intellectual property, that may result from the proposed research. Proposals may also be submitted by federal agencies or State Agricultural Experiment Stations; however, these proposals would be eligible for funding only by the USDA.

Simultaneous submission of proposals to this program and another federal agency is permissible with prior written approval of the appropriate program officers at each agency involved. Proposers are encouraged to establish international collaborations where appropriate. It is anticipated that foreign agencies will support the offshore activities of these programs. Under most circumstances, the NSF component of this program will not make awards or allow subcontracts to non-U.S. institutions.

CSREES Eligibility Criteria:

The source of CSREES funds for the FY 2007 Microbial Genome Sequencing Program is the National Research Initiative (NRI) Competitive Grants Program. Except where otherwise prohibited by law, State agricultural experiment stations, all colleges and universities, other research institutions and organizations, Federal agencies, national laboratories, private organizations, or corporations, and individuals are eligible to apply for and to receive a competitive grant. Faculty at small and mid-sized academic institutions with limited institutional success and faculty at institutions in USDA Experimental Program for Stimulating Competitive Research (EPSCoR) entities are encouraged to apply (for definitions of small and mid-sized institutions and for EPSCoR eligibility see Part II, C., 2.(c) of the FY 2007 NRI Request for Applications at http://www.csrees.usda.gov/funding/rfas/nri_rfa.html. Applications from scientists at non-U.S. organizations will not be accepted. Award recipients may subcontract to organizations not eligible to apply, provided such organizations are necessary for the conduct of the project.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Additional Eligibility Info:

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=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. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

This program solicitation supplements the standard GPG or NSF Grants.gov Application Guide proposal preparation guidelines. Proposers or applicants who have had prior support from the Microbial Genome Sequencing Program (from NSF and/or USDA/CSREES) should indicate the results of that prior support in the Project Description section of the solicitation.

Applicants selected for funding by CSREES will be required to submit CSREES agency-specific forms prior to the awarding of the grant. Successful applicants will be notified at the time of award to prepare and submit applicable forms.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF or by CSREES in proposals submitted under this Program Solicitation.

Indirect Cost (F&A) Limitations:

The applicant should submit a proposal using their Federally negotiated indirect cost rate.

NSF Policy

Standard NSF policy regarding indirect cost rates applies to proposals funded by the NSF. The CSREES policy regarding indirect cost rates is described below.

CSREES Policy

Section 709 of the FY 2006 Consolidated Appropriations Act (Public Law 109-97) limits indirect costs to 20 percent of the total Federal funds provided under each award. Therefore, when preparing budgets, applicants should limit their requests for recovery of indirect costs to the lesser of their institution's official negotiated indirect cost rate or the equivalent of 20 percent of total Federal funds awarded. Another method of calculating the maximum allowable is 25 percent of the total direct costs. Please note that if the 2007 Appropriation Act contains a different indirect cost limitation CSREES will contact each successful applicant to apply the correct rate prior to the award of a grant.

To accommodate differences in allowable indirect costs between CSREES and NSF, the proposer may be required at the time of award to submit a separate budget with indirect cost rates appropriate to each agency.

Budget Preparation Instructions:

A budget is required for each year of requested support. In addition, a cumulative budget is required detailing the requested total support for the overall project period. Funds may be requested under any of the categories listed on the budget, provided that the item or service for which support is requested is allowable under the authorizing legislation, the applicable statutes, regulations, and Federal cost principles, and these program guidelines, and can be justified as necessary for the successful conduct of the proposed project. In the budget justification, all budget categories for which support is requested, with the exception of Indirect Costs, must be individually listed (with costs) in the same order as in the budget and justified on a separate page according to the instructions in the GPG.

Proposers are reminded to include in the submitted budget the cost of the principal investigator or designee to attend the annual Microbial Genomics Awardee Workshop that is organized by NSF and CSREES. This meeting is often held as a satellite to a larger national genomics meeting.

C. Due Dates

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

  March 08, 2007

  Due by 5 PM submitter's local time

D. FastLane / Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

  Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: https://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 funding opportunity.

  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. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- **For Proposals Submitted Via Grants.gov:**

  Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: http://www.grants.gov/CustomerSupport. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

  Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF

Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved 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 the reviewer 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 following additional evaluation factors will be considered in reviewing all proposals:

1. Relevance of the microorganism(s) to be sequenced and the scientific merit of the project. This criterion addresses the scientific and/or practical importance of the microorganism chosen for sequencing, the novelty, uniqueness and originality of the proposal, and the conceptual adequacy of the sequencing approach including suitability of methodology, clarity and delineation of objectives, and demonstration of feasibility through preliminary data (e.g., known or estimated genome size and techniques for isolation of nucleic acid).

2. The speed, level of accuracy, and cost effectiveness of the proposed work.

3. The broader impact of the activity on the biological sciences or agriculture, community involvement,

education, training, and outreach. This criterion addresses the potential of the proposed activity to contribute to better understanding or improvement in the quality and effectiveness of the Nation's scientific research, education, and human resources capabilities. Important issues are the widespread use and appropriate dissemination of results, strengthening the biological sciences and agriculture, and contributing to the security and social stability of the nation. Priority also will be given to projects that integrate research with education and outreach, and those that exhibit close collaboration among multiple investigators, institutions, and end users.

4. Performance competence. This criterion addresses the technical merit of the proposed approach, the capabilities of the proposed personnel, including those of the Principal Investigator and other senior staff, the adequacy of the resources available or proposed, and the likelihood that this project will lead to successful, timely, and cost-effective completion of the microbial genome sequence(s).

5. Project management. This criterion addresses the overall quality of the technical and managerial aspects of the proposal, including management oversight, long-range planning, release of the data, and sharing of the information and resources resulting from the project within the broader scientific community. To this end, applications are required to have a section on deliverables that would include a time line and a clear statement of what the project deliverables (or products) will be at the end of the project period (i.e., a complete and finished sequence; a repository site for the sequence; tools for accessing the sequence; completed automated and manual annotation, etc.). The time line should cover scheduling, resource allocation, milestones, contingencies and deliverables. There should be clear examples of what will be accomplished by each person in the proposal.

6. Scientific collaboration and information sharing and the identification and involvement of an active community of experimental users. Sequencing of the genome of an organism is a community activity. As such, a close collaboration among the scientists and organizations involved in sequencing activities and effective dissemination to the potential users of the information are important components of this criterion. This criterion also includes adequacy of plans for long-term maintenance of data accessibility and plans for updating data in response to new information about functional assignments. Thus, key criteria are compatibility, accessibility, longevity and the size and enthusiasm of the user community.

7. Appropriateness of the proposed budget. Budget requests should be proportional to the size of the genome (s) to be sequenced or the amount of sequencing to be done. The cost of sequencing should be $20,000-$25,000 per megabase for closed, non-problematic, finished prokaryotic genomes, including library preparation, template production, sequencing closure, assembly, personnel and indirect costs and automated annotation. It should be less (about half) for eukaryote genomes where finishing is not included. When sequencing costs exceed this benchmark, an explanation and justification need to be provided. Additional activities, such as manual annotation, and integral education and outreach are appropriate for inclusion in the project; when included, full justification and a description of appropriateness within the context of the project is required. Factors resulting in additional costs (e.g., resulting from methodological complexity, non sequence related personnel, education and outreach, community integration, resource storage and management) should be clearly identified and rationalized. It is unlikely that awards will be made in excess of $2,500,000.

8. In judging the merits of a proposal, the speed, level of accuracy, and cost effectiveness of the proposed work will be among the evaluation criteria.

9. For proposals to enhance existing annotation programs and resources, it is imperative that enhancements be compatible with existing sites (e.g. websites above) and that principal investigators and submitting institutions foster compatibility. Concrete examples of how the proposed project would improve current resources are encouraged.

B. Review and Selection Process

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 under this program solicitation will be carefully reviewed by a combination of at least three ad hoc (mail) or panel reviewers from outside of the Foundation who have expertise in some aspect of the proposal. Reviewers are selected by the responsible Program Director and are asked to provide a written critique of the proposal that addresses the two National Science Board review criteria and the special program criteria described above. The written reviews will also include an overall rating of the proposal. An individual reviewer may not have expertise in all aspects of a complex proposal and therefore may choose to focus on areas that are closest to their areas of expertise. In all cases reviews are treated as confidential documents.

Each proposal, along with the associated written reviews, will be discussed by a review panel. The panel will rate each

proposal relative to all other proposals under consideration. A summary of the panel deliberations will be written by one of the panelists. The summary will describe substantive issues raised by the panel that are not covered in the written reviews, and in addition, will provide a general impression of the enthusiasm of the panel for the project and their overall panel rating of the proposal. The panel rating is not intended to be an average of the ratings of the written reviews.

The Program Directors assigned to manage the review of the proposals will consider all available information, including the written ad hoc and panel reviews, the panel discussion and rating, the panel summary and all other available information and formulate a recommendation to award or decline the proposal. After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to either the Division of Grants and Agreements or the USDA/CSREES Office of Extramural Programs (OEP) for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only an NSF Grants and Agreements Officer or an OEP Authorized Departmental Officer may make commitments, obligations, awards or authorize the expenditure of funds on behalf of either NSF or USDA. No commitment on the part of either NSF or USDA should be inferred from technical or budgetary discussions with a NSF or USDA Program Director. 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 or the CSREES Authorized Departmental Officer, does so at their own risk.

For both awarded and declined proposals, verbatim copies of all written reviews and the panel summary, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding. NSF and USDA are striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

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 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.B. 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 (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 agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF. 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 and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

Special Award Conditions: CSREES Awards

Within the limit of funds available for such purpose, the awarding CSREES official shall make grants to those responsible, eligible applicants whose applications are judged most meritorious under the procedures set forth in this program solicitation. All funds granted by CSREES under this solicitation shall be expended solely for the purpose for which the funds are granted in accordance with the approved application and budget, the regulations, the terms and conditions of the award, the applicable Federal cost principles, and the assistance regulations of the USDA (parts 3015 and 3019 of 7 CFR).

Specific management information relating to an applicant shall be submitted on a one-time basis as part of the responsibility determination prior to the award of a grant identified under this solicitation, if such information has not been provided previously under this or another CSREES program. CSREES will provide copies of forms recommended for use in fulfilling these requirements as part of the preaward process. Although an applicant may be eligible based on its status as one of these entities, there are factors which may exclude an applicant from receiving Federal financial and nonfinancial assistance and benefits under this program (e.g., debarment or suspension of an individual involved or a determination that an applicant is not responsible based on submitted organizational management information).

A CSREES award document shall include at a minimum the following:

1. Legal name and address of performing organization or institution to whom the CSREES Administrator has awarded a grant under the terms of this solicitation;
2. Title of project;
3. Name(s) and institution(s) of Project Directors chosen to direct and control approved activities;
4. Identifying grant number assigned by CSREES;
5. Project period, specifying the amount of time CSREES intends to support the project without requiring recompetition for funds;
6. Total amount of CSREES financial assistance approved by the CSREES Administrator during the project period;
7. Legal authority(ies) under which the grant is awarded;
8. Appropriate Catalog of Federal Domestic Assistance (CFDA) number;
9. Applicable award terms and conditions (see http://www.csrees.usda.gov/business/awards/awardterms.html for CSREES award terms and conditions);
10. Approved budget plan for categorizing allocable project funds to accomplish the stated purpose of the grant award; and
11. Other information or provisions deemed necessary by CSREES to carry out its respective granting activities or to accomplish the purpose of a particular grant.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) 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. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

CSREES Awards

Applicants selected for funding by CSREES will need to submit the Current Research Information System (CRIS) forms AD-

416 and AD-417 for NEW awards only. These forms must be submitted electronically via the CRIS Web Forms site at http://cwf.uvm.edu/cris. For assistance with CRIS forms, please contact the CRIS office at 202-690-0009 or cdeckers@cris.csrees.usda.gov.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Ronald Weiner, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7183, fax: (703) 292-9061, email: rweiner@nsf.gov
- Matthew Kane, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7186, fax: (703) 292-9061, email: mkane@nsf.gov
- Patrick Dennis, Program Director, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-7145, fax: (703) 292-9061, email: pdennis@nsf.gov
- Richard McCourt, Division of Biological Infrastructure, 615 N, telephone: (703) 292-8470, fax: (703) 292-9063, email: rmccourt@nsf.gov
- Ann Lichens-Park, National Program Leader, CSREES, U.S. Department of Agriculture, telephone: (202) 401-6460, fax: (202) 401-6488, email: apark@csrees.usda.gov
- Daniel Jones, National Program Leader, CSREES, U.S. Department of Agriculture, telephone: (202) 401-6854, email: djones@csrees.usda.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service)is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at http://www.nsf.gov/mynsf/.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

CSREES supports a wide variety of agricultural research and educational programs. Further information concerning funding opportunities may be obtained on the CSREES web site at http://www.csrees.usda.gov/fo/funding.cfm.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: pubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and 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 proposer 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 or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; 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," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records, " 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (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 the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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The National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia 22230, USA
Tel: (703) 292-5111, FIRS: (800) 877-8339 | TDD: (800) 281-8749

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