National Ocean Sciences Accelerator Mass Spectrometry Facility (NOSAMS)

PROGRAM SOLICITATION
NSF 12-521

National Science Foundation

Directorate for Geosciences
Division of Ocean Sciences

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

March 19, 2012

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 11-1, was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in NSF 11-1 apply to proposals submitted in response to this funding opportunity.

Cost Sharing: The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG)* Chapter II.C.2.g(xi) for further information about the implementation of these recommendations.

Data Management Plan: The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Postdoctoral Researcher Mentoring Plan: As a reminder, each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

National Ocean Sciences Accelerator Mass Spectrometry Facility (NOSAMS)

Synopsis of Program:

The Division of Ocean Sciences (OCE) at the National Science Foundation (NSF) funds numerous research programs that collect environmental samples. Each year, thousands of these samples require analyses of environmental-level ^{14}C abundances to determine the age of the samples. Sample types include sea water and a wide variety of other carbon-bearing materials. In order to process these samples and to provide research on new methods for ^{14}C dating of oceanography-related samples, OCE supports the National Ocean Sciences Accelerator Mass Spectrometer (NOSAMS) facility. This solicitation seeks proposals to operate NOSAMS and provide necessary services to the ocean sciences research community.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Elizabeth L. Rom, telephone: (703) 292-7709, email: elrom@nsf.gov

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

- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1 - The Division of Ocean Sciences will provide up to one award for a single NOSAMS facility, pending results of the review process and availability of funds.

Anticipated Funding Amount: $9,000,000 The Division anticipates a five year cooperative agreement with annual budgets ranging from $1.5 to $2.5 Million and with possible renewal for up to ten years pending budget considerations and successful performance by the facility. The award may be considered for re-competition after ten years if there is continued need for services by the oceanographic community.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

PI Limit:

The PI should be a scientist whose research is related to environmental or ocean science and who potentially uses ^{14}C data in that research effort.

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
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: 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/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

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

  March 19, 2012

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: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Division of Ocean Sciences (OCE) at the National Science Foundation (NSF) funds research programs that require analyses of environmental-level ^{14}C abundances for a wide variety of carbon-bearing materials. In order to process these samples in a timely, accurate and cost effective manner and to provide research into ^{14}C analysis techniques, OCE supports the National Ocean Sciences Accelerator Mass Spectrometer (NOSAMS) facility.

The impact of the NOSAMS facility on the ocean sciences community to date can be seen in OCE-funded research programs such as the World Ocean Circulation Experiment (WOCE) and the Joint Global Ocean Flux Study (JGOFS) programs where results from radiocarbon dating at NOSAMS helped to further our understanding of large-scale ocean circulation and the ocean carbon cycle. Current oceanographic programs like Climate Variability and Predictability (CLIVAR) and GEOTRACES continue to require the radiocarbon dating services offered by the NOSAMS facility. Accurate and timely analyses of the water samples is essential for the success of this research in which the Division of Ocean Sciences and many other U.S. government agencies have made a large investment.

In addition to the CLIVAR and GEOTRACES programs, OCE funds numerous single investigator projects that rely upon the NOSAMS facility to analyze samples. Sample types from small projects, which now make up the majority of samples analyzed by NOSAMS, range from bulk organic carbon samples to foraminifera. Some investigators need special services such as the rapid analysis of multiple samples or compound-specific radiocarbon analyses that require chemical separation and purification. Individual investigators depend on the NOSAMS facility to prepare and analyze a wide variety of material for radiocarbon analyses, and these measurements are often critical to accurate understanding of their particular scientific problem.

NOSAMS staff includes geoscientists, physicists and technical experts who provide radiocarbon analysis services to the ocean sciences community and who conduct research on new methods of radiocarbon dating that might benefit the ocean science research community. The current NOSAMS facility was initially constructed at Woods Hole Oceanographic Institution (WHOI) with OCE funding starting in 1989 and has been operating since 1993. It receives direct support for operations, maintenance and research from the Division of Ocean Sciences for about 40% of its budget and collects user fees for the remaining 60% of the facility's budget. In accordance with NSF policy that all facility awards must be re-competed after an appropriate period of operation (NSB-08-12 and NSB-08-16), this solicitation requests proposals to provide accelerator mass spectrometer services required by the ocean sciences community for the next five years with possible extensions for up to twenty years depending on continued performance, scientific demand and overall OCE budgets.

II. PROGRAM DESCRIPTION

Description of Services Required:

The Division of Ocean Sciences is seeking proposals that maintain the level of service provided by the current NOSAMS facility, with minor service upgrades anticipated over the life of the award as budgets and improved technology and methods allow.

However, proposals that seek to enhance the current level of services provided are also welcome. A description of the services currently required by the ocean sciences community is below. In addition, a description of instrumentation currently operated by NOSAMS is available at the website http://www.whoi.edu/nosams/page.do?pid=40135.

Services required by the ocean sciences community include:

A. Consulting services to the community concerning ^{14}C analysis of various samples:

All members of the NOSAMS staff need a service-oriented outlook. A focus on accuracy of data and timely delivery of data is important, as is a willingness to discuss samples and data with a wide variety of scientists. The facility must maintain a fair and open access policy for all scientific users. NOSAMS staff will consult with several hundred scientists and potential users of the AMS facilities each year, providing information on the application of ^{14}C dating to particular scientific samples and advice on which services provided by the facility might be most appropriate for the scientific investigation. Currently the average batch of samples submitted by individual investigators contains 10 samples. Sample types include, but are not limited to, organic carbon, carbonate minerals, dissolved inorganic carbon in water, carbon dioxide, dissolved organic carbon, various materials that require low cost/low precision reconnaissance, prepared graphite and contamination check (swab) samples. NOSAMS Staff will communicate with facility users on a regular basis as samples are processed, provide sample analysis data to users and consult with the PI's regarding interpretation of that data as necessary.

B. Facility Management:

A single Laboratory Director must have overall responsibility for the facility. Duties related to management of the sample preparation laboratory, AMS operation and maintenance, data management, etc. should be divided among senior personnel as appropriate. The Director should be a scientist whose research is related to environmental or ocean issues and who potentially uses ^{14}C data in that research effort. Up to four co-PI's may be listed on the proposal and their CV's are required. In addition, CV's for all other key personnel should be included in the supplementary documents. An organizational chart and clear guidelines for management of the facility must be included in the Supplementary Documents. Descriptions of how the various senior personnel will interact and prioritize laboratory efforts including sample preparation and throughput vs AMS operation and maintenance are required. Collaborative proposals must be submitted using the "single proposal" method as described in Chapter II, Section D.4.a. of the GPG. The project must be managed by a single organization with other organizations involved via sub-awards. **Separately submitted collaborative proposals are not allowed**.

The NOSAMS facility provides a service to the oceanographic community in particular and the wider scientific community as well. A minimum of 60% of the facility's income must be generated by user fees, and NSF expects to support about 40% of the facility costs, including research on methods development by staff. Information that demonstrates an ability or willingness to provide AMS services to a wide variety of users is required in the proposal. The ability to manage data in a secure manner and to analyze large numbers of varied sample-types with high precision and in a timely manner must be demonstrated. NOSAMS staff will be responsible for continuous quality assurance/quality control monitoring.

If a facility will be supporting users other than the ocean science users described in this solicitation and/or will analyze other isotopes or biological ^{14}C samples, a clear management plan for prioritizing services for NOSAMS must be presented. Proposers must describe what other samples will be run at the facility and how the NOSAMS-related samples will be handled, processed, analyzed and maintained separately from other samples processed by the facility.

NOSAMS will support the operations and maintenance of all laboratory instrumentation and equipment necessary for state-of-the-art radiocarbon sample analysis. Periodic upgrades to the instrumentation may be anticipated as budgets allow. NOSAMS will accept samples for analysis from a variety of users and will charge users for sample processing at rates that are set in consultation with an advisory board and with approval by NSF. The facility is responsible for the rapid analysis of samples in order to provide timely data to scientists. The average time from sample submission to provision of data to the user should be approximately ten weeks or less. The facility will also archive all data. Any leftover sample material will be archived for at least two years and then either returned to the PI or disposed. Any costs associated with such archiving during the duration of the award should be included in the proposal budget.

Proposers should assume that most instrumentation and equipment operated by the current NOSAMS facility is either owned by WHOI or is functionally obsolete, and therefore, existing equipment would not be transferred to a new operator.

C. Sample Preparation Services for ^{14}C Analysis:

Sample preparation from a wide variety of sample types as a service to the ocean science community is a primary function of the NOSAMS facility. Sample types include water samples and a wide variety of environmental samples. When NOSAMS is responsible for all sample preparation, staff will convert the samples to CO_2 gas, then the gas will be converted to graphite and analyzed via AMS, or introduced directly into a Continuous Flow AMS (CFAMS) for analysis. The facility operator must commit to being able to process at least 1000 CLIVAR water samples each year. OCE funds these sample fees directly after all the analyses are completed, and the fees are included as part of the 60% sample fee recovery amount. Water sample analyses are currently accomplished via an automated sample preparation process with in-line analysis of $^{12}C/^{13}C$.

NOSAMS may also receive samples that have already been converted to CO_2 gas. For these samples, NOSAMS is responsible for analysis of ^{13}C in CO_2, conversion of CO_2 to graphite, and AMS analysis of the graphite. Alternatively, the gas may be introduced directly into the CFAMS for analysis.

NOSAMS staff will prepare graphite from a variety of environmental samples, including from very small samples (10 to 100 µg C). A goal of the facility will be to prepare samples from ultra-small samples (3-10 µg C). The analysis of small samples is of particular importance to oceanographic studies, and proposers must demonstrate expertise in small sample size analysis of ^{14}C.

NOSAMS will provide Compound Specific Radiocarbon Analysis (CSRA) for a limited number of compounds that are useful for oceanographic-related studies. CSRA analysis requires isolation of organic materials from samples, a very labor intensive process. This capability should be available for about 5-10 percent of the total samples per year. Facility staff must include personnel with expertise in CSRA analysis.

D. AMS Sample Analysis Services:

NOSAMS will provide AMS analysis of a minimum of 7500 ^{14}C samples per year (plus associated standards, blanks, duplicates etc.), increasing to at least 8500 per year at the end of the grant period, of which at least seventy-five percent of the samples must be analyzed at state-of-the-art precision and accuracy. Capabilities must include state-of-the-art analysis of very small samples (< 100 µg C), and the AMS must be capable of analyzing samples of 10 µg C or less. Proposers must provide information on the accuracy and precision of existing AMS instrumentation and expected performance characteristics of any instruments proposed for acquisition as part of the response to this solicitation.

The NOSAMS facility must include a Continuous Flow Accelerator Mass Spectrometer (CFAMS) with a gas-accepting ion source (CFAMS/GIS) system. The existing system consists of an AMS with a microwave gas ion source. CFAMS will provide services for rapid analysis of large numbers of samples and for other samples that require the direct introduction of gas to the AMS. The facility will also maintain and operate a variety of instruments that can be connected to the CFAMS such as an Elemental Analyzer, Gas Chromatograph, etc. These services will be available to the ocean science community and to the wider scientific community as appropriate.

E. Data Services for Samples:

NOSAMS must maintain an extensive database of measurements for each sample and provide each user with access to important measurements and information about their samples. The facility also will be responsible for archiving the data for the life-time of the facility and maintaining it in an electronic form suitable for preservation over several decades. NOSAMS will maintain a database of measurements during important steps in the sample preparation and analysis process for each sample. Data must include, but is not limited to, information on the submission of the sample, sample preparation variables, AMS analysis variables, and final delivery of data and follow-up consulting. NOSAMS will maintain a database of instrument performance characteristics over time so that errors introduced by instrument variations can be corrected at a future date. NOSAMS will also be responsible for maintaining records necessary for sample fee billing and collection. Users should be able to access and follow samples submitted via remote, on-line access to the database. A plan for developing a permanent data storage for oceanographic ^{14}C data must be included as part of the proposal. At the end of the grant period, critical elements of the database must be provided to NSF or a designated recipient in a standard portable format.

F. Research into new methods for ^{14}C analysis related to ocean sciences:

In addition to providing state-of-the-art ^{14}C analysis for scientific purposes, the facility must evolve to meet future ocean science ^{14}C analysis needs. Therefore, NOSAMS staff will conduct independent research as part of the 40% facility funding provided that will advance the science of AMS analysis and that will lead to new methods and increased efficiency for ^{14}C sample preparation and analysis. This methods advancement effort will present new research opportunities and open new areas of research. The facility must maintain a balance between managing a high-throughput sample analysis facility while insuring high quality and managing research into improving and streamlining existing techniques and new frontiers in analysis. Major research goals of the Center include, but are not limited to, the following:

- Expanding the NOSAMS analytical capacity to meet growing demand in the Ocean Science community and further reducing costs and sample turnaround times;
- Improving analytical procedures and capabilities, for example by research on processes that will reduce sample size requirements, enhance measurement accuracy, decrease process blanks, or improve QA/QC strategies;
- Developing new routine analytical services, for example rapid, low cost reconnaissance analyses, contamination containment checks, high precision radiocarbon measurements or DOC measurements;
- Upgrading the AMS instrumentation and data systems to improve performance on small and high precision measurements;
- Experimenting with CFAMS/GIS (continuous flow AMS with a gas ion source) coupled to various instruments such as an Elemental Analyzer, Gas Chromatography system, Programmed Temperature Pyrolysis and Combustion System, Liquid chromatography system, and/or a Laser ablation/combustion system.

G. External Oversight:

The NOSAMS staff will seek the advice of an external National AMS Policy Board that will meet on an annual basis to discuss progress at the facility and recommend future actions and policies related to sample price, etc. to the NOSAMS Director and to NSF. The Policy board should have at least five members who can represent the ocean science and AMS communities. Policy board membership will be approved by NSF. In addition to the annual policy meeting, NSF will conduct a mid-award review at approximately 2.5 years of operation to assess the overall management and operations at the facility. The Director of the facility will submit quarterly financial reports to NSF, and the facility must participate in International Radiocarbon inter-comparisons.

H. Education and Outreach to the Ocean Science Community:

The NOSAMS facility will maintain an active education program for undergraduate students, graduate students, and postdoctoral researchers. NOSAMS will hire post-doctoral researchers for up to two years to conduct research applicable to ^{14}C dating of oceanographic samples. A formal mentoring process for postdoctoral researchers is required. Postdoctoral and graduate student positions will be used to support research goals of the laboratory, not the daily operational goals. Undergraduates should have some research responsibilities and may also help with the overall operational goals. In addition to these educational positions, NOSAMS staff will organize workshops on an annual to bi-annual basis to educate scientists on scientific applications of ^{14}C dating and on new sample preparation techniques. NOSAMS staff will give presentations annually at major AMS and ocean science related meetings in order to widely disseminate research results from the facility, to advertise the services of the facility and to maintain communication with the ocean science and AMS communities.

III. AWARD INFORMATION

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1 - The Division of Ocean Sciences will provide up to one award for a single NOSAMS facility, pending results of the review process and availability of funds.

Anticipated Funding Amount: $9,000,000 The Division anticipates a five year cooperative agreement with annual budgets ranging from $1.5 to $2.5 Million and with possible renewal for up to ten years pending budget considerations and successful performance by the facility. The award may be considered for re-competition after ten years if there is continued need for services by the oceanographic community.

Estimated award size and duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

PI Limit:

The PI should be a scientist whose research is related to environmental or ocean science and who potentially uses ^{14}C data in that research effort.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

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 nsfpubs@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/publications/pub_summ.jsp?ods_key=grantsgovguide). 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 nsfpubs@nsf.gov.

Collaborative proposals must be submitted using the "single proposal" method as described in Chapter II, Section D.4.a. of the GPG. The project must be managed by a single organization with other organizations involved via sub-awards. Separately submitted collaborative proposals are not allowed.

The following supplements guidance in the GPG and NSF Grants.gov Application Guide.

Proposal Preparation:

1. **Cover Sheet:** Choose Division of Ocean Sciences (OCE) and AMS Facility Program

2. **Project Summary:** This section must include a description of the Intellectual Merit and the Broader Impacts of the project or the proposal will be returned without review. (1 page)

3. **Table of Contents**

4. **Project Description:** The proposal project description must include the following sections: (page guidelines are approximate only)

    A. Introduction and explanation of expertise of PI and senior staff who will be associated with the management of the facility (2 pages)

    B. Statement of the anticipated demand for AMS analysis by the ocean sciences community, likely future ^{14}C analysis requirements, opportunities for improved analysis and the general level of service(s) to be provided by the proposed facility. (2 pages)

    C. Description of facilities to be provided and operated (10 pages) including:

        1. Existing Facilities available for immediate use including the 1) Sample laboratory space and instrumentation, 2) AMS laboratory space and related instrumentation, and 3) Office Space and meeting rooms.

        2. Required instrumentation upgrades: NSF will fund limited instrumentation acquisitions and upgrades to accommodate operation of the facility during the next five years. Up to $1M may be budgeted for instrumentation upgrades as part of the initial 5-year award. Ongoing operational equipment needs are part of the overall facility costs.

        3. Required laboratory renovations: NSF will **not** fund laboratory renovations as part of this award, however if a renovation is planned for any space that is related to the proposed facility, a description of the renovations and a plan for their completion is required.

    D. Description of consulting services to be provided (2 pages)

    E. Description of Sample Preparation and Analysis services to be provided (3 pages)

    F. Description of AMS operation and maintenance plan (2 pages)

    G. Description of Database maintenance and services (1 page)

    H. Description of Quality Assurance/Quality Control methods (1 page)

    I. Description of Data and Sample Archival Services (1 page)

    J. Description of Research on ^{14}C analysis techniques (2 pages)

    K. Description of Education and Outreach to be provided (2 pages)

    Total pages (28) - page guidelines are approximate

5. **Reference Cited:**

6. **Biographical Sketches:**

7. **Budget:** The Budget Form included here in FASTLANE should be limited to the NSF-funded portion of the budget only (a pro-rated 40% of the complete budget). A separate budget included in the supplementary documents should be a complete budget including all costs. (see Appendix for description). NSF will support up to 40% of the total costs of the facility after final negotiations on the budget. The remaining 60% of the total costs of the facility must be recovered through user fees. The budget justification may be up to five pages. The Division of Ocean Sciences expects to have about $1.1 to $1.5 Million available to support operation of the laboratory each year. An additional allowance of up to $1 Million for initial instrumentation costs may be requested in order to bring instruments in the facility up to state-of-the-art. There is no mandatory cost-sharing requirement. Voluntary committed cost-sharing is prohibited. Please see the Grant Proposal Guide for more details.

8. **Current and Pending Support:**

9. **Facilities, Equipment and Other Resources:** When completing this required section of the proposal, please enter the statement "See full proposal for information about the facilities, equipment, and other resources available to support the project".

10. **Special information/Supplementary Documentation**

    a. Floor plan of Facility

    b. Management diagram/Organization chart

    c. Timeline with milestones from start-up to full operation: Must show important dates in laboratory renovation, instrument acquisition, installation, testing and acceptance, initial operation and full operation.

    d. Complete budget including estimated user fees: This budget should include all costs for the facility for the next five years. It should include costs for instrument acquisition and installation, as well as operation and maintenance of the facility, and costs for research to be conducted by the staff. **Costs for laboratory renovations, including but not limited to demolition, electrical, plumbing, HVAC, building materials, etc., are not appropriate and cannot be included in the budget.** Annual budgets based on the NSF budget format should be presented for each of the five years. Budgets should include all facility and research costs combined and in total. An estimated 60% of these costs will be provided via user fees to the facility. NSF will support up to 40% of the total costs estimated. The Division of Ocean Sciences expects to have from $1.1 to $1.5M available to support operation of the laboratory each year for routine operation. Additional funding of up to $1 Million may be requested for instrumentation upgrades for the initial award.

e. CV's of key staff who are not PI's or co-PI's

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Budget Preparation Instructions: A complete budget including all operating expenses must be included in the Appendix. The NSF budget form should include only 40% of the total operating costs with the remainder to be provided by user fees charged by the facility.

C. Due Dates

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

  March 19, 2012

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. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. 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 where they will be reviewed if they meet NSF proposal preparation requirements. 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 of interest with the proposal.

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, original, or potentially transformative 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?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

Additional Solicitation Specific Review Criteria

1. Experience and qualifications of PI, senior staff and technical staff to operate and maintain the proposed instruments and to provide the requested sample analysis services;
2. Quality of management plan and organizational structure and the probability that the facility will be able to provide services as requested in the solicitation;
3. Quality of instrumentation available for immediate use;
4. Quality of instrumentation to be acquired with consideration of risk associated with acquisition, installation, testing and acceptance;
5. Quality of the proposed sample preparation facilities and capabilities;
6. Quality of the proposed AMS analysis facilities and capabilities;
7. Quality of facility-related office and meeting space;
8. Quality of plans for database maintenance and QA/QC;
9. Quality of the proposed research efforts and the likelihood that they will lead to new and improved ^{14}C analysis services for the oceanographic community;
10. Quality of the proposed education and outreach programs.

NSF staff also 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.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, or Site Visit Review.

The review process will include a combination of mail review and panel review. Program may excercise the option of a site review to no more than two sites if two proposals are closely rated following mail and panel review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program 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 Research 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/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report 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. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Elizabeth L. Rom, telephone: (703) 292-7709, email: elrom@nsf.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.

- Elizabeth Rom
  Program Director, Integrated Programs Section
  Division of Ocean Science, Room 725
  Elrom@nsf.gov or 703-292-7709

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, National Science Foundation Update is a free e-mail subscription service 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 when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

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.

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 Arctic 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: nsfpubs@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
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