Digital Archiving and Long-Term Preservation (DIGARCH)

National Science Foundation
Directorate for Computer and Information Science and Engineering
Division of Information and Intelligent Systems

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

September 14, 2004

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Digital Archiving and Long-Term Preservation (DIGARCH)

Synopsis of Program:

The goal of this program is to stimulate research that builds capabilities for long-term management and preservation of digital materials. As more research disciplines and societal sectors have come to rely on data-driven models and observational data, the archiving problem is growing, the shortcomings of current technologies have become apparent and the need to preserve historical material has become imperative. This program will support both technical and sociotechnical research topics.

Candidate topics include:

- scientific data such as astronomy and the human genome,

- government material such as drug-testing records,

- private for-profit media such as film and music recordings, and

- public documents such as those associated with the government rulemaking process.

Content may include text, databases, electronic documents, images, sound, video and other object types.

Cognizant Program Officer(s):

- Valerie Gregg, Program Manager, Directorate for Computer & Information Science & Engineering, Division of

Information and Intelligent Systems, 1125 S, telephone: (703) 292-8911, fax: (703) 292-9073, email: vgregg@nsf.gov

- Stephen M. Griffin, Program Manager, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8918, fax: (703) 292-9073, email: sgriffin@nsf.gov

- William G LeFurgy, Library of Congress, Office of Strategic Initiatives, telephone: 202-707-8618, email: wlef@loc.gov

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

- 47.070 --- Computer and Information Science and Engineering

Eligibility Information

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

Award Information

- **Anticipated Type of Award:** Standard Grant
- **Estimated Number of Awards:** 12 to 15
- **Anticipated Funding Amount:** $2,300,000 pending availability of funds

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** Standard GPG Guidelines apply.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
  September 14, 2004

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

Long-term preservation of digital material has rapidly become a critical national issue. The requirements for long-term preservation test the limits of many current technologies and information management methodologies. Preservation of digital material will impact all sectors of society and all research disciplines including science and engineering, as well as the arts and humanities. More and more valuable content is "born digital" and must be managed, preserved, and used in digital form. Digital archiving research is based on the premise that all aspects of computer and information technology (e.g. storage, networking, processing power, software capabilities) will continue to evolve at a rapid pace and that some of the information created yesterday and today will move through many generations of information technology, with regular or sporadic reuse at points in the future. Long-term large-scale digital archiving requires systems, organizational structures, policies and business models that are robust enough to withstand i) technological progress, ii) failures, iii) changing standards, iv) changes in institutional missions, and v) interruptions in management and funding.

In 2000, The Library of Congress (LoC) was asked by United States Congress to lead the effort to develop a National Digital Information Infrastructure and Preservation Program (http://www.digitalpreservation.gov). Potential proposers to this solicitation may wish to track the progress of LoC's competition entitled "Program Announcement to Support Building a Network of Partners" at http://www.digitalpreservation.gov/index.php?nav=4. Related programmatic activities at the National Science Foundation (NSF) include the Digital Libraries Program at http://www.dli2.nsf.gov/ and the National Science, Technology, Engineering and Mathematics Education Digital Library program at http://www.ehr.nsf.gov/due/programs/nsdl/.

To provide a greater focus on digital archiving and preservation, a national-level multi-sector interdisciplinary Workshop on

Research Challenges in Digital Archiving and Long-term Preservation was convened in April 2002. The goal of the workshop was to identify the significant and unique CS/IT challenges and opportunities related to this topic. The workshop report is available at http://www.digitalpreservation.gov/index.php?nav=3&subnav=11 Its recommendations are the motivation for this solicitation. Related information can also be found in an NSF-European Union report under the Fifth Framework Programme by the Network of Excellence for Digital Libraries (DELOS) entitled *Invest to Save: Report and Recommendation of the NSF-DELOS Working Group on Digital Archiving and Preservation* at http://delos-noe.iei.pi.cnr.it/activities/internationalforum/Joint-WGs/digitalarchiving/Digitalarchiving.pdf.

II. PROGRAM DESCRIPTION

The goal of this Solicitation is to elucidate the special informatics research challenges and opportunities of the long-term preservation of digital material. Rather than incremental extensions of current work, proposals are expected to address new and innovative research directions, while helping to identify the next-generation library information infrastructure. Grants made under this solicitation are expected to produce results within approximately one year. Successful proposals in response to this solicitation will foster novel and synergistic interdisciplinary research between and among computer scientists, economists, librarians, content holders and archivists responsible for collections, and other related communities from the government, academic and private sectors. Proposals that involve collaborations with one or more government agencies are particularly encouraged.

Relevant research topic areas fall into three main focus areas: 1) digital repository models, 2) tools, technologies and processes, and 3) organizational, economic and policy issues. Specific topics include but are not limited to:

- interoperability among heterogeneous systems,

- very-large archives (petabyte scale),

- distributed systems,

- automation of ingest and preservation management processes,

- dynamic/evolving objects,

- aggregation of items and objects into collections,

- metrics for measuring authenticity and reliability of preserved digital objects,

- re-purposing of archives,

- tools to aggregate objects into packages for ingest and dissemination,

- interoperability of naming mechanisms,

- data provenance,

- tools for automated curatorial functions, metadata extraction, validation, and quality control,

- access control supporting intellectual property rights,

- semantic representation, and

- hardware/software obsolescence.

Research is also needed on policies and incentives for

- long-term preservation,

- economic, social, and legal impediments to digital archiving,

- incentives for archiving,

- methods for determining market value of archives and archiving services,

- projecting costs of archives,

- market analysis of user demand,

- articulating and modeling curatorial processes,

- digital lifecycle management methodologies, and

- decision models for archive selection.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

This solicitation seeks to support proposals for high-risk, small-scale planning (less than $100,000) or demonstration (less than $500,000) activities that have the potential to catalyze rapid and innovative advances in this interdisciplinary research area. Subject to the availability of funds, about $2.3 million will be jointly available from NSF and the Library of Congress; 12-15 standard grants are anticipated. This program solicitation will be managed within the "Systems in Context" cluster of the Division of Intelligent Information Systems (IIS), part of the NSF Directorate for Computer and Information Science and Engineering (CISE) (http://www.cise.nsf.gov).

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program announcement/solicitation number (04-592) in the program announcement/ 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.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

C. Due Dates

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

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

September 14, 2004

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal 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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that

both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

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.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc and/or panel review.

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

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual award.

NSF is 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 closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at 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 Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Proposers should plan and budget for attendance at a Principal Investigators' Workshop, to be held in the Summer of 2005 in the Washington D.C. metropolitan area.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Valerie Gregg, Program Manager, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1125 S, telephone: (703) 292-8911, fax: (703) 292-9073, email: vgregg@nsf.gov

- Stephen M. Griffin, Program Manager, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8918, fax: (703) 292-9073, email: sgriffin@nsf.gov

- William G LeFurgy, Library of Congress, Office of Strategic Initiatives, telephone: 202-707-8618, email: wlef@loc.gov

For questions related to the use of FastLane, contact:

- Lawrence E. Brandt, Program Manager, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1125 S, telephone: (703) 292-8911, fax: (703) 292-9073, email: lbrandt@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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**   (703) 292-5111
  (NSF Information Center)**:**

- **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

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and

researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

OMB control number: 3145-0058.

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