

Human Language and Communication (HLC)

Program Solicitation

NSF 03-613

Replaces Document NSF 01-156



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):

January 8, 2004

December 6, 2004

December 6 annually thereafter

REVISIONS AND UPDATES

The Dear Colleague Letter, "Proposal Submission Deadlines for the Division of Information and Intelligent Systems [IIS]," (NSF 01-156 dated September 6, 2001) established two annual proposal submission deadlines, March 1 and November 16. The Dear Colleague Letter is being replaced by individual IIS program solicitations, each with one annual proposal submission deadline. Please see the IIS Web site (<http://www.cise.nsf.gov/iis>) for additional information.

Effective on the day this program solicitation is posted by NSF, the deadline for Human Language and Communication proposals is January 8, 2004 and December 6 annually thereafter. Proposals submitted in anticipation of a November 16, 2003 deadline will be accepted and reviewed with those submitted for the January 8, 2004 deadline.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Human Language and Communication (HLC)

Synopsis of Program:

The Human Language and Communication (HLC) program focuses on advancing the state of the art in text and speech processing, as well as in multi-modal communication. The program supports research and related education activities fundamental to the development of computer systems capable of analyzing,

understanding, and generating language, speech, and other forms of communication that humans use naturally across a wide variety of situations. The program's ultimate objective is to transform the human-computer communication experience so that users can address a computer at any time and any place at least as effectively as if they were addressing another person.

Cognizant Program Officer(s):

- Mary P. Harper, Program Director, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8930, email: mharper@nsf.gov
- Karen Kukich, Program Director, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8930, fax: (703) 292-9073, email: kkukich@nsf.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 or Continuing Grant
- **Estimated Number of Awards:** 12 to 20
- **Anticipated Funding Amount:** \$4,500,000

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):

January 8, 2004

December 6, 2004

December 6 annually thereafter

Proposal Review Information

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

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Human Language and Communication Program (HLC) focuses on advancing the state of the art in computer processing of text and speech, as well as multi-modal communication, through supporting research and related educational activities. The HLC program encompasses research aimed at testing new theories and developing new computational models for all aspects of human language and communication. Such research should deepen our understanding of the relationships among

text, speech, and other communicative forms, as well as their underlying meaning, intent, and realization. Research is encouraged that extends the understanding of communication to enable innovative new modes of interaction. HLC research could lead to important applications in speech/language technology for managing the vast streams of text, speech, and video interactions that are available today via the Internet and mass media. It should support a myriad of practical applications such as more effective data mining tools for selecting information from these streams for education, business, and government, robust spoken control of mobile and embedded computers, high quality dialog systems to enhance computer usability, and effective machine translation systems for expanded information access. As an intellectual discipline in its own right, machine processing of language raises fascinating questions about the relationship between structure and meaning and presents great technical challenges such as how to duplicate the full variety of human communication with machines.

II. PROGRAM DESCRIPTION

The HLC program supports research and related education activities fundamental to the development of computer systems capable of analyzing, understanding, and generating language, speech, and other forms of communication that humans use naturally across a wide variety of situations. The program's ultimate objective is to transform the human-computer communication experience so that users can address a computer at any time and any place as though they were addressing another person. To this end, the HLC program seeks highly innovative proposals aimed at advancing the ability to test new theories and develop new computational models of all aspects of human language and communication. Because such research is often interdisciplinary in nature, HLC encourages proposals that bring together collaborators, solid research, and new ideas from related disciplines. Furthermore, the HLC program encourages research with broader impacts that promote modular, sharable, extensible code, tools, data resources (e.g., tree, proposition, and frame banks, ontologies, lexicons, annotated speech), knowledge representation schemes, annotation formats, and evaluation metrics and methods. The HLC program encourages innovative proposals involving computer processing of text, speech, and multimodal communication involving one or more languages. Methodologies may include, but are not limited to, supervised and unsupervised machine learning, corpus-based approaches, statistical techniques, symbolic and other approaches. Topics include, but are not limited to:

- computational approaches to phonology,
- morphology,
- syntax,
- semantics,
- emotive, affective, and pragmatic communication,
- speech recognition,
- language models,
- speech synthesis,
- prosodic analysis,
- language and speaker identification,
- machine translation,
- lexical and knowledge acquisition,
- sense disambiguation,
- summarization,
- question answering,
- text planning and generation,
- discourse analysis,
- understanding,
- language metrics (e.g., readability),
- multi-modal communication encompassing gesture, gaze, facial and emotive expression,
- meaning representation in multimodal interaction,
- metaphor and analogy in human language and communication,
- modeling and using context for semantic interpretation,
- cognitively and neuro-linguistically informed approaches to language and communication processing,
- novel extensions of normal communication modes,
- human communication principles derived from bio-immuno-genetic or animal communication,
- text/speech/video mining and information extraction involving fundamental language processing techniques.

Supplementary Information

The proposers are requested to carefully follow the [Grant Proposal Guide](#). In particular, clearly describe the Intellectual Merit and Broader Impacts of the proposed research, provide an evaluation plan (success metrics) for the proposed research, a mile-stone-based plan for each year of the project, and outline expected results, their potential applications and dissemination plans. Note that 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. Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary.

Projects that involve **human subjects** (e.g., to evaluate the relevance of retrieved images, validity of discovered knowledge, usefulness of an interface, etc.) or potentially sensitive personal data (e.g., Web logs, video, images, etc.) will require the IRB Approval or Exemption, and HUMAN SUBJECTS need to be indicated on the Proposal Cover Form. For details, see [Grant Proposal Guide, Proposals Involving Human Subjects](#). Failure to address Human Subjects issues in the proposal may result in critical reviews, and/or delay/terminate award processing, as NSF must comply with the federal government's "Common Rule" for the protection of human subjects.

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

The anticipated funding amount in Fiscal Year 2004 is \$4,500,000. The estimated number of new awards in the program will be 12 to 20. The estimated duration of these awards is up to three years.

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

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 (03-613) 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 Announcement.

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):

January 8, 2004

December 6, 2004

December 6 annually thereafter

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: <http://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.

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 date of receipt. 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.

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:

- Mary P. Harper, Program Director, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8930, email: mharper@nsf.gov
- Karen Kukich, Program Director, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8930, fax: (703) 292-9073, email: kkukich@nsf.gov

For questions related to the use of FastLane, contact:

- Michele R. Johnson, Program and Technology Specialist, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1115 N, telephone: (703) 292-8930, fax: (703) 292-9073, email: mrjohnso@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) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

Related Programs in the Division of Information and Intelligent Systems in the Directorate for Computer and Information Science and Engineering include:

- Information and Data Management
- Artificial Intelligence and Cognitive Science
- Universal Access
- Human-Computer Interaction
- Digital Society and Technologies
- Robotics and Computer Vision

Related Programs in the Division of Computer-Communications Research in the Directorate for Computer and Information Science and Engineering include:

- Signal Processing Systems

Related Programs in the Division of Behavioral and Cognitive Sciences in the Directorate for Social, Behavioral, and Economic Sciences include:

- Linguistics
- Cognitive Neuroscience
- Developmental and Learning Sciences
- Sciences Perception, Action, and Cognition

ABOUT THE NATIONAL SCIENCE FOUNDATION

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 (FASSED) provide funding for special assistance or

equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the 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** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090 or (800) 281-8749
- **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; 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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