Collaborative Research in Computational Neuroscience (CRCNS)

Innovative Approaches to Science and Engineering Research on Brain Function

PROGRAM SOLICITATION
NSF 11-505

REPLACES DOCUMENT(S):
NSF 08-514, NSF 09-60

National Science Foundation

Directorate for Computer & Information Science & Engineering

Directorate for Biological Sciences

Directorate for Social, Behavioral & Economic Sciences

Directorate for Mathematical & Physical Sciences

Directorate for Engineering

Office of International Science and Engineering

Office of Cyberinfrastructure

National Institutes of Health

National Institute of Neurological Disorders and Stroke

National Institute of Mental Health

National Institute on Drug Abuse

National Eye Institute

National Institute on Deafness and Other Communication Disorders

National Institute of Biomedical Imaging and Bioengineering

National Institute on Alcohol Abuse and Alcoholism

Eunice Kennedy Shriver National Institute of Child Health and Human Development

National Center for Complementary and Alternative Medicine

Federal Ministry of Education and Research, Germany

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

February 16, 2011

November 02, 2011

November 02, 2012

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), **NSF 13-1**, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in **NSF 13-1** apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in **NSF 13-1**.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

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. Proposers who opt to submit prior to January 18, 2011, must also follow the guidelines contained in NSF 11-1.

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.

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.

Revision Summary

This solicitation extends the Collaborative Research in Computational Neuroscience program for a period of three years, including what had previously been solicited under a separate Dear Colleague Letter on German-USA Collaboration in Computational Neuroscience.

The German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) is now a formal partner in this activity, along with the National Science Foundation (NSF) and the National Institutes of Health (NIH). At NIH, CRCNS is now affiliated with the NIH Blueprint for Neuroscience Research (http://neuroscienceblueprint.nih.gov).

The new solicitation incorporates the following programmatic and administrative changes:

- Scientific description and scope have been updated;
- Requirements for Data Sharing Proposals and US-German Research Proposals (for international collaborative research projects to be funded in parallel by US and German agencies, as described herein) have been revised and clarified;
- A Data Management Plan is now required as a supplementary document for all proposals;
- In response to this solicitation, an investigator may participate as PI or Co-PI in no more than one Research Proposal per review cycle, in no more than one US-German Research Proposal per review cycle, and in no more than one Data Sharing Proposal per review cycle;
- Budget limits and expected award durations have been clarified.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Collaborative Research in Computational Neuroscience (CRCNS)
Innovative Approaches to Science and Engineering Research on Brain Function

Synopsis of Program:

Computational neuroscience provides a theoretical foundation and a rich set of technical approaches for understanding complex neurobiological systems, building on the theory, methods, and findings of computer science, neuroscience, and numerous other disciplines.

Through the CRCNS program, participating organizations of the National Science Foundation (NSF), the National Institutes of Health (NIH), and the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) support collaborative activities that will advance the understanding of nervous system structure and function, mechanisms underlying nervous system disorders, and computational strategies used by the nervous system.

Three classes of proposals will be considered in response to this solicitation:

Research Proposals describing collaborative research projects,

US-German Research Proposals describing international collaborative research projects to be funded in parallel by US and German agencies, and

Data Sharing Proposals to enable sharing of data and other resources.

As detailed in the solicitation, appropriate scientific areas of investigations may be related to any of the participating funding organizations. Questions concerning a particular project's focus, direction and relevance to a participating funding organization should be addressed to the appropriate person in the list of agency contacts found in section VIII of the solicitation.

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.

- Nicky Clark,1125, telephone: (703) 292-4686, email: snclark@nsf.gov

- Kenneth Whang, CRCNS Program Coordinator - NSF; Program Director, Division of Information and Intelligent Systems, National Science Foundation, 1125 S, telephone: (703) 292-5149, fax: (703) 292-9073, email: kwhang@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.079 --- Office of International Science and Engineering
- 47.080 --- Office of Cyberinfrastructure
- 93.173 --- National Institute on Deafness and Other Communication Disorders
- 93.213 --- National Center for Complementary and Alternative Medicine
- 93.242 --- National Institute of Mental Health
- 93.273 --- National Institute on Alcohol Abuse and Alcoholism
- 93.279 --- National Institute on Drug Abuse
- 93.286 --- National Institute of Biomedical Imaging and Bioengineering
- 93.853 --- National Institute of Neurological Disorders and Stroke
- 93.865 --- Eunice Kennedy Shriver National Institute of Child Health and Human Development
- 93.867 --- National Eye Institute

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15 to 25 per year

Anticipated Funding Amount: $5,000,000 to $20,000,000 per year, subject to availability of funds

Eligibility Information

Organization Limit:

> The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

PI Limit:

> None Specified

Limit on Number of Proposals per Organization:

> None Specified

Limit on Number of Proposals per PI:

> In response to this solicitation, an investigator may participate as PI or Co-PI in no more than one Research Proposal per review cycle, in no more than one US-German Research Proposal (for international projects to be funded in parallel, as described herein) per review cycle, and in no more than one Data Sharing Proposal per review cycle. In the event that a PI or Co-PI does appear in any of these roles on more than one Research Proposal (whether they are lead or collaborative proposals or subawards/subcontracts), all Research Proposals that include that person as a PI or Co-PI will be returned without review. Likewise, in the event that a PI or Co-PI does appear in any of these roles on more than one US-German Research Proposal, all US-German Research Proposals that include that person as a PI or Co-PI will be returned without review. And likewise, in the event that a PI or Co-PI does appear in any of these roles on more than one Data Sharing Proposal, all Data Sharing proposals that include that person as a PI or Co-PI will be returned without review.

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:** Indirect costs may not be requested by foreign institutions on the NSF budget pages submitted in response to this solicitation. Indirect costs on foreign subawards/subcontracts will be limited to eight (8) percent

on NIH awards.

- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

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

    February 16, 2011

    November 02, 2011

    November 02, 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: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

One of the most exciting and difficult challenges for contemporary science and engineering is to understand complex neurobiological systems, from genetic determinants to cellular processes to the complex interplay of neurons, circuits, and systems orchestrating behavior and cognition. Disorders of the nervous system are also associated with complex neurobiological changes, which may lead to profound alterations at all levels of organization. The computational principles and strategies of the nervous system have implications for biological and engineered systems alike, opening new avenues for discovery, application, and invention.

Computational neuroscience provides a theoretical foundation and a rich set of technical approaches for understanding the principles and dynamics of the nervous system. Building on the theory, methods, and findings of computer science, neuroscience, biology, the mathematical and physical sciences, the social and behavioral sciences, engineering, and other fields, computational neuroscience employs a broad spectrum of approaches to study structure, function, organization, and computation across all levels of the nervous system. Advances in computational neuroscience are being accelerated by new methods for integrating and analyzing complex data, conceptual frameworks deriving from many different theoretical sources, and new modalities for large-scale data collection and fine experimental manipulation.

Furthering these advances, collaboration plays a pivotal role. Collaborative research enables close interaction between theory, modeling, and analysis, and experimental neuroscience. This provides a framework for interpretation of empirical data, quantitative hypotheses for empirical testing, and grounding of theories and models in an empirical and evaluation context. International collaborations bring together diverse research perspectives, expand the range of research partnerships, and develop a community of globally engaged scientists and engineers. Sharing of data, software, and other resources provides a powerful modality for larger-scale

interaction and collaborative discovery.

Research and research communities supported by the National Science Foundation (NSF) in computer science, engineering, and the biological, behavioral, cognitive, physical, mathematical, and social sciences; by the National Institutes of Health (NIH) in biological, biomedical, and bioengineering fields; and by the German Federal Ministry of Education and Research (BMBF) in all areas of computational neuroscience make computational neuroscience an area where cooperation among the agencies is appropriate and essential. Through the Collaborative Research in Computational Neuroscience (CRCNS) program, participating organizations of NSF, NIH, and BMBF support collaborative activities that will advance the understanding of nervous system structure and function, mechanisms underlying nervous system disorders, and computational strategies used by the nervous system.

CRCNS is affiliated with the NIH Blueprint for Neuroscience Research (http://neuroscienceblueprint.nih.gov/).

An NIH Notice (NOT-NS-11-006) and BMBF *Richtlinien* (http://www.gesundheitsforschung-bmbf.de/de/2547.php) are being issued in parallel with this solicitation.

II. PROGRAM DESCRIPTION

Three classes of proposals will be considered in response to this solicitation: **Research Proposals** describing collaborative research projects, **US-German Research Proposals** describing international collaborative research projects to be funded in parallel by US and German agencies, and **Data Sharing Proposals** to enable sharing of data and other resources.

In general, appropriate scientific areas of investigations may be related to the missions and strategic objectives of any of the participating funding organizations. Some specific examples are given below. Questions concerning a particular project's focus, direction and relevance to a participating funding organization should be addressed to the appropriate person in the list of agency contacts.

Each of the funding organizations participating in this program has a commitment to developing and supporting computational neuroscience research for the purpose of advancing the understanding of the neuroscience questions relevant to the missions of the organizations. Proposals selected for funding must be responsive to the mission of a participating funding organization.

Assurance of Innovative Collaborative Research Effort Across Scientific Disciplines

The driving principle behind this program is the recognition that projects crossing traditional academic disciplinary boundaries often bring about increased productivity, creativity, and capacity to tackle major challenges. Collaborative efforts that bring together scientists and engineers with complementary experience and training, and deep understanding of multiple scholarly fields, are a requirement for this program and must be convincingly demonstrated in the proposal. A typical research collaboration might involve a computer scientist and a neurobiologist, for example, though note that this solicitation does not prescribe any particular mix of disciplinary backgrounds or scientific approaches. Proposals for research projects should describe collaborations that bring together the complementary expertise needed to achieve significant advances on challenging interdisciplinary problems. Proposals for data sharing should describe resources that can be used by a broad community of investigators to enable wide-ranging research advances.

This program emphasizes innovative research and resources, encouraging the application and development of state-of-the-art computational methods by theorists, computational scientists, engineers, mathematicians, and statisticians to tackle dynamic and complex neuroscience problems.

Computational research supported under this program must relate to biological processes and should lead to hypotheses that are testable in biological studies. It is expected that: (1) proposals should include collaborations among computational and/or modeling experts, theorists, and experimental neuroscientists; (2) collaboration should involve a dynamic and possibly protracted period of development and refinement of models, theories, and/or analytical techniques, and intense interactions among scientists and engineers from different disciplines; and (3) the development and testing of new models or theories should provide a framework for the design of experiments and the generation of new hypotheses that can help reveal mechanisms and processes underlying normal or diseased states of the nervous system.

Sharing of data and software is highly recommended in all CRCNS projects, to facilitate the translation and dissemination of research results, to accelerate the development of generalizable approaches and tools that can be put to wide use by researchers, and to broaden the scope of collaboration in computational neuroscience and related communities.

Proposals for data sharing may relate to any of the scientific topics that would be appropriate for research proposals under this solicitation. Awards for data sharing will support the preparation and deployment of data, software, code bases, stimuli, models, or other resources in a form that is useful to a broad community of researchers. A smaller-scale data sharing project might focus on preparation and deployment of a few significant data sets coming out of a single laboratory or project. A larger-scale project might bring together a consortium of researchers, providing a coherent collection of data and other resources covering a set of topics, systems, or methods of interest. CRCNS support for data sharing focuses primarily on data and other resources, not more general infrastructure. Proposers of data sharing projects are strongly encouraged to build on existing facilities and services where possible, rather than develop infrastructure from scratch. Proposers are encouraged to coordinate with other CRCNS data sharing projects and related activities, including national and international efforts to develop sustainable, extensible neuroscience resources. Further information about resources for data sharing is available in Section IX of this solicitation, and on the CRCNS program web site (http://www.nsf.gov/crcns/).

Innovative educational and training opportunities are highly encouraged, to develop research capacity in computational neuroscience, to broaden participation in research and education, and to increase the impact of computational neuroscience research. Activities at all levels of educational and career development are welcome under this solicitation. International research experiences for students and early-career researchers are highly encouraged in all projects involving international collaborations.

A broad range of topics and approaches is welcome under this solicitation. The following list of examples illustrates some areas of research that are appropriate under this solicitation. **This list is not intended to be exhaustive or exclusive.**

- Explanatory, predictive and informative models and simulations of normal and abnormal structures and functions of the nervous system and related disorders;
- Mathematical, statistical and other quantitative analyses of research related to genetic, epigenetic, molecular, sub-cellular, cellular, network, systems, behavioral and/or cognitive neuroscience;
- Theoretical and computational approaches to delineate and understand the structures and functions of neural circuits;
- Theoretical and computational approaches that relate nervous system processes to learning algorithms, probabilistic representations, estimation, prediction, inference, and information integration and consolidation;
- Theory and algorithms for designing experiments and integrating and analyzing data related to imaging and brain mapping

technologies, including microscopic, macroscopic, and multimodal methods;
- Methods for measuring and analyzing connectivity, dynamics, information, and causation in neural systems;
- Approaches that integrate neural and cognitive models;
- Data-intensive approaches to modeling and analysis;
- Mathematical, statistical, and modeling approaches arising from areas such as communications, network science, the social and economic sciences, engineering, and other fields;
- Multi-scale modeling spanning temporal scales, spatial scales, biological scales, and states (e.g., behavioral, normal and diseased states) to understand and predict processes, behaviors, and diseases;
- Theoretical and computational methods that can be applied to: common pathways, circuits, and mechanisms underlying multiple diseases in the nervous system; translational research including therapeutic devices and drug development; and/or clinical research and clinical trials (e.g, predictive models of diseases, adaptive design of clinical trials, and simulation of clinical trials);
- Theoretical and computational methods that can be applied across multiple areas of basic, translational, and clinical neuroscience research;

Examples of topics amenable to these approaches include but are not limited to the following:

- Neurodevelopment, neurodegeneration and regeneration;
- Pattern recognition and perception;
- Motor control mechanisms and sensorimotor integration;
- Learning, representation, and encoding;
- Cognitive and decision-making functions and dysfunction, including, *e.g.*, impulse control and disinhibition;
- Neural origins of risk and time preference;
- Judgment, choice formation, and social-behavioral phenomena such as trust, competitiveness, and cooperation;
- Language and communication;
- Neural interface decoding and analysis, control, and modeling of processes affecting neural interfaces.
- Normal and abnormal sensory processing (vision, audition, olfaction, taste, balance, proprioception and somatic sensation);
- Neurological, neuromuscular and neurovascular disorders;
- Mental health, mental illness and related disorders;
- Alcohol and drug abuse related disorders, including, *e.g.*, their interaction with eating disorders and other psychiatric and neurological disorders

III. AWARD INFORMATION

As in previous years, there will be a minimum of $5 million available each year for this competition, with potentially $15 to $20 million annually, depending on the quality of proposals and availability of funds.

Award sizes for Research Projects are expected to range from approximately $100,000 to $250,000 per year in direct costs, with durations of three to five years. Most awards will be on the smaller end of this range; no awards will exceed $250,000 per year in direct costs. Proposers are strongly discouraged from requesting greater budgets than are necessary for the activities being proposed. Investigators contemplating four- or five-year projects are advised to discuss their project requirements with the appropriate agency contact(s) before submitting.

Total award sizes for US-German Research Projects (funded in parallel by US and German agencies) are expected to be in the same approximate range of $100,000 to $250,000 per year in direct costs, including the combined costs of all components of the collaborative project, inside and outside of the United States. The durations of these projects are expected to be no greater than three years. Investigators contemplating US-German Research Projects that would require longer durations are advised to discuss their project requirements with the appropriate agency contact(s) before submitting.

Awards for Data Sharing Projects will be scaled according to the needs of the project; typically they will be much smaller in size than research awards. Investigators are encouraged to discuss their project requirements with the CRCNS Program Coordinator - NSF before submitting.

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

Upon conclusion of the review process, meritorious research proposals may be recommended for funding by NSF, NIH, and/or BMBF, at the option of the agencies, not the proposer. Subsequent grant administration procedures will be in accordance with the individual policies of the awarding agency. (See section VI.B. for additional information on NSF, NIH, and BMBF processes.)

IV. ELIGIBILITY INFORMATION

Organization Limit:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

In response to this solicitation, an investigator may participate as PI or Co-PI in no more than one Research Proposal per review cycle, in no more than one US-German Research Proposal (for international projects to be funded in parallel, as described herein) per review cycle, and in no more than one Data Sharing Proposal per review cycle. In the event that a PI or Co-PI does appear in any of these roles on more than one Research Proposal (whether they

are lead or collaborative proposals or subawards/subcontracts), all Research Proposals that include that person as a PI or Co-PI will be returned without review. Likewise, in the event that a PI or Co-PI does appear in any of these roles on more than one US-German Research Proposal, all US-German Research Proposals that include that person as a PI or Co-PI will be returned without review. And likewise, in the event that a PI or Co-PI does appear in any of these roles on more than one Data Sharing Proposal, all Data Sharing proposals that include that person as a PI or Co-PI will be returned without review.

Additional Eligibility Info:

- **Proposal Limit:** Proposals submitted in response to this solicitation may not duplicate or be substantially similar to other proposals concurrently under consideration by other NSF, NIH, or BMBF programs or study sections. Duplicate or substantially similar proposals will be returned without review.

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.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

The following information supplements the Grant Proposal Guide or NSF Grants.gov Application Guide.

Additional instructions are given below for each of the three classes of proposals that will be considered in response to this solicitation. Note that the instructions for **US-German Research Proposals** apply only to proposals for research projects involving collaborations between institutions in the United States and institutions in Germany, to be funded in parallel by US and German agencies. Proposals involving other types of international collaboration should be submitted according to the instructions for **Research Proposals** or **Data Sharing Proposals**. Proposers are advised to discuss such projects with the appropriate agency contact(s) before submitting.

Research Proposals

1. **Project Summary:** For projects with medical relevance, the statement on broader impacts within the one-page project summary should include a summary of the project's potential contributions to understanding, preventing, and managing disease, and enhancing public health.

2. **Project Description:** Proposals for research projects must include a Coordination Plan. **Up to two additional pages are permitted in the Project Description for this purpose only, allowing a maximum of 17 pages.** The Coordination Plan must include: 1) the specific roles of the collaborating PIs, Co-PIs, other Senior Personnel and paid consultants at all organizations involved; 2) how the project will be managed across institutions and disciplines; 3) identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration (e.g., workshops, graduate student exchange, project meetings at conferences, use of videoconferencing and other communication tools, software repositories, etc.), and 4) specific references to the budget line items that support these coordination mechanisms.

3. **Supplementary Documents:** Supplementary documents are limited to the specific types of documentation listed in the GPG, with the following exceptions:

    Human Subjects Protection. Proposals involving human subjects should include a supplementary document no more than two pages in length summarizing potential risks to human subjects; plans for recruitment and informed consent; inclusion of women, minorities, and children; and planned procedures to protect against or minimize potential risks.

    Vertebrate Animals. Proposals involving vertebrate animals should include a supplementary document no more than two pages in length that addresses the following points:

    - Detailed description of the proposed use of the animals, including species, strains, ages, sex, and number to be used;
    - Justification for the use of animals, choice of species, and numbers to be used;
    - Information on the veterinary care of the animals;
    - Description of procedures for minimizing discomfort, distress, pain, and injury; and

Method of euthanasia and the reasons for its selection.

Data Management Plan. All proposals must include a supplementary document no more than two pages in length describing plans for data management and sharing of the products of research, which may include:

- The types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project;
- The standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
- Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
- Policies and provisions for re-use, re-distribution, and the production of derivatives; and
- Plans for archiving data, samples, and other research products, and for preservation of access to them.

The Data Management Plan should address possible differences between U.S. and applicable non-U.S. data protection requirements as needed. A valid Data Management Plan may include only the statement that no detailed plan is needed, as long as the statement is accompanied by a clear justification.

Proposals containing special information or supplementary documentation that has not been explicitly allowed in the GPG or this solicitation, such as article reprints or preprints, or appendices, will be returned without review.

US-German Research Proposals (for international collaborative research projects to be funded in parallel by US and German agencies)

1. A proposal to NSF should be prepared according to the guidelines above for Research Proposals. Proposal titles should begin with the phrase, "US-German Collaboration: ." The NSF proposal should be submitted by the US partner in the collaboration. The NSF proposal should describe the combined US-German project as a unified entity.

2. A full listing of the collaborating US and German PIs, Co-PIs, and senior personnel, with their departmental and institutional affiliations, should appear on the first page of the project description. Biographical sketches for the German PI, Co-PIs, and senior personnel should be included as supplementary documents in the NSF proposal.

3. The Coordination Plan should specifically describe plans for exchange of students and researchers, including timing, duration, and logistical arrangements for visits, and roles of specific project personnel. NSF specifically encourages US students and early-career researchers to spend substantive time abroad collaborating with researchers in foreign institutions.

4. The budget of the NSF proposal (in US Dollars) should not include any of the costs of the German component of the project. A summary budget of the German component of the project (in Euros), as submitted in parallel to BMBF, must be included as a supplementary document in the NSF proposal.

5. A proposal with the same project description should be submitted by the German partner in the collaboration to the project management organization

   Projektträger im DLR für das BMBF
   -Gesundheitsforschung-
   Heinrich-Konen-Straße 1
   53227 Bonn
   Tel: 0228-3821-210
   Fax. 0228-3821-257
   Internet: http://www.pt-dlr.de/

   according to the instructions of the *Richtlinien* (http://www.gesundheitsforschung-bmbf.de/de/2547.php). Applicants are urged to contact the project management organization for advice on applications. The organization will provide further information and details. Forms for funding applications, guidelines, leaflets, information and auxiliary terms and conditions are available on the Internet at http://www.foerderportal.bund.de/ or can be obtained from the project management organization. Applicants are strongly advised to use the electronic application system "easy" to draft (project outlines and) formal applications (http://www.foerderportal.bund.de/). Collaborating investigators in US-German Research Projects selected for funding will provide assurance to BMBF that a cooperation agreement, covering issues including intellectual property, has been established.

Data Sharing Proposals

1. **Title:** Titles for data sharing proposals should begin with the phrase, "CRCNS Data Sharing: ."

2. **Project Description:** Project descriptions for data sharing proposals should address the following points:

   - Description and significance of the data, software, code bases, stimuli, models, or other resources, including their quality, scientific importance, structure, format, and scale;
   - Relationship to similar data or other resources, relevant standards, coordination with relevant related activities and infrastructure, and potential for integration with other resources;
   - Anticipated range of uses for research and education in computational neuroscience or other fields;
   - Plan for preparation and deployment, including technical plans, project management, and plans for outreach and community input.

   For proposals involving multiple collaborators, institutions, or collaborating contributors, a Coordination Plan, as described above under Research Proposals, is allowed but not required. (As with the Research Proposals and US-German Research Proposals, up to two additional pages are permitted in the Project Description for the Coordination Plan.)

3. **Supplementary Documents:** Data management issues should be addressed within the project description; however, a Data Management Plan is still required as a supplementary document for technical reasons. Please include a supplementary document on data management that refers the reader to the project description. Proposals should include a supplementary document on Human Subjects Protection, as described above, if sharing of the data or other resources raises potential human subjects issues (e.g., confidentiality).

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Indirect Cost (F&A) Limitations: Indirect costs may not be requested by foreign institutions on the NSF budget pages submitted in response to this solicitation. Indirect costs on foreign subawards/subcontracts will be limited to eight (8) percent on NIH awards.

Other Budgetary Limitations:

Budgets should include travel funds for the PI to attend an annual CRCNS Principal Investigators' meeting.

C. Due Dates

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

    February 16, 2011

    November 02, 2011

    November 02, 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 for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with 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. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
   1. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   2. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

A central goal of this solicitation is to enable high-quality collaborative research. Following are suggested considerations pertaining to the quality of collaboration, not all of which will necessarily apply to any given proposal:

Quality of collaboration

Is the expertise of the proposers complementary and well-suited to the problems being addressed? Does the collaboration productively bring together new combinations of investigators, approaches, or resources? Are the specific roles of each collaborating investigator clear? Is the collaborative activity coordinated efficiently and effectively? To what extent will it contribute to the advancement of multiple collaborating disciplines? To what extent will it lead to the development of high-quality resources that will be useful to the research community at large? To what extent will it provide unique collaborative research experiences for participating students and early-career researchers?

For proposals involving international collaborations, reviewers will consider: mutual benefits, true intellectual collaboration with the foreign partner(s), benefits to be realized from the expertise and specialized skills, facilities, sites and/or resources of the international counterpart, and active research engagement of U.S. students and early-career researchers, where such individuals are engaged in the research.

The mission of the NIH is to support science in pursuit of knowledge about the biology and behavior of living systems and to apply that knowledge to extend healthy life and reduce the burdens of illness and disability. In their evaluations of intellectual merit, reviewers will be asked to consider the following criteria that are used by NIH:

Overall Impact. Reviewers will provide an overall impact/priority score to reflect their assessment of the likelihood for the project to exert a sustained, powerful influence on the research field(s) involved, in consideration of the following five core review criteria, and additional review criteria (as applicable for the project proposed).

Significance. Does the project address an important problem or a critical barrier to progress in the field? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?

Investigator(s). Are the PD/PIs, collaborators, and other researchers well suited to the project? If Early Stage Investigators or New Investigators, do they have appropriate experience and training? If established, have they demonstrated an ongoing record of accomplishments that have advanced their field(s)? If the project is collaborative or multi-PD/PI, do the investigators have complementary and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?

Innovation. Does the application challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions? Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense? Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?

Approach. Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project? Are potential problems, alternative strategies, and benchmarks for success presented? If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed?

If the project involves clinical research, are the plans for 1) protection of human subjects from research risks, and 2) inclusion of minorities and members of both sexes/genders, as well as the inclusion of children, justified in terms of the scientific goals and research strategy proposed?

Environment. Will the scientific environment in which the work will be done contribute to the probability of success? Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed? Will the project benefit from unique features of the scientific environment, subject populations, or collaborative arrangements?

Additional NIH Review Criteria

Where applicable, the following items will also be considered:

Protections for Human Subjects. For research that involves human subjects but does not involve one of the six categories of research that are exempt under 45 CFR Part 46, the committee will evaluate the justification for involvement of human subjects and the proposed protections from research risk relating to their participation according to the following five review criteria: 1) risk to subjects, 2) adequacy of protection against risks, 3) potential benefits to the subjects and others, 4) importance of the knowledge to be gained, and 5) data and safety monitoring for clinical trials.

For research that involves human subjects and meets the criteria for one or more of the six categories of research that are exempt under 45 CFR Part 46, the committee will evaluate: 1) the justification for the exemption, 2) human subjects involvement and characteristics, and 3) sources of materials.

Inclusion of Women, Minorities, and Children. When the proposed project involves clinical research, the committee will evaluate the proposed plans for inclusion of minorities and members of both genders, as well as the inclusion of children.

Vertebrate Animals. The committee will evaluate the involvement of live vertebrate animals as part of the scientific assessment according to the following five points: 1) proposed use of the animals, and species, strains, ages, sex, and numbers to be used; 2) justifications for the use of animals and for the appropriateness of the species and numbers proposed; 3) adequacy of veterinary care; 4) procedures for limiting discomfort, distress, pain and injury to that which is unavoidable in the conduct of scientifically sound research including the use of analgesic, anesthetic, and tranquilizing drugs and/or comfortable restraining devices; and 5) methods of euthanasia and reason for selection if not consistent with the AVMA Guidelines on Euthanasia.

Biohazards. Reviewers will assess whether materials or procedures proposed are potentially hazardous to research personnel and/or the environment, and if needed, determine whether adequate protection is proposed.

Budget. The reasonableness of the proposed budget and the requested period of support in relation to the proposed research.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review 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.

NSF Process: Those proposals selected for funding by NSF will be handled in accordance with standard NSF procedures. 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 date of receipt. 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.

NIH Process: For those proposals that are selected for potential funding by participating NIH Institutes or Centers, the PI will be required to resubmit the proposal in an NIH-approved format directly to the Center for Scientific Review (http://www.csr.nih.gov/) of the NIH. PIs invited to resubmit to NIH will receive further information on resubmission procedures from NIH. An applicant will not be allowed to increase the proposed budget or change the scientific content of the application in the resubmission to the NIH. Indirect costs on any foreign subawards/subcontracts will be limited to eight (8) percent. Applicants will be expected to utilize the Multiple Principal Investigator option at the NIH (http://grants.nih.gov/grants/multi_PI/) as appropriate. These NIH applications will be entered into the NIH IMPAC II system. The results of the review will be presented to the involved Institutes' or Centers' National Advisory Councils for the second level of review. Subsequent to the Council reviews, NIH Institutes and Centers will make their funding determinations and selected awards will be made. Subsequent grant administration procedures for NIH awardees, including those related to New and Early Stage Investigators (http://grants.nih.gov/grants/new_investigators/), will be in accordance with the policies of NIH. Applications selected for NIH funding will use the NIH R01 funding mechanism.

Proposals that are funded by the NIH are expected to be renewed as competing continuing applications. Principal Investigators should contact their NIH Program Officer for additional information. For informational purposes, NIH Principal Investigators may wish to consult the NIAID web site, "All About Grants," which provides excellent generic information about all aspects of NIH grantsmanship, including competitive renewals (http://www.niaid.nih.gov/ncn/grants/).

BMBF Process: On the basis of the evaluation, suitable project ideas will be selected for funding. The applicants will be informed in writing of the result of the selection procedure.

In the second phase of the procedure, applicants whose applications have received a positive evaluation will be invited to present a formal application for funding. A decision will be made after a final evaluation. Forms for funding applications, guidelines, leaflets, information and auxiliary terms and conditions are available on the Internet at http://www.foerderportal.bund.de/ or can be obtained from the project management organization. Applicants are strongly advised to use the electronic application system "easy" to draft (project outlines and) formal applications (http://www.foerderportal.bund.de/).

VII. NSF AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of an NSF 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.

Special Award Conditions:

Attribution of support in publications must acknowledge the joint program, as well as the funding organization and award number, by including the phrase, "as part of the NSF/NIH/BMBF Collaborative Research in Computational Neuroscience Program."

C. Reporting Requirements

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

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

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

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:

- Nicky Clark, 1125, telephone: (703) 292-4686, email: snclark@nsf.gov

- Kenneth Whang, CRCNS Program Coordinator - NSF; Program Director, Division of Information and Intelligent Systems, National Science Foundation, 1125 S, telephone: (703) 292-5149, fax: (703) 292-9073, email: kwhang@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.

Questions concerning a particular project's focus, direction and relevance to a participating funding organization should be addressed to:

NSF

Kenneth Whang, Program Director, Division of Information and Intelligent Systems, 1125S, telephone: (703) 292-5149, fax: (703) 292-9073, email: kwhang@nsf.gov

Akaysha Tang, Program Director, Division of Behavioral and Cognitive Sciences, 995N, telephone: (703) 292-7281, email: atang@nsf.gov

Jonathan Leland, Program Director, Division of Social and Economic Sciences, 995N, telephone: (703) 292-7285, email: jleland@nsf.gov

Elizabeth Cropper, Program Director, Division of Integrative and Organismal Systems, 685S, telephone: (703) 292-8421, email: ecropper@nsf.gov

Mary Ann Horn, Program Director, Division of Mathematical Sciences, 1025N, telephone: (703) 292-4879, email: mhorn@nsf.gov

Kaiming Ye, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, 565S, telephone: (703) 292-2161, email: kye@nsf.gov

Maija Kukla, Program Director, Office of International Science and Engineering, II-1155, telephone: (703) 292-4940, email: mkukla@nsf.gov

Dane Skow, Program Director, Office of Cyberinfrastructure, 1145S, telephone: (703) 292-4551, email: dskow@nsf.gov

ANR

Mathieu Girerd, Scientific Officer, Information and Communication Sciences and Technologies Department, telephone: + 33 1 7354 8213, email: mathieu.girerd@agencerecherche.fr

BMBF

Rainer Girgenrath, Projektträger im DLR für das BMBF, telephone: + 44 (228) 3821-200, email: rainer.girgenrath@dlr.de

NIH

Yuan Liu, Chief, Office of International Activities; Director, Computational Neuroscience and Neuroinformatics Program, National Institute of Neurological Disorders and Stroke, telephone: (301) 496-0012, email: liuyuan@ninds.nih.gov

Dennis Glanzman, Chief, Theoretical and Computational Neuroscience Research Program, National Institute of Mental Health, telephone: (301) 443-1576, email: dglanzma@mail.nih.gov

David Shurtleff, Director, Division of Neuroscience and Behavioral Research, National Institute on Drug Abuse, telephone: (301) 443-1887, email: david_shurtleff@nih.gov

Michael A. Steinmetz, Program Director, Division of Extramural Research, National Eye Institute, telephone: (301) 451-2020, email: Michael.Steinmetz@nih.gov

Christopher Platt, Program Director, Central Pathways for Hearing and Balance, National Institute on Deafness and Other Communication Disorders, telephone: (301) 496-1804, email: plattc@nidcd.nih.gov

Grace C. Y. Peng, Program Director, Discovery Science and Technology, National Institute of Biomedical Imaging and Bioengineering, telephone: (301) 451-4778, email: penggr@mail.nih.gov

John A. Matochik, Program Director, Division of Neuroscience and Behavior, National Institute on Alcoholism and Alcohol Abuse, telephone: (301) 451-7319, email: jmatochi@mail.nih.gov

Theresa H. Cruz, Program Director, Eunice Kennedy Shriver National Institute of Child Health and Human Development, telephone (301) 496-9233, E-mail cruzth@mail.nih.gov

John R. Glowa, Program Director for Neuroscience, National Center for Complementary and Alternative Medicine, telephone (301) 496-0527, email: glowaj@mail.nih.gov

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, 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.

Coordination of Data Sharing

All CRCNS investigators are encouraged to coordinate with other CRCNS data sharing projects and related activities, including national and international efforts to develop sustainable, extensible neuroscience resources. For example:

An activity supported by NSF, the NIH, and BMBF is the International Neuroinformatics Coordinating Facility (INCF; http://www.incf.org/) located at the Karolinska Intitute in Stockholm, Sweden. Initiated as an activity of the OECD Global Science Forum, INCF fosters worldwide collaboration and data sharing in neuroscience.

The CRCNS data sharing website (http://crcns.org/) hosts experimental data sets of high quality that will be valuable for testing computational models of the brain and new analysis methods.

The Neuroscience Information Framework (NIF; http://www.neuinfo.org/) is a dynamic inventory of web-based neuroscience resources: data, materials, and tools accessible via any computer connected to the Internet. An initiative of the NIH Blueprint for Neuroscience Research, NIF advances neuroscience research by enabling discovery and access to public research data and tools worldwide through an open source, networked environment.

The Neuroimaging Informatics Tools and Resources Clearinghouse (http://www.nitrc.org/) facilitates finding and comparing neuroimaging resources for functional and structural neuroimaging analyses.

Related Funding Opportunities

The following NSF programs support computational neuroscience and related research, including single-investigator projects:

- **Cognitive Neuroscience** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5316&org=BCS)
- **Mathematical Biology** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5690&org=DMS)
- **Neural Systems** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501089&org=IOS)
- **Robust Intelligence** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503305&org=IIS)
- **Biomedical Engineering** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501023&org=CBET)
- **Perception, Action, and Cognition** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5686&org=BCS)
- **Decision, Risk, and Management Sciences** (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES)

The following NIH programs support computational neuroscience and related research, including single-investigator projects:

- **Predictive Multiscale Models of the Physiome in Health and Disease** (R01) - PAR-08-023 (http://grants.nih.gov/grants/guide/pa-files/PAR-08-023.html)
- **Innovations in Biomedical Computational Science and Technology** (R01) - PAR-09-218 (http://grants.nih.gov/grants/guide/pa-files/PAR-09-218.html)
- **Exploratory Innovations in Biomedical Computational Science and Technology** (R21) - PAR-09-219 (http://grants.nih.gov/grants/guide/pa-files/PAR-09-219.html)
- **Innovations in Biomedical Computational Science and Technology Initiative** (SBIR [R43/R44]) - PAR-09-220 (http://grants.nih.gov/grants/guide/pa-files/PAR-09-220.html)
- **Innovations in Biomedical Computational Science and Technology Initiative** (STTR [R41/R42]) - PAR-09-221 (http://grants.nih.gov/grants/guide/pa-files/PAR-09-221.html)

- **Continued Development and Maintenance of Software** (R01) - PAR-08-010 - This is a reissue of PAR-07-235 (http://grants.nih.gov/grants/guide/pa-files/PAR-08-010.html)

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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

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

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

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

ABOUT THE NATIONAL INSTITUTES OF HEALTH

The National Institutes of Health (NIH) mission is to uncover new knowledge that will lead to better health for everyone. NIH works toward that mission by conducting research in its own laboratories; supporting the research of non-Federal scientists in universities, medical schools, hospitals, and research institutions throughout the country and abroad; helping in the training of research investigators; and fostering communication of medical information. The NIH institutes and centers participating in this program contribute to NIH's mission through research efforts aimed at understanding, treating, and preventing disease states that involve or are related to the nervous system.

- The NINDS is interested in supporting collaborative research in innovative computational analysis, simulation and modeling of physiological and pathological structures and functions of the nervous system, and mechanisms underlying neurological neuromuscular and neurovascular disorders.
- NIMH supports an integrated program of basic and clinical research in biology, neuroscience, epidemiology, behavioral sciences as well as services research aimed at developing and assessing new approaches to diagnose, prevent and treat mental illness.
- NIDA supported research is aimed at increasing the understanding of the causes and consequences of drug abuse and addiction. NIDA supports a broad research program in basic and clinical research, neuroscience, molecular biology, genetics, epidemiology, behavioral sciences and services research.
- NEI supports basic and clinical research aimed at increasing our understanding of the eye and the visual system in normal health and disease.
- NIDCD supports biomedical and behavioral research related to normal and disordered processes of hearing, balance, smell, taste, voice, speech and language. Basic and clinical studies of genetic, molecular, cellular, physiological, biochemical, and behavioral aspects of function in health and disease are encouraged.
- NIBIB supports research and development of new and novel computational methods for modeling, simulation and analysis for the purpose of detecting, treating and preventing disease. For projects developing computational methods for image analysis and post-processing, where the computation is not linked to the direct testing or generation of a neuroscience hypothesis, please refer to the NIBIB program for image processing: http://www.nibib.nih.gov/Research/ProgramAreas/ImageProcessing.
- NIAAA supports basic, clinical and behavioral research to increase the understanding of normal and abnormal biological functions and behavior relating to alcohol use, to improve the diagnosis, prevention, and treatment of alcohol use disorders, and to enhance quality health care to reduce the burden of alcohol abuse and addiction.
- NICHD supports the full spectrum of basic, clinical, and translational research in the biomedical and behavioral neuroscience arenas, particularly as they affect developing systems and rehabilitation
- NCCAM sponsors and conducts research using scientific methods and advanced technologies to study a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine.

For the latest information about NIH programs, visit the NIH website at http://www.nih.gov/.

ABOUT THE FEDERAL MINISTRY OF EDUCATION AND RESEARCH

Research and development in areas such as chemistry and materials science, semiconductors, laser and plasma technology together with the latest production processes are the basis for new technological developments of tomorrow. The Federal Ministry of Education and Research (BMBF) provides financial support for innovative projects and ideas under targeted research funding programmes.

The range covers everything from basic scientific research, environmentally friendly sustainable development, new technologies, information and communication technologies, the life sciences, work design; structural research funding at institutions of higher education to innovation support and technology transfer.

Research funding supports scientific institutions and enterprises. The BMBF also funds individual researchers via special funding institutions.

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:**

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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:

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