Next Generation Networks for Neuroscience (NeuroNex) Technology-enabled, Team-based Neuroscience

PROGRAM SOLICITATION
NSF 19-563

REPLACES DOCUMENT(S):
NSF 16-569

National Science Foundation

Directorate for Biological Sciences
    Division of Biological Infrastructure
    Division of Integrative Organismal Systems

Office of International Science and Engineering

Canadian Institutes of Health Research

Deutsche Forschungsgemeinschaft

Fonds de Recherche du Québec

Medical Research Council (part of UK Research and Innovation)

Preliminary Proposal Due Date(s) *(required)* (due by 5 p.m. submitter's local time):

    June 14, 2019

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

    December 13, 2019

IMPORTANT INFORMATION AND REVISION NOTES

This revision of the NeuroNex solicitation builds on the investments in neurotechnology and theoretical framework development and dissemination by the NSF, other U.S. Federal agencies, and international partners.

This revision emphasizes a network approach to address fundamental questions in neuroscience of a scope and complexity that would not be addressable under traditional funding of individual research projects and that require the convergence of multiple disciplines to answer.

The inherent complexity of the brain necessitates that countries leverage each other's major resources directed toward neuroscience research to achieve a full understanding of brain function. Therefore, this revision requires that the collaborative networks applying for support include one or more investigators eligible for funding through one or more of the international partner agencies (Canadian Institutes of Health Research, Deutsche Forschungsgemeinschaft, Fonds de Recherche du Québec, and Medical Research Council).

Proposed work is expected to take advantage of recent developments in neurotechnologies, e.g., through the U.S. BRAIN Initiative, and to advance neurotechnology and cyberinfrastructure resource development, as appropriate for achieving the objectives of a research network. However, different from the previous NeuroNex solicitation, technology development is not the primary focus of this revision.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1), which is effective for proposals submitted, or due, on or after February 25, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

> Next Generation Networks for Neuroscience (NeuroNex)
> Technology-enabled, Team-based Neuroscience

Synopsis of Program:

> Understanding how behavior emerges from the dynamic patterns of electrical and chemical activity of brain circuits is universally recognized as one of the great, unsolved mysteries of science. Advances in recent decades have elucidated how individual elements of the nervous system and brain relate to specific behaviors and cognitive processes. However, there remains much to discover to attain a comprehensive understanding of how the healthy brain functions, specifically, the general principles underlying how cognition and behavior relate to the brain's structural organization and dynamic activities, how the brain interacts with its environment, and how brains maintain their functionality over time.
>
> Achieving an understanding of brain structure and function that spans levels of organization, spatial and temporal scales, and the diversity of species requires an international, transdisciplinary collaborative effort to not only integrate discipline-specific ideas and approaches but also extend them to stimulate new discoveries, and innovative concepts, theories, and methodologies.
>
> The objective of this phase of the NeuroNex Program is the establishment of distributed, international research networks that build on existing global investments in neurotechnologies to address overarching questions in neuroscience. The creation of such global research networks of excellence will foster international cooperation by seeding close interactions between a wide array of organizations across the world, as well as creating links and articulating alliances between multiple recently launched international brain projects. The potential transformative advances in neuroscience stemming from this activity will have profound scientific and societal impacts.
>
> The goal of this solicitation is to support collaborative networks (approximately 15 to 20 investigators in each network) comprised of international teams of disciplinarily diverse experimentalists, theorists, and research resource (including technology and cyberinfrastructure) developers working on a common foundational question in neuroscience. It is anticipated that these international networks will enable experimentation, analysis, and discovery in neuroscience at scales much larger than currently possible.
>
> This interdisciplinary, international program is one element of NSF's broader effort directed at Understanding the Brain, a multi-year activity that includes NSF's participation in the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative (https://www.nsf.gov/brain/) and the phased approach to develop a research infrastructure for neuroscience as outlined in the Dear Colleague Letter NSF16-047. The need for a program that helps neuroscientists collect, standardize, manage, and analyze the large amounts of data that result from research attempting to understand how the brain functions has been recognized by stakeholders in the scientific community and by the U.S. Congress in the American Innovation and Competitiveness Act (AICA) of 2017. The NSF and international partner agencies envision a connected portfolio of transformative, integrative projects that leverage existing global investments in neurotechnologies and create synergistic links across domestic and international investigators and communities, yielding novel ways of tackling the challenges of understanding the brain in action and in context.

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.

- Edda (Floh) Thiels, telephone: (703) 292-8167, email: ethiels@nsf.gov

- Sridhar Raghavachari, telephone: (703) 292-4845, email: sraghava@nsf.gov

- Reed S. Beaman, telephone: (703) 292-7163, email: rsbeaman@nsf.gov

- Claire A. Hemingway, telephone: (703) 292-7135, email: chemingw@nsf.gov

- Krastan B. Blagoev, telephone: (703) 292-4666, email: kblagoev@nsf.gov

- William L. Miller, telephone: (703) 292-7886, email: wlmiller@nsf.gov

- Shubhra Gangopadhyay, telephone: (703) 292-2485, email: sgangopa@nsf.gov

- Gregg Solomon, telephone: (703) 292-8333, email: gesolomo@nsf.gov

- Kurt Thoroughman, telephone: (703) 292-7281, email: kthoroug@nsf.gov

- Junping Wang, telephone: (703) 292-4488, email: jwang@nsf.gov

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

- 47.074 --- Biological Sciences
- 47.079 --- Office of International Science and Engineering

Award Information

Anticipated Type of Award:

Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 3 to 5

Anticipated Funding Amount: $10,000,000

The number of Network Awards will depend on the quality of the proposals, availability of funds, and partner agency priorities. An estimate of $10M will be available from the NSF in FY2020 for funding approximately 3 to 5 Networks.

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no limits.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as PI, co-PI, or other Senior Personnel on no more than one Network proposal. The PI of a Network must be an investigator at a U.S. organization. Network proposals in excess of the limit for any person will be returned without review in the reverse order received. This limit applies to all PIs, co-PIs, or other Senior Personnel based inside or outside of the United States. Changes in investigator roles post-submission to meet the eligibility limits will not be allowed. See Section VI.B for eligibility criteria for investigators from international partner countries. **It is the responsibility of the submitters to confirm that the entire team meets the eligibility guidelines**.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.

- **Full Proposals:**

    - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
    - 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: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

    Inclusion of voluntary committed cost sharing is prohibited.

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

    Not Applicable

- **Other Budgetary Limitations:**

    Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposal Due Date(s)** *(required)* (due by 5 p.m. submitter's local time):

    June 14, 2019

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

    December 13, 2019

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

TABLE OF CONTENTS

I. INTRODUCTION

Understanding how behavior emerges from the dynamic patterns of electrical and chemical activity of brain circuits is universally recognized as one of the great, unsolved mysteries of science. Advances in recent decades have elucidated how individual elements of the nervous system and brain relate to specific behaviors and cognitive processes. However, there remains much to discover to attain a comprehensive understanding of how the healthy brain functions, specifically, the general principles underlying how cognition and behavior relate to the brain's structural organization and dynamic activities, how the brain interacts with its environment, and how brains maintain their functionality over time.

Achieving an understanding of brain structure and function that spans levels of organization, spatial and temporal scales, and the diversity of species requires an international, transdisciplinary collaborative effort to not only integrate discipline-specific ideas and approaches but also extend them to stimulate new discoveries, and innovative concepts, theories, and methodologies.

The objective of this phase of the NeuroNex Program is the establishment of distributed, international research networks that build on existing global investments in neurotechnologies to address overarching questions in neuroscience. The creation of such global research networks of excellence will foster international cooperation by seeding close interactions between a wide array of organizations across the world, as well as creating links and articulating alliances between multiple recently launched international brain projects. The potential transformative advances in neuroscience stemming from this activity will have profound scientific and societal impacts.

The goal of this solicitation is to support collaborative networks (approximately 15 to 20 investigators in each network) comprised of international teams of disciplinarily diverse experimentalists, theorists, and research resource (including technology and cyberinfrastructure) developers working on a common foundational question in neuroscience. It is anticipated that these networks will enable experimentation, analysis, and discovery in neuroscience at scales much larger than currently possible. The NSF and international partner agencies envision a connected portfolio of transformative, integrative projects that leverage existing global investments in neurotechnologies and create synergistic links across domestic and international investigators and communities, yielding novel ways of tackling the challenges of understanding the brain in action and in context.

II. PROGRAM DESCRIPTION

The objective of this phase of the NeuroNex Program is the establishment of distributed international research networks that build on existing global investments in neurotechnologies to address overarching questions in neuroscience. The creation of such global research networks of excellence will foster international cooperation by seeding close interactions between a wide array of organizations across the world, as well as creating links and articulating alliances between multiple recently launched international brain projects. The potential transformative advances in neuroscience stemming from this activity will have profound scientific and societal impacts.

This solicitation calls for proposals addressing fundamental questions in neuroscience of a scope and complexity that would not be feasible under traditional funding of individual research projects and that by their nature require the convergence of multiple disciplines to answer. Through this program, the NSF and international partner agencies seek to support groups of investigators with a wide variety of disciplinary backgrounds to work together at the *nexus* of their respective fields to accelerate our understanding of brain function across the phylogenetic spectrum.

A Network must be composed of international teams that include disciplinarily diverse experimentalists and theorists working to obtain mechanistic insights into foundational questions in neuroscience. These networks must incorporate:

- Strong integration across levels of study within an organism;
- Comparative analysis of neural underpinnings of behavior in naturalistic settings and across organisms;
- Predictive theory and modeling to guide research and uncover general principles; and
- Global partnerships.

Networks must coalesce around a tractable, discrete behavior that is sufficiently generalizable to address a foundational question in brain function. It is desirable that the behavior under investigation is of sufficient complexity to inform how organisms function in their natural environments. Network goals must include the development of theoretical foundations that enable integration across levels, such as mapping of neural structure and activity to behavior. Each network proposal is strongly encouraged to have strong international and US participation.

Networks must include one or more investigators eligible for funding through one or more of the international partner agencies (see Section VIII) and are expected to involve approximately 15 to 20 investigators comprised of any combination of theorists, experimentalists, engineers, and computer and data scientists distributed among 2 to 4 interdisciplinary research groups (IRGs). The composition of each IRG may cut across organizations and countries as appropriate. The IRGs in a Network, each involving about 3 to 6 investigators, are expected to address different but complementary aspects of the central question tackled by the Network. The Network as a whole is expected to be more than the sum of its IRGs, with the synergy arising from a team science approach to integration across levels and organisms to address a common foundational question, the Network's shared theoretical and analytical capabilities, and common workflow and data management practices.

Networks are encouraged to leverage prior and ongoing investments in neurotechnologies by the NSF (including NeuroNex Neurotechnology Hubs), other U.S. Federal agencies, and international partners; expand the development and use of theoretical frameworks to guide experimentalists; contribute to the development of and comply with data sharing and standardization, "best practices," and policies to conduct research in an "open science" fashion that enables broad access to research outcomes.

Networks may include a limited degree of cyberinfrastructure resources and services (e.g., data infrastructure, software infrastructure, means of accessing and utilizing shared computing resources) if such development is demonstrated to be essential for the success of the network effort and not duplicative of existing resources and services.

Successful proposals will articulate clearly a synergy or value-added rationale that justifies the combination of IRGs within a Network and the team composition within each IRG to advance neuroscience beyond what is possible by small groups of investigators while fostering a vibrant and international environment for training, outreach, and public engagement. Maximum flexibility in the design of international teams funded through this program is essential, so the specific organization of the Network is left to the creativity of the principal investigators.

Innovative educational and training opportunities, including international research experiences for students and early-career researchers, that prepare the next generation of investigators for convergent, team-oriented approaches to neuroscience in the global realm and that broaden participation in research and education are encouraged highly. Activities at all levels of educational and career development are welcome under this solicitation.

III. AWARD INFORMATION

Individual Network awards are expected to range in size from approximately $150,000 to $400,000 per U.S. investigator per year, with durations of five years. The expected range of award sizes applies to the combined direct costs, expressed in U.S. Dollars, of each component of a Network for which funding is being sought from the NSF. For components for which funding is sought from the international partners, please see Sections VI.B and VIII.

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 one or more of the participating funding organizations, at the option of the funders, not the proposer. U.S. investigators will receive funding from the NSF, and international investigators from the appropriate participating foreign partners (see Section VIII). Subsequent grant administration procedures will be in accordance with the individual policies of the awarding agency. Further information will be provided to these proposers after selection.

Further information about agency processes and agency-specific award information is provided in Sections VI.B and VIII of this solicitation.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no limits.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may appear as PI, co-PI, or other Senior Personnel on no more than one Network proposal. The PI of a Network must be an investigator at a U.S. organization. Network proposals in excess of the limit for any person will be returned without review in the reverse order received. This limit applies to all PIs, co-PIs, or other Senior Personnel based inside or outside of the United States. Changes in investigator roles post-submission to meet the eligibility limits will not be allowed. See Section VI.B for eligibility criteria for investigators from international partner countries. **It is the responsibility of the submitters to confirm that the entire team meets the eligibility guidelines**.

Additional Eligibility Info:

Full proposals may be submitted by invitation only.

All proposals are expected to adhere to the eligibility requirements, submission procedures, funding limits, and grant durations for the agencies from which funding is sought. Specific requirements for participating international partners are listed in Sections VI.B. and VIII.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals *(required)*: Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

It is important that preliminary proposals conform to the instructions provided in this solicitation and the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). Conformance with all preparation and submission instructions is required. NSF may return without review proposals that are not

consistent with these instructions.

The following information supplements the PAPPG and the NSF Grants.gov Application Guide.

NeuroNex Preliminary Proposals (required):

1. NSF Cover Sheet. Titles for preliminary proposals should begin with "NeuroNex:". Identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet, and select "NeuroNex" from the FastLane organization unit pull-down list. Make sure to select the "Preliminary Proposal" checkbox. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Enter $2 in the Requested Amount box. Failure to submit this information may delay processing.
2. Project Summary. The Project Summary of a NeuroNex preliminary proposal needs to contain the following three components: (a) articulation of the foundational question under investigation, a rationale for establishing the Network, and the anticipated synergies between network elements; (b) a brief description of the proposed interdisciplinary research groups (IRGs), including their intellectual merit; and (c) a statement on the broader impacts of the proposed activities such as research, education/outreach, shared facilities and resources, and collaborations. Limit: 1 page.
3. Table of Contents. Will be generated automatically.
4. Project Description. Include ONLY the following titled sections (a. through f.) as below:
   a. **Participating Investigators**. A list of faculty rank and/or equivalent of the NeuroNex investigators that will receive support through this activity. Include for each investigator: full name; organizational, departmental, and national affiliation; and major role in the proposed Network (e.g., IRG 1, IRG 2, etc). All networks must include one or more investigators eligible for funding through one or more of the international partner agencies (see Section VIII for participating agencies). Failure to include international investigators will result in the proposal being returned without review. Limit: 1 page.
   b. **Introduction and Strategic Plan**. State the rationale, the significance, and the vision of the Network. Included in this section should be a clear articulation of the need for a synergistic, interdisciplinary collection of investigators to solve the central question. In separate paragraphs, identify the high-level research, neurotechnology development (if applicable), cyberinfrastructure resource and services development (if applicable), synergistic partnerships with existing neurotechnology developments, education, and broader impact activities of the Network. Limit: 2 pages.
   c. **Interdisciplinary Research Group Descriptions**. Each Network must contain a minimum of 2 interdisciplinary research groups (IRGs) and a maximum of 4 IRGs. For each IRG, provide a concise description of the research goals and intellectual focus of each IRG, its relationship to the overall Network goals, and an outline of the planned research activities. The need for an interactive, interdisciplinary team-science approach involving multiple investigators within the IRG, and the means of achieving this, should be articulated clearly. Limit for each IRG: 2 pages.
   d. **Broader Impacts**. Provide a brief description of the Network's education, human resource development, broadening participation, and science outreach activities, and their integration with the research goals of the Network. Also include a summary of the project's potential contributions to society. Limit: 1 page.
   e. **Network Coordination and Management Plan**. Provide a concise description of 1) the specific roles of the collaborating PIs, co-PIs, other Senior Personnel at all participating organizations; 2) the leadership and organizational structure of the Network; and 3) the coordination mechanisms that will enable cross-organizational and/or cross-discipline scientific integration. Limit: 1 page.
   f. **Data and Computing Resource Management Plan**. Provide a description of how data, software, code bases, stimuli, models, or other resources will be stored, accessed, and shared across the Network. As needed, the Data Management Plan should also address possible differences between U.S. and applicable non-U.S. data protection requirements. For projects involving use of shared data infrastructure, high-performance or cloud computing, or other such cyber- or e-infrastructure resources and services, also provide a description of how access to these resources and the associated research data will be effected for all network team members. Limit: 1 page.
5. References Cited. List only references cited in the Project Description. See the NSF PAPPG for format instructions. Noncompliance with NSF PAPPG guidelines may result in the preliminary proposal being returned without review.
6. Biographical Sketches. A biographical sketch is required for all senior personnel affiliated with U.S. organizations. No additional biographical sketches can be uploaded. The biographical sketches must conform to the NSF format as specified in the NSF PAPPG. Noncompliance with the NSF PAPPG will result in the preliminary proposal being returned without review. Limit: 2 pages for each biographical sketch.
7. Single Copy Documents. (1) Collaborators & Other Affiliations Information: Information regarding collaborators and other affiliations must be provided for all senior personnel affiliated with U.S. organizations in the proposal using the NSF COA template as specified in the PAPPG. **Note:** Collaborations involving junior authorship on multi-authored papers (>5 authors) may be limited to the senior author. Additional information and FAQs about using the COA template can be found on the Collaborators and Other Affiliations Information page. This information is used in the selection of reviewers to help identify potential conflicts of interest. (2) Institutional endorsement (UKRI-MRC components only): An institutional certification of the submission must be a signed letter from an authorized U.K. institutional representative with the following text: "I confirm on behalf of [*insert name of institution*] that the Network between [List PIs and organizations of all IRG PIs] is endorsed and has been submitted by [*name of Research Office*]."

Required Supplementary Documents:

Biographical sketches for all of the participating investigators affiliated with a foreign organization as listed in Section 4.a.

Requested Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function. Include their names, affiliations, phone numbers, e-mail addresses, and areas of expertise (or IRG#); make sure they do not also appear in the Collaborators & Other Affiliations Information (see Section 7 above).

No additional material is required or permitted with the preliminary proposal submission. Budget, Current and Pending Support, and Facilities, Equipment and Other Resources, Postdoctoral Mentoring plan, and a separate Data Management Plan sections are not required or permitted.

International investigators are requested to submit a copy of the entire preliminary proposal to the relevant agency (CIHR, DFG, FRQ, or UKRI-MRC) in accordance to their respective procedures.

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 Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG 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: (

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. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

NeuroNex Full Proposals may be submitted by invitation only. Invitations will be communicated by no later than September 2019 based on panel review and programmatic considerations.

The full proposal should not deviate substantially from the preliminary proposal in the scope of the project (including the number of IRGs) or the list of personnel without prior written approval from NSF NeuroNex program directors or representatives of international partner agencies referenced in Section VIII of this solicitation.

The following information supplements the NSF PAPPG and the NSF Grants.gov Application Guide.

1. NSF Cover Sheet. Titles for proposals should begin with "NeuroNex:". Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet, and to select "NeuroNex" from the FastLane organization unit pull-down list. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. Make sure that the button asking "If This Is A Preliminary Proposal ..." is UNCHECKED; also make sure to enter your preliminary proposal number in the box asking "Show Related Preliminary Proposal Number If Applicable."
2. Project Summary. The Project Summary of a NeuroNex proposal needs to contain the following three components: (a) articulation of the foundational question under investigation, a rationale for establishing the Network, and the anticipated synergies between network elements; (b) a brief description of the proposed interdisciplinary research groups (IRGs), including their intellectual merit; and (c) a statement on the broader impacts of the proposed activities such as research, education/outreach, shared facilities and resources, and collaborations. Limit: 1 page.
3. Table of Contents. Generated automatically by the system.
4. Project Description. Include ONLY the following titled sections (a. through f.) as below:
   a. **Participating Investigators**. A list of faculty rank and/or equivalent of the NeuroNex investigators that will receive support through this activity. Include for each investigator: full name, organizational, departmental, and national affiliation, and major role in the proposed Network (e.g., IRG 1, IRG 2, etc). All networks must include one or more investigators eligible for funding through one or more of the international partner agencies (see Section VIII for participating agencies). Failure to include international investigators will result in the proposal being returned without review. Limit: 1 page.
   b. **Introduction and Strategic Plan**. State the foundational question to be addressed by the Network, its significance and implications for understanding the brain, and the potential societal impacts stemming from such understanding. Provide a description of the proposed Network, its organizational setting, and its scientific scope. Briefly describe the need for a synergistic, interdisciplinary collection of investigators to solve the central question. Outline the strategic plan by which the Network will achieve the proposed goals, including activities in research, neurotechnology development (if applicable), cyberinfrastructure resource and services development (if applicable), and research training. Articulate efforts to leverage prior and ongoing investments in neurotechnologies by the NSF (including NeuroNex Neurotechnology Hubs), other US Federal agencies, and international partners. Also include the process and metrics used to monitor progress, and the mechanisms of assessment. Limit: 4 pages.
   c. **Interdisciplinary Research Group Descriptions**. A description of each interdisciplinary research group (IRG). Provide a description of the research goals and intellectual focus of each IRG, its relationship to the overall Network goals, and the planned research activities. IRGs should aim to expand the development and use of theoretical frameworks and analytical approaches to guide their experimental efforts. Research activities of IRGs may include the development of neurotechnologies and, to a limited degree, the development of cyberinfrastructure resources and services (e.g. data infrastructure, software infrastructure, means of accessing and utilizing shared computing resources) if such development is demonstrated to be essential to achieve the goals of the IRG or Network and not duplicative of existing resources and services. The development of neurotechnologies and/or cyberinfrastructure resources must be integrated tightly with the research activities of the IRG to attain its scientific objectives. The description of the proposed activities has to be in sufficient detail to allow a thorough assessment of the independent scientific merit and the significance. The need for a team-science approach involving multiple investigators, and the means of achieving this, should be articulated clearly as well. Place the IRG in the context of the Network as a whole, describing clearly the contribution of the IRG research activities to achieving the overall goal of the Network. Also describe interactions with other IRGs, and, if applicable, with NeuroNex research teams and similar groups and organizations. At the beginning of each IRG section in the proposal, name the IRG investigators that will contribute to this IRG. Limit for each IRG: 12 pages.
   d. **Broader Impacts**. Provide a detailed description of the Network's education, training and human resource development, broadening participation, and science outreach activities, and their integration with the research goals of the Network. Also include a description of the project's potential contributions to society. Limit: 3 pages.
   e. **Network Coordination and Management Plan**. Provide a comprehensive description of: 1) the specific roles of the collaborating PIs, co-PIs, other Senior Personnel at all participating organizations; 2) the leadership structure of the Network; 3) how experimental design, data collection and analysis, training, and personnel decisions will be managed across participating organizations to ensure shared workflow practices across the Network; 3) the mechanisms by which research resources will be shared across the Network; 4) the coordination mechanisms that will enable cross-organizational and/or cross-discipline scientific integration; and 5) strategies for assessing and mitigating scientific, technical, and management risks. Limit: 4 pages.
   f. **Data and Computing Resource Management Plan**. Provide a description of how data, software, code bases, stimuli, models, or other resources will be stored, accessed, and shared across the Network. Comment on the relationship to similar data or research resources and to relevant standards and practices in the field. Include a description of the efforts to enhance data sharing and standardization, "best practices," and policies to conduct research in an "open science" fashion that enables broad access to research outcomes. As needed, address possible differences between U.S. and applicable non-U.S. data protection requirements. For projects involving use of shared data infrastructure, high-performance or cloud computing, or other such cyber- or e-infrastructure resources and services, also provide a description of how access to these resources and the associated research data will be effected for all network team members. Limit: 4 pages.
5. References Cited. List only references cited in the Project Description. See the NSF PAPPG for format instructions. Noncompliance with NSF PAPPG guidelines may result in the proposal being returned without review.
6. Biographical Sketches. A biographical sketch is required for all senior personnel affiliated with U.S. organizations. No additional biographical sketches can be uploaded. The biographical sketches must conform to the NSF format as specified in the NSF PAPPG. Noncompliance with the NSF PAPPG will result in the proposal being returned without review. Limit: 2 pages for each biographical sketch.
7. Budget pages and budget justification (U.S. components only). Complete budget pages for each year of support (1 to 5). A five-year cumulative budget will be automatically generated. The budget must include funds to cover the cost of attendance at an annual PI meeting for each funded year. Provide a five-year summary budget justification. Provide separate budget pages for the lead organization and for each organization

receiving a subaward. Provide a separate budget justification, up to three pages, for each subaward. Do not list personnel with zero support on the budget page; FastLane will not allow proposal submission with personnel listed with zero support. See the NSF PAPPG for further instructions. The NSF budget pages (in US Dollars) should not include any of the costs of project components that are to be funded by the international partner agencies. Budgets for these components (in the currencies used by the respective partner agencies) must be prepared according to instructions of the partner agencies (see Sections VI.B and VIII of this solicitation) and included as a supplementary document in the NSF proposal.

8. Current and Pending Support (U.S. components only). List current and pending support only for senior personnel affiliated with U.S. organizations.
9. Facilities, Equipment and Other Resources (U.S. components only). Provide a brief description of the relevant facilities, equipment, and other resources only for senior personnel affiliated with U.S. organizations.
10. Single Copy Documents. (1) Collaborators & Other Affiliations Information: Information regarding collaborators and other affiliations must be provided for all senior personnel affiliated with U.S. organizations in the proposal using the NSF COA template as specified in the PAPPG. **Note:** Collaborations involving junior authorship on multi-authored papers (>5 authors) may be limited to the senior author. Additional information and FAQ about using the COA template can be found on the Collaborators and Other Affiliations Information page. This information is used in the selection of reviewers to help identify potential conflicts of interest. (2) Invitation to submit full proposal: Email invitation from the NSF to submit a full proposal. (3) Institutional endorsement (UKRI-MRC components only): An institutional certification of the submission must be a signed letter from an authorized U.K. institutional representative with the following text: "I confirm on behalf of [*insert name of institution*] that the Network between [List PIs and institutions of all IRG PIs] is endorsed and has been submitted by [*name of Research Office*]."

Required Supplementary Documents:

Biographical sketches for all of the participating investigators affiliated with a foreign organization as listed in Section 4.a.

Postdoctoral Researcher Mentoring Plan (U.S. components only), if applicable, in accordance with PAPPG Chapter II.C.2.j.

Data Management Plan (U.S. components only). Upload a document or insert text that states "See Project Description."

Letters of Collaboration: Letters of collaboration, limited to stating the intent to collaborate and not containing endorsements or evaluation of the proposed project, are permitted. Letters of support should not be submitted, as they are not a standard component of an NSF proposal.

Letters of collaboration should follow the format specified in the NSF PAPPG (Chapter II.C.2.j.). Departure from this format may result in the proposal being returned without review. The Project Description should document the need for and nature of collaborations, such as intellectual contributions to the project, permission to access a site, an instrument, or a facility, offer of samples and materials for research, logistical support to the research and education program, or mentoring of U.S. students at a foreign site.

Scan your signed letters and upload into the Supplementary Documents section of FastLane, but do not send originals. For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form. Only one letter per page. Limit: 5 pages.

In addition to the above, proposals must refer to special instructions from the appropriate partner agency(ies), referenced in Section VIII of this solicitation.

Supplementary documents pursuant to Human Subjects Protection and Vertebrate Animal Welfare for components of the Network conducted at a foreign participating institution must follow guidelines specified by the respective partner agencies (see Section VIII).

Requested Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function of FastLane. Include the following 9 columns: last name, first name, middle initial, institution, department, phone number, e-mail address, expertise, IRG(s). Make sure that the suggested reviewers do **not** also appear in the collaborators list. PIs may also include a short list of reviewers not to include.

No additional material is required or permitted with the full proposal submission, unless specified in the special instructions from the appropriate partner agencies, referenced in Section VIII of this solicitation.

International investigators are requested to submit a copy of the entire full proposal to the relevant agency (CIHR, DFG, FRQ, or UKRI-MRC) in accordance to their respective procedures.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposal Due Date(s)** *(required)* (due by 5 p.m. submitter's local time):

    June 14, 2019

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

    December 13, 2019

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html.

For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. 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.

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: https://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical 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.

Proposers that submitted via FastLane or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

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 PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.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 *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. 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 strategic objectives 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 must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of 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. (PAPPG 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 PAPPG 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
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. 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

In addition to the National Science Board merit review criteria, NeuroNex proposals have additional review criteria. Given competing proposals of essentially equal merit, NSF and partner agency staff will be responsible for ensuring that the overall activity reflects an appropriate balance among research topics, agency priorities, and among networks of differing size and complexity. Preliminary proposals will be evaluated in terms of their potential to meet the criteria for full proposals.

Proposals will be evaluated in terms of the individual IRGs and the Network as a whole using the following additional criteria:

A. **The Network as a Whole:**
    i. Does the Network address a foundational question in neuroscience that requires convergence, i.e., the merging of ideas, approaches, and technologies from widely diverse fields of knowledge to stimulate discovery and innovation?
    ii. Does the proposal articulate a collaborative, well-integrated research program that includes the development and use of theoretical frameworks and analytical approaches to guide the experimental efforts, is distinguished by intellectual excellence, and is driven by a clear vision leading to fundamental advances, new discoveries, and new technological developments?
    iii. Does the Network leverage prior investments in neurotechnologies and cyberinfrastructure resources made as part of the BRAIN Initiative and relevant international programs?
    iv. Is the requirement for network support and the leadership structure for its management laid out, are the proposed integrative activities and management mechanisms in the Network Coordination and Management Plan compelling, is their implementation plan sound, and are the proposed assessment and risk management strategies adequate?
    v. Is the Data and Computing Resource Management Plan sound, and does it address the relationship to similar data or research resources and relevant standards and practices in the field?
B. **Individual Interdisciplinary Research Groups:**
    i. Are the scientific goals of the IRG well integrated with the overall goals of the Network?
    ii. Does the IRG address key aspects of the overall question examined by the Network, and are these aspects non-overlapping with the efforts of other IRGs?
    iii. Are the capabilities of the investigators appropriate?
    iv. Are the proposed approaches technically sound and feasible?
    v. If applicable, is the development of the proposed novel neurotechnologies or other research resources well justified for the success of the IRG or Network and not duplicative of existing such resources?
    vi. If applicable, is the development of the proposed cyberinfrastructure and/or analytic software development well justified for the success of the IRG or Network and not duplicative of existing such resources?
    vii. (Full proposals only) Are the available resources, including instrumentation and facilities, adequate?
    viii. Are the benefits of a multi-investigator, interdisciplinary approach clearly laid out?
    ix. Is cooperation and interdependence of the investigators within the IRG apparent?

B. Review and Selection Process

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

NSF will coordinate and manage the review of preliminary and full proposals jointly with participating domestic and foreign funding organizations, through a joint panel review process used by all participating funders. Program Officers from all participating agencies will be involved in selecting panelists and *ad hoc* reviewers, as needed, operating a joint panel and, following joint discussion of overall merit, settling on recommendations to their respective leadership. Relevant information about proposals and reviews of proposals will be shared between the participating organizations as appropriate. Further information on the processes and requirements of participating funding organizations is detailed in this Section and in Section VIII of this solicitation.

Preliminary and full proposals will be reviewed by topical panels. Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and additional program specific criteria as specified. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. Program Officers from all participating agencies will jointly consider the advice of reviewers and will formulate a recommendation for each proposal. If a full proposal is recommended for funding, the U.S. component(s) will be supported by the NSF, the Canadian component(s) by the CIHR or FRQ, as applicable, the German component(s) by the DFG, and the UK component(s) by UKRI-MRC. NSF, CIHR, DFG, FRQ, and UKRI representatives will review budgets to ensure that there are no duplications in funding.

NSF:

Preliminary proposals deemed meritorious after scientific, technical and programmatic review and aligned with program priorities will be recommended for invitation to full proposal in accordance with standard NSF procedures. The NSF Program Officer recommends to the cognizant Division Director whether the preliminary proposal should be invited or not invited.

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 invite or not invite.

Full proposals deemed meritorious after scientific, technical and programmatic review and aligned with program priorities will be recommended for funding in accordance with standard NSF procedures. 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 of the full proposal. 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, full 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, 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.

CIHR:

Any CIHR component of IRGs must be deemed eligible and relevant by CIHR. CIHR staff will perform relevance review on preliminary proposals. Canadian applicants invited to the full proposal stage and applying for CIHR funding must complete an abbreviated CIHR application (in either of Canada's official languages) and submit it using the ResearchNet portal (please see the CIHR website for more information). The deadline for submission of this application is the same as the Full Application deadline to NSF. The purpose of this additional application to CIHR is to provide CIHR with an Operating Budget for the project, with the amounts quoted in Canadian dollars, a complete justification for funds requested, a one-page research summary, and a copy of the project description submitted to NSF.

Once the review process managed by NSF is completed, CIHR will use the recommendation to make funding scenarios within the available funding envelop. Funding decisions will follow the standard approval process for all CIHR programs.

Total expected funding from CIHR for Canadian components will be a maximum of Can$2.5M (CIHR and FRQ will coordinate their funding for Québec components).

DFG:

Eligibility

Applicants to be funded by the DFG are requested to fulfil the eligibility requirements of DFG Research Grants, see the corresponding guidelines of the Research Grants Programme (DFG form 50.01). This includes the duty to cooperate ("Kooperationspflicht") within Germany for members of non-university institutions with permanent positions.

Project scale and duration

Awards will not exceed, on the US side, USD 100.000-250.000 in direct costs per investigator per year. Project funding does not need to be symmetrical in the sense that neither the sums requested nor the items requested have to be identical on the different international sides. However, the DFG would expect a reasonably equal distribution of the work packages between the different parties.

Proposals in response to this call fall into the DFG funding scheme "Sachbeihilfe / Research Grants". The NeuroNex project duration is intended to be five years. Technically, DFG funded NeuroNex project shares will receive an initial 3-year funding period in conjunction with the possibility of another 2 years of DFG funding upon positive evaluation of a renewal proposal.

Proposal submission

In parallel to submitting to the NSF, German applicants are requested to submit a copy of the proposal to the DFG via elan, the DFG's electronic proposal processing system (https://elan.dfg.de/en), following the DFG's guidelines. When submitting the proposal via elan, one has to select "NSF-UKRI-FRQ-DFG 2019 NeuroNex" from the list of calls. If applicants are using the elan system for the first time, they need to register themselves and their institutional address before being able to submit a proposal. Further, applicants who are planning to move to a different institution within Germany (e.g., with a temporary position for principal investigators) need to register the new institutional address beforehand. All German applicants of the project (in case there is more than one) must start their registration not later than two weeks before the submission deadline.

Additional required information for full proposals submitted to DFG:

For proposals that include experiments involving humans or human materials, an ethics committee vote is mandatory. The use of human material obtained for diagnostic purposes also requires a statement by the chair of the local ethics committee. For proposals that include animal experiments, please explain in a separate document how the principle of the 3Rs (replacement, reduction, and refinement) will be implemented. For the analysis and reporting of results, the DFG expects you to comply with established international standards, such as the ARRIVE guidelines (http://www.nc3rs.org.uk/arrive-guidelines). Further, we need discrete descriptions of proposed investigations involving dual use research of concern.

Review Process

Preliminary and full proposals will be reviewed by topical panels as outlined in section VI-B. The DFG review board 206 "Neuroscience" will be adequately involved in the evaluation process. The recommendations of the review panel will be the basis for the final funding decision made by the DFG joint committee ("Hauptausschuss"). Funding by the DFG can only be granted for an initial three-year funding period. One renewal for another two years of DFG-funding is possible upon positive evaluation of a renewal proposal. The renewal proposal for the German project shares should be submitted to the DFG six months before the end of the first funding period at the latest. The renewal proposal will be reviewed according to the DFG standard review process as outlined here:http://www.dfg.de/en/research_funding/proposal_review_decision/quo_vadis_proposal/index.html.

The final funding decision about the renewal proposal will be made by the DFG Joint Committee ("Hauptausschuss").

FRQ:

The FRQ process is similar to the one followed by the NSF. After review, Programs, after discussion with the two relevant Scientific Directors (FRQNT & FRQS) will submit their recommendations to the Boards. After approval by the respective Boards, applicants will be informed by Programs and, if relevant, put in contact with an officer of our joint finance department for administrative details and follow-ups.

Québec's applicants and their institutions must have signed the FRQ responsible conduct of research document in order to be eligible to receive funding. More details can be provided on request.

Total expected funding from FRQ for Québec components will be a maximum of Can$2.5M (CIHR and FRQ will coordinate their funding for Québec components).

UKRI-MRC:

Eligibility

Any UK IRGs or UK components of international IRGs must fit within UKRI-MRC's remit and adhere to UKRI-MRC standards. UK investigators must contact the relevant MRC contact to confirm that the UK component fits UKRI-MRC's requirements. UK investigators must meet UKRI-MRC eligibility requirements for MRC research board calls and must apply through an institution eligible to receive UKRI-MRC's funding. Please see UKRI-MRC funding rules: https://mrc.ukri.org/funding/guidance-for-applicants. IRGs with non-eligible UK partners will not be considered for funding.

Studentships

UK studentships are not eligible for funding through this call and must not be included. However, UK IRGs or UK components of international IRGs can request travel funds for existing students to travel to international labs within the Network for training opportunities.

Review process

Preliminary and full proposals will be reviewed by topical panels as outlined in Section VI.B.

Project duration

UK IRGs or UK components of international IRGs are eligible for support for 3-year funding awards from UKRI-MRC.

Post decision

If the UKRI-MRC selects an IRG or a component of an international IRG for funding, the applicant will be required to submit the costs for the UK elements of the proposal via the Je-S application submission system before final sign-off. UK collaborators should therefore ensure they are registered Je-S users before the proposal is submitted. Subsequent grant administration procedures will be in accordance with UKRI-MRC policy.

Total expected funding from MRC for UK components will be a maximum of £6M.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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. After an administrative review has occurred, Grants and Agreements Officers perform 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, 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.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, 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 notice; (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 notice. 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 https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 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 *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Award Conditions:

Attribution of support in publications must acknowledge the NeuroNex program, as well as the funding organization and award number, by including a phrase such as, "as part of the NSF/CIHR/DFG/FRQ/UKRI-MRC Next Generation Networks for Neuroscience Program."

Awardees agree to participate in annual PI meetings composed of other NeuroNex awardees and NSF staff. Awardees will share resources and data, and implement any other common guidelines and procedures consistent with policies to be developed collectively by NeuroNex awardees.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

It is expected that NSF-funded awards will follow program-specific requirements for reporting, and will report on research and integration activities. Site visits may be conducted in the third year of the award. Continued support will be contingent on successful review and availability of funds.

Projects with UK component(s): UKRI-MRC Awardees are subject to UKRI-MRC reporting and administration requirements as appropriate and outlined in MRC Guidance for Award Holders https://mrc.ukri.org/funding/guidance-for-mrc-award-holders.

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:

- Edda (Floh) Thiels, telephone: (703) 292-8167, email: ethiels@nsf.gov

- Sridhar Raghavachari, telephone: (703) 292-4845, email: sraghava@nsf.gov

- Reed S. Beaman, telephone: (703) 292-7163, email: rsbeaman@nsf.gov

- Claire A. Hemingway, telephone: (703) 292-7135, email: chemingw@nsf.gov

- Krastan B. Blagoev, telephone: (703) 292-4666, email: kblagoev@nsf.gov

- William L. Miller, telephone: (703) 292-7886, email: wlmiller@nsf.gov

- Shubhra Gangopadhyay, telephone: (703) 292-2485, email: sgangopa@nsf.gov

- Gregg Solomon, telephone: (703) 292-8333, email: gesolomo@nsf.gov

- Kurt Thoroughman, telephone: (703) 292-7281, email: kthoroug@nsf.gov

- Junping Wang, telephone: (703) 292-4488, email: jwang@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188

  FastLane Help Desk e-mail: fastlane@nsf.gov.

  Research.gov Help Desk e-mail: rgov@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:

Canadian Institutes for Health Research

For general inquiries, please contact:

- Melody Sajedi, Advisor, Program Design and Delivery, telephone: 613-960-9475, email: melody.sajedi@cihr-irsc.gc.ca

Deutsche Forschungsgemeinschaft

Point of contact:

- Dr. Anna Christa, telephone: +49 228 885 2632, email: anna.christa@dfg.de

Fonds de Recherche du Québec

For general inquiries and additional information about this program and the FRQ, please contact:

- Sylvain Charbonneau, Program Director, telephone: 514-873-0321, email: sylvain.charbonneau@frq.gouv.qc.ca
- Richard Brière, Senior Analyst, telephone: 514-873-0321, email: richard.briere@frq.gouv.qc.ca

Medical Research Council (part of UK Research and Innovation)

For general inquiries and additional information about this program and the UKRI-MRC, please contact:

- Charlotte Inchley, Programme Manager – Neurosciences and Mental Health, UKRI-MRC, telephone: +44 (0)1793 41 6305, email: charlotte.inchley@mrc.ukri.org

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, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

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

ABOUT THE CANADIAN INSTITUTES OF HEALTH RESEARCH

At the Canadian Institutes of Health Research (CIHR), we know that research has the power to change lives. As Canada's health research investment agency, we collaborate with partners and researchers to support the discoveries and innovations that improve our health and strengthen our health care system.

ABOUT THE GERMAN RESEARCH FOUNDATION

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is the central, independent research funding organisation in Germany. It serves all branches of science and the humanities by funding research projects at universities and other research institutions.

The DFG promotes excellence by selecting the best research projects on a competitive basis and facilitating national and international collaboration among researchers. Its mandate also includes encouraging the advancement and training of early career researchers, promoting gender equality in the German scientific and academic communities, providing scientific policy advice, and fostering relations between the research community and society and the private sector.

The DFG is an association under private law. Its member organisations include research universities, non-university research institutions, such as the Max Planck Society, Fraunhofer, the Helmholtz Association and the Leibniz Association, the academies of sciences and humanities, and a number of scientific associations. The DFG has a current annual budget of €3.2 billion, provided primarily by the German federal government (68 percent) and the states (31 percent), but also including EU funds and private donations.

Further information is available on www.dfg.de/en/.

ABOUT THE RESEARCH FOUNDATION OF QUÉBEC

The FRQ web sites provide comprehensive information on the various programs of the three funds covering the health sector (FRQS),

science and engineering (FRQNT) and social sciences and humanities (FRQSC). The majority of our programs aim to support trainees, infrastructure and collaborative networks and institutes. Recently, we developed innovative programs aiming to foster intersectoral research programs ('Audace' is one example) on major challenges of our societies such as demographic changes, sustainable development, climate changes and artificial intelligence. International collaborations and partnerships are seen as essential to increase the global impacts of Quebec-based research teams. The FRQNT and the FRQS are partnering to support the NeuroNex program.

ABOUT THE MEDICAL RESEARCH COUNCIL (PART OF UK RESEARCH AND INNOVATION)

UK Research and Innovation is a new body which works in partnership with universities, research organisations, businesses, charities, and government to create the best possible environment for research and innovation to flourish. We aim to maximise the contribution of each of our component parts, working individually and collectively. We work with our many partners to benefit everyone through knowledge, talent and ideas. Operating across the whole of the UK with a combined budget of more than £6 billion, UK Research and Innovation brings together the seven Research Councils, Innovate UK and a new organisation, Research England.

The Medical Research Council is at the forefront of scientific discovery to improve human health. Founded in 1913 to tackle tuberculosis, the MRC now invests taxpayers' money in some of the best medical research in the world across every area of health. Thirty-three MRC-funded researchers have won Nobel prizes in a wide range of disciplines, and MRC scientists have been behind such diverse discoveries as vitamins, the structure of DNA and the link between smoking and cancer, as well as achievements such as pioneering the use of randomised controlled trials, the invention of MRI scanning, and the development of a group of antibodies used in the making of some of the most successful drugs ever developed. Today, MRC-funded scientists tackle some of the greatest health problems facing humanity in the 21st century, from the rising tide of chronic diseases associated with ageing to the threats posed by rapidly mutating micro-organisms. The Medical Research Council is part of UK Research and Innovation. https://mrc.ukri.org/.

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 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

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

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

> The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.
>
> To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at https://www.nsf.gov

•	**Location:**	2415 Eisenhower Avenue, Alexandria, VA 22314
•	**For General Information** (NSF Information Center)**:**	(703) 292-5111
•	**TDD (for the hearing-impaired):**	(703) 292-5090
•	**To Order Publications or Forms:**	
	Send an e-mail to:	nsfpubs@nsf.gov
	or telephone:	(703) 292-7827
•	**To Locate NSF Employees:**	(703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See System of Record Notices, NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314

| Policies and Important Links | | Privacy | | FOIA | | Help | | Contact NSF | | Contact Web Master | | SiteMap |

National Science Foundation, 2415 Eisenhower Avenue, Alexandria, Virginia 22314, USA
Tel: (703) 292-5111, FIRS: (800) 877-8339 | TDD: (703) 292-5090 or (800) 281-8749

Text Only