

NSF Innovation Corps Hubs Program (I-Corps™ Hubs)

PROGRAM SOLICITATION

NSF 20-529

**REPLACES DOCUMENT(S):
NSF 17-533, NSF 16-547**



National Science Foundation

Directorate for Biological Sciences

Directorate for Computer and Information Science and Engineering
Division of Computer and Network Systems

Directorate for Education and Human Resources

Directorate for Engineering
Industrial Innovation and Partnerships

Directorate for Geosciences

Directorate for Mathematical and Physical Sciences

Directorate for Social, Behavioral and Economic Sciences

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

August 13, 2020

August 25, 2021

April 07, 2022

First Thursday in April, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

- **The I-Corps Hubs program has placed greater emphasis on expansion and development of the National Innovation Network through a new funding model.** An I-Corps Hub consists of a Principal, at least two Partners, and at least five Affiliates. The Partners and Affiliates will be funded as subawards on Hub awards to the Principal. Memoranda of Understanding with Partners and Affiliates must be included in proposals.
- **The I-Corps Hubs program has strengthened the requirement to support a diverse and inclusive community of innovators.** Teams are encouraged to recruit diverse members at all levels, from I-Corps leadership to team composition. Hubs are required to submit a Diversity and Inclusion plan.
- **The I-Corps Hubs program has new pathways for teams to qualify for participation in the national I-Corps Teams program.** I-Corps Hubs serve as a translational channel for deep technologies (technologies based on discoveries in fundamental science and engineering) offering the greatest opportunity for industrial and societal transformation. That channel now incorporates a direct funding pathway for Teams who have not identified Industry Mentors to participate in the national I-Corps Teams program. Supporting teams through this pathway will be included in the proposal through participant support costs.
- **The I-Corps Hubs program has strengthened the requirement for tracking, and assessment into program outcomes to meet the needs of the American Innovation and Competitiveness Act (AICA). Tracking and assessment of regional teams conducted by the Hubs will be incorporated into the NSF reporting requirements under the AICA.**
- **The proposal preparation instructions have been revised.** Proposers are allowed up to 20 pages for their Project Descriptions.
- **The solicitation-specific review criteria have been updated to reflect the new I-Corps emphases.**

Informational webinar: One or more webinars will be held within approximately 30 days of the release of the solicitation, which will discuss key aspects and expectations of the Program, as revised. At NSF's discretion, a recorded version of the webinar may be posted (https://www.nsf.gov/news/special_reports/i-corps/webinars.jsp) afterward. Questions may be submitted in advance of the webinar to the cognizant Program Officer(s).

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 20-1), which is effective for proposals submitted, or due, on or after February 25, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Innovation Corps Hubs Program (I-Corps™ Hubs)
Note: Trademark hereafter asserted and referred to as I-Corps.

Synopsis of Program:

The National Science Foundation (NSF) seeks to further develop and nurture a national innovation ecosystem that guides the output of scientific discoveries closer to the development of technologies, products, and services that benefit society. The goal of the NSF Innovation Corps (I-Corps) Program, created in 2011 by NSF, has been and will continue to be to reduce the time and risk associated with translating promising ideas and technologies from the laboratory to the marketplace. The I-Corps Program utilizes experiential learning of customer and industry discovery, coupled with first-hand investigation of industrial processes, to quickly assess the translational potential of inventions. The I-Corps Program is designed to support the commercialization of so-called "deep technologies," or those revolving around fundamental discoveries in science and engineering. The I-Corps program addresses the skill and knowledge gap associated with the transformation of basic research into deep technology ventures (DTVs).

In the program's initial phase, I-Corps Nodes and Sites were funded separately to serve as the backbone of the National Innovation Network (NIN). Previous solicitations for NSF I-Corps Nodes and NSF I-Corps Sites have now been archived. This new solicitation for I-Corps Hubs has been informed by feedback received from the community and lessons learned over the first eight years of the program.

In 2017, the American Innovation and Competitiveness Act (AICA, Public Law 114-329, Sec. 601) formally authorized and directed the expansion of the NSF I-Corps Program. Through this solicitation, NSF seeks to evolve the current structure, in which NSF I-Corps Teams, Nodes, and Sites are funded through separate programs, toward a more integrated operational model capable of sustained operation at the scope and scale required to support the expansion of the NSF I-Corps Program as directed by AICA. In this more integrated model, I-Corps Hubs, comprising a Principal and at least two Partner institutions, form the backbone of the NIN, and each Hub has at least five Affiliates that extend the network to other institutions. Each Hub is funded through a single award. Throughout this solicitation, the term "Hub" refers to all associated organizations identified in a proposal responding to this solicitation, including the Principal, Partners, and Affiliates.

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.

- Ruth Shuman, telephone: (703) 292-2160, email: rshuman@nsf.gov
- Rebecca Shearman, telephone: (703) 292-74035, email: rshearman@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 5

Up to five (5) I-Corps Hubs

Anticipated Funding Amount: \$15,000,000

Annually for Hubs in FY 2020. NSF I-Corps Hub awardees will be supported at a level of up to \$3,000,000 per year for up to five years. All funds are awarded to the Principal institution; Partner and Affiliate members receive funding as subawardees.

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

PLEASE NOTE: NSF I-Corps Hub proposals must be submitted by a single Principal institution, with Partners and Affiliates listed as subawardees in the budget. ***Separately submitted collaborative proposals submitted in response to this solicitation will be returned without review.***

Eligibility Information**Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses

of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

- Multi-institution NSF I-Corps Hub proposals are submitted by a single Principal institution, with Partners and Affiliates listed as subawardees in the budget. These eligibility requirements apply to the Principal, Partners and Affiliates of the Hub.

Who May Serve as PI:

The PI must be at the Principal (defined in Section II: Program Description) institution and must be in a senior academic administrative role at the level of Dean or higher.

Each Partner (defined in Section II: Program Description) institution must identify a senior academic administrator at the level of Dean or higher to be included as Senior Personnel.

Limit on Number of Proposals per Organization: 1

Organizations may only be a participant (Principal, Partner or Affiliate) in one proposal per deadline.

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

An Individual may be PI, co-PI, or Senior Personnel of only one NSF I-Corps Hub proposal per deadline.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **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

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):
 - August 13, 2020
 - August 25, 2021
 - April 07, 2022
 - First Thursday in April, Annually Thereafter

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.

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I. INTRODUCTION

America's prosperity has originated in part from the ability to capitalize on groundbreaking discoveries from science and engineering research. Simultaneously, a knowledgeable, creative workforce has maintained the country's global leadership in critical areas of technology. These important discoveries and capable workforce resulted from substantial, sustained investment in science and engineering. A strong capacity for translating fundamental scientific discoveries into powerful engines of innovation is essential to maintain our nation's competitive edge in the future.

The National Science Foundation (NSF) supports fundamental research and education in science and engineering. NSF's role results in new knowledge and tools as well as a capable, innovative workforce. These complementary building blocks of innovation have led to revolutionary technological advances and wholly new industries.

NSF seeks to further develop and nurture a national innovation ecosystem built upon fundamental research that guides the output of scientific and engineering discoveries closer to the development of technologies, products, and services that benefit society. The goal of the NSF Innovation Corps (I-Corps) Program is to use experiential education to help entrepreneurial researchers reduce the time necessary to translate a promising idea from the laboratory bench to widespread implementation. In addition to accelerating technology translation, NSF seeks to reduce the risk associated with technology development conducted without insight into industry requirements and challenges.

Through this solicitation, NSF seeks to create the structure required to support the expansion of the NSF I-Corps Program throughout the community of NSF-funded researchers, local and regional entrepreneurial communities, and other federal agencies. The resulting National Innovation Network (NIN) will work collaboratively to create and sustain a national innovation ecosystem. The NIN is expected to be diverse and inclusive in all aspects, including research areas, personnel, institutions, tools, programs, capabilities, and geographic locations – providing the network with the flexibility to grow or reconfigure as needs arise. NSF I-Corps Hubs, as envisioned in this solicitation, will form the backbone of the NIN to enhance the nation's ability to:

- identify, develop and support promising ideas that can generate value;
- create and implement tools, resources and training activities that enhance our nation's innovation capacity;
- gather, analyze, evaluate and utilize the data and insight resulting from the experiences of those participating in local, regional, and national programs;
- provide opportunities to diverse communities of innovators; and
- share and leverage effective innovation practices on a national scale to improve the quality of life for the U.S. citizenry.

II. PROGRAM DESCRIPTION

Vision of the I-Corps Program

The I-Corps Program serves the nation by enabling the transformation of invention to impact, based on an approach of integrating scientific inquiry and industrial discovery in an inclusive, data-driven culture driven by rigor, relevance, and evidence. The I-Corps program is implemented in the research community by the Hubs, characterized by institutions actively pursuing the following strategic goals:

1. **Technology Translation.** Hubs operate in environments where the advancement of technologies toward societal impact is strategic, not opportunistic; and where it is valued throughout the institution. Hubs are well integrated into the academic operation of an institution of higher education and represent world-class leadership in innovation. Hubs articulate plans for strong partnerships with the entire NSF community and seek opportunities to translate fundamental research into societal benefit.
2. **Collaboration and Inclusion.** Hubs are collaborative environments crossing institutional and geographic boundaries (as defined by each Hub) to significantly impact the nation. Importantly, Hubs model a culture in which all members feel valued and welcomed, creatively contribute, and gain mutual benefit from participating. Because of the Hubs' emphasis on diversity and a culture of inclusion, participation by members of groups traditionally underrepresented in deep technology, as well as diverse scientific and other perspectives, is required.
3. **Entrepreneurial Workforce Development.** Hubs offer multiple pathways toward innovation education and training at all levels. Hubs seek to reach the entire national scientific and engineering community, creating new pathways through professional societies, nonprofit incubators, and other stakeholders in the national ecosystem.
4. **Impact and Improvement.** Hubs are geared toward results and take appropriate risks to generate large positive impacts. Hubs track activity in service of broader goals, link metrics to the program's strategic objectives, and take action to improve their activities based on data and assessment. Hubs manage beyond activities toward outcomes.

Objectives of the Hubs

I-Corps Hubs will serve as regional centers of excellence in achieving these four strategic goals through the following objectives:

1. Train scientists and engineers to investigate the industrial marketplace using the principles of the scientific method.
2. Enable institutions throughout the nation to incorporate structured entrepreneurial training and support processes in their infrastructure and offerings in a diverse and inclusive culture.
3. Form and invite teams to participate in entrepreneurial training and community building.
4. Revise and improve operations continuously in a culture of thoughtful experimentation, rapid feedback, and rigorous analysis, providing value to the nation.

Components of a Hub

To implement the I-Corps vision, Institutions of Higher Education (IHEs, as defined in Section IV) collaborate to deliver a standardized curriculum at varying levels of engagement as members of the scientific community (students, postdocs, and faculty) begin the discovery to market exploration process. These collaborating universities participate in **Hubs**, consortia spanning distinct geographic regions to facilitate interactions with entrepreneurial stakeholders (mentors, advisors, investors, and others) in a localized ecosystem. The Hubs, in turn, form the NIN, a tightly connected, highly functional network spanning the nation. The Hubs are intended to be flexible, with the capability for institutions to evolve in their roles. Hubs have three types of members:

NSF I-Corps Hub Principal ("Principal"): The Hub Principal, a U.S.-based IHE (see Eligibility **information in Section IV**), effectively guides the multiple elements of the Hub. The Hub headquarters are located at the Principal; the Principal is the NSF awardee and is responsible for the financial and reporting obligations of the Hub award. The Principal serves as a source for Teams and is the primary source for instructors and mentors for the Hub. To qualify as a Principal, a minimum of two faculty members from the Principal must participate in the Hub, one of whom must be in a senior academic administrative role **at the level of Dean or higher** and be listed as PI on the Hub proposal. The second faculty member plays a key role in connecting faculty members to the I-Corps community, serving as a Principal Faculty Lead.

NSF I-Corps Hub Partner ("Partner"): In addition to the Principal, each Hub has at least two Partners, which must be U.S.-based IHEs (see Eligibility). Partners serve as sources for Teams, instructors, and mentors for Hubs. To qualify as a Partner, a minimum of two faculty members from the Partner institution must participate in the Hub, one of whom must be in a senior **academic administrator at the level of Dean or higher** and be listed as Senior Personnel on the Hub proposal, and the other of whom plays a key role in connecting faculty members to the I-Corps community, serving as a Partner Faculty Lead.

NSF I-Corps Hub Affiliates ("Affiliates") are U.S.-based IHEs. Affiliates serve as sources for Teams. Affiliates are a critical element of the Hub and the principal mechanism to distribute best practices and other resources from the I-Corps community to the entire nation. To qualify as an Affiliate, at least one faculty member must participate in the proposal, serving as an Affiliate Faculty Lead.

Activities of the Hubs

The I-Corps Program enables entrepreneurial scientists to engage in industry discovery, customer discovery, and related market validation exercises to identify opportunities for advancement and translation of basic research. The results of this intensive search process are expected to guide future technology development as well as commercialization activities. The educational philosophy of the I-Corps Program, anchored by lean startup methodology, is the consistent and systematic delivery of a rigorous curriculum blending critical thinking, the scientific method, and first-hand exploration of industrial processes and practice. These experiential learning sessions take place in two distinct formats:

- **Regional cohort.** A regional cohort serves as both an introductory educational experience and as a channel to identify and attract promising technologists. The educational content must be based on the lean startup methodology, but is typically an abbreviated version of the content taught in a national cohort (described below).
- **National cohort.** A national cohort is a seven-week experiential exercise for teams validating the commercial potential of deep technologies, utilizing a lean startup framework. The course content and format are standardized throughout the country and managed through an I-Corps Curriculum Committee led by NSF. National cohort teams (NSF I-Corps Teams) receive funding to encourage their industry discovery exercises through one of the following competitive award mechanisms:
 - I-Corps Teams Solicitation ([NSF 18-515](#)); or
 - Hub-Mentored Teams process (described below as Activity 3 contributions in the Project Description).

NSF I-Corps Hubs achieve the strategic objectives through four principal activities:

Activity 1: NIN training: Deliver and execute regional cohorts at Partner and Affiliate institutions, and staff national cohort instructional teams (funded through the I-Corps Teams Solicitation referenced above) and Hub Mentored Teams.

Activity 2: Institutional expansion of the NIN: Deliver regional instruction at Affiliate institutions, and identify, recruit, and support new Teams for national cohorts.

Activity 3: Team expansion of the NIN: Recruit and support Teams identified through researchers who are recipients of NSF research awards, researchers receiving funding from other federal agencies, former students or postdoctoral fellows participating in technology research, or other avenues.

Activity 4: NIN evaluation, assessment, and blue-sky research: Collect and analyze data to inform evaluation of the NIN, including advanced scholarship on topics related to national support of entrepreneurial ecosystems and dissemination of best practices.

The network of NSF I-Corps Hubs will work cooperatively to support the development of innovations that will benefit society. The interconnected Hubs are expected to be diverse and inclusive in many aspects including: research areas, personnel, resources, tools, programs, capabilities and geographic locations – thereby providing the network with the flexibility to grow or reconfigure as needs arise.

Oversight of the Hub

To provide oversight, the NSF Program Director and a site visit team will visit the Hub at least once during the course of the award.

III. AWARD INFORMATION

NSF I-Corps Hub awardees to be supported at a level of up to \$3,000,000 per year for up to five years. All funds are awarded to the Principal institution; Partner and Affiliate members receive funding as subawardees.

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

PLEASE NOTE: NSF I-Corps Hub proposals must be submitted by a single Principal institution, with Partners and Affiliates listed as subawardees in the budget. ***Separately submitted collaborative proposals submitted in response to this solicitation will be returned without review.***

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Multi-institution NSF I-Corps Hub proposals are submitted by a single Principal institution, with Partners and Affiliates listed as subawardees in the budget. These eligibility requirements apply to the Principal, Partners and Affiliates of the Hub.

Who May Serve as PI:

The PI must be at the Principal (defined in Section II: Program Description) institution and must be in a senior academic administrative role at the level of Dean or higher.

Each Partner (defined in Section II: Program Description) institution must identify a senior academic administrator at the level of Dean or higher to be included as Senior Personnel.

Limit on Number of Proposals per Organization: 1

Organizations may only be a participant (Principal, Partner or Affiliate) in one proposal per deadline.

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

An Individual may be PI, co-PI, or Senior Personnel of only one NSF I-Corps Hub proposal per deadline.

Additional Eligibility Info:

The Principal must have at least two faculty members, one as PI, and one as co-PI.

Each Partner must have at least two faculty members serving in Senior Personnel roles.

Each Affiliate must include at least one faculty member serving in a Senior Personnel role.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via FastLane or Grants.gov.

- 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) 292-8134 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: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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.

In addition to the requirements specified in the NSF PAPPG, an NSF I-Corps Hub proposal consists of the following required elements:

Cover Sheet:

The title should include, as a prefix, the name "NSF I-Corps Hub:" followed by the geographic region addressed by the Hub, for example: "*NSF I-Corps Hub: Central Region.*"

Project Description:

An NSF I-Corps Hub proposal should include information organized in the most effective way to present a compelling story about why the proposed Hub should be funded and why it will be effective at all four Activities described below. A minimum of two Partner institutions and five Affiliate institutions must be identified, in addition to the Principal institution; placeholders will NOT be accepted. **The Project Description is limited to 20 pages and should address all of the following topics.**

1. Activity 1: NIN training

One critical function of a Hub is to deliver and execute regional cohorts at Partner and Affiliate institutions, as well as to staff national cohort instructional teams and Hub-Mentored Teams (see the Activity 3 contribution). Proposing Hubs are encouraged to support geographic and demographic diversity in generating Partner relationships. Project Descriptions should include the following:

- Hub Organization.** Specify the Principal and Partners, and the prior engagement of the administrative leaders (PI and the Partners' administrative Senior Personnel) in deep technology venture entrepreneurship, including the history of creating geographic, demographic, industrial, and other diversity, with examples specific to supporting deep technology venture entrepreneurship. The Principal and Partners must each identify a senior administrative leader at the role of Dean or higher to be engaged in the Hub.
- Hub Leadership Team.** Several operational roles are required and must be clearly indicated in the Project Description, Budget, and Budget Justification. Individuals must be identified for these roles initially and any changes must be approved by NSF. Unnamed placeholders will not be accepted for the following roles, except for the Coordinator:
 - Hub Director (HD):** An experienced faculty or staff member at the Principal with an affiliation to the Principal's innovation activities, responsible for strategic management and Hub operations, including data collection, communications, reporting, etc. Proposers are strongly encouraged to select individuals with prior commercialization experience as Hub Director.
 - Hub Coordinator (HC):** A Hub Coordinator should be identified to manage standardization of programs across Partners and Affiliates, team recruiting logistics, and hosting of regional cohorts. (Note that national cohorts are managed by NSF and should not be included in the Hub proposal budget.)
 - Principal and Partner Faculty Leads:** The Principal and Partners must each identify a single faculty member to serve as the Faculty Lead (FL), responsible for faculty engagement at his/her home institution. Faculty Leads with prior commercialization experience and affiliation with the institution's innovation activities are strongly encouraged. These FLs should be indicated as Senior Personnel in the budget. At the Principal, the individual serving as Hub Director also may serve as the FL, but this is not required.
 - Lead Instructor (LI):** An instructor experienced in teaching lean startup methodology and customer discovery principles must be named to recruit, staff, and vet potential instructors for regional and national cohorts. The individual serving as Hub Director also may serve as the Lead Instructor, but this is not required.

Describe the history of engagement of all the individuals with the innovation activities at their respective institutions, and the history of collaboration among the Partners in supporting deep technology venture entrepreneurship regionally and nationally. Describe the approach to ensuring participation, support, and engagement of Affiliates. Discuss explicitly the Hub Leadership Team's approach to engaging the research-active faculty, post-doctoral researchers, and graduate students and the role of each institution's innovation activities in the Hub activities.

- Instructional team.** Discuss the proposed Lead Instructor's prior engagement with the Principal and/or Partners and the history of teaching deep technology venture entrepreneurship and engagement, if any, with regional and/or national I-Corps cohorts. Identify members of the proposed instructional team. Discuss the approach and track record to creating a diverse instructional team.
- Approaches to entrepreneurial recruiting and training.** Discuss the history and track record of the Principal and Partners in development of innovative curricula, practices, or approaches to identifying and supporting first-time deep technology venture

- entrepreneurial undergraduate, graduate, postdoctoral, and faculty. Discuss the specific capability to support novel approaches to training such as virtual synchronous training, innovative course structure, and other methods to extend the classroom boundary, structure, and reach. Discuss the approach to enhancing diversity in the entrepreneurial pool and supporting under-represented teams.
- e. **Educational expansions of lean startup methodology.** Discuss the history and track record of the Principal and Partners of creating and executing training that builds on and extends lean startup and related methods. Examples that precede lean startup education include precursor ideation courses, convergence training, and related material; examples of subsequent courses include bootcamps, new venture initiation, business launchpads, and similar structures.
 - f. **Deep technology venture (DTV) community development.** Discuss the history and track record of the Principal and Partners in supporting DTVs and associated scientists and engineers, including facilitation of engagement with mentors and venture capitalists, and approaches to recruiting members from the local investment community to participate in the proposed Hub's activities.
 - g. **Deep technology venture scope.** Describe the scope of technologies launched from the Principal and Partners, and the subsequent success of the resulting ventures. Include specific examples. Discuss prior engagement of faculty and staff from the Principal and Partners with customer and industry discovery through general lean startup methodology, regional or national I-Corps cohorts, and/or other internal programming.
 - h. **Dissemination of best practices.** Discuss the history and approach of the Principal and Partners to sharing best practices throughout the nation, including but not limited to: publication through various media and venues (conference participation, videos, web pages, etc.); personnel exchanges with other organizations; and other mechanisms to ensure that the entire nation benefits from innovations at the Hub level.

2. Activity 2: Institutional expansion of the NIN

The Hub is responsible for expanding the NIN. A minimum of five Affiliates must be identified as potential sources of national cohort teams. Proposing Hubs are encouraged to support geographic and demographic diversity in generating Affiliate relationships. The Hub is required to identify five Affiliates in the proposal, with a plan of adding at least one per year during the life of the award such that each Hub comprises at least ten institutions during the life of the award. The initial five Affiliates must be identified; placeholders will NOT be accepted. Describe the following:

- a. **Operational approach to growing the NIN.** Discuss the approach to attracting and retaining Affiliate relationships to ensure ongoing engagement. Specify programming that the Hub will conduct at Affiliate institutions, such as Train-the-Trainer sessions, mentor orientations, investor workshops, information sessions on national cohorts, and related activities.
- b. **Vision for evolving the Hub.** Discuss a vision for the expansion of the Hub beyond the proposed organization. How will the Hub support Affiliates becoming Partners, and how would the Hub identify other potential members of the collaboration?
- c. **Affiliate Institutions and Affiliate Faculty Lead.** For each Affiliate institution, identify the co-Principal Investigator who will serve as the Affiliate Faculty Lead (AFL), with responsibility for leading faculty engagement at that institution. Discuss other faculty members, staff members, executives, or other leaders who will participate in managing the relationship and hosting regional events. Describe the history of engagement with customer and industry discovery programs, including courses, competitions, prizes, and/or past I-Corps experience.
- d. **Approaches to recruiting and training.** Discuss history with developing innovative curricula, practices, or approaches to identifying and supporting first-time entrepreneurial undergraduate, graduate, postdoctoral, and faculty engineers. Discuss the approach to enhancing diversity in the entrepreneurial pool and supporting under-represented teams.
- e. **Deep technology venture (DTV) community development.** Discuss Affiliates' track record in supporting DTVs and associated scientists and engineers, including facilitation of engagement with mentors and venture capitalists, and approaches to recruiting members from the local investment community to participate in the proposed Hub's activities. Specify plans to engage Affiliate teams with the Hub investment ecosystem.
- f. **Deep technology venture scope.** Describe the scope of technologies and DTVs launched by each Affiliate and their subsequent success.

3. Activity 3: Team expansion of the NIN

The Hub is responsible for expanding the pool of Teams participating in national cohorts by creating and managing appropriate recruiting processes. The Hub may identify three types of Teams:

- o Hub-Connected Teams (HCT) originate in a Hub Principal, Partner, Affiliate, or another organization serving as a source of DTV. An HCT may require Hub guidance or information to advance to the national Teams program, but otherwise fulfills all requirements to qualify for the current/active I-Corps Teams Solicitation (NSF 18-515), including appropriate NSF lineage through a recent NSF-funded research award. Teams with NSF research lineage and meaningful Hub interactions may be counted towards team production requirements.
- o Hub-Mentored Teams (HMT) originate in a Hub Principal, Partner, Affiliate, or another organization serving as a source of deep technology ventures. An HMT has at least two members connected directly to the technology development to serve as entrepreneurial lead and technical lead, but is lacking a mentor. The team's technology is eligible for the national I-Corps Teams program through a recent NSF-funded research award, as defined in the current/active I-Corps Teams Solicitation (NSF 18-515). A Hub-Mentored Team has a mentor provided by the Hub.
- o Hub-Recommended Teams (HRT) originate in a Hub Principal, Partner, Affiliate, or another organization serving as a source of deep technology ventures. These teams must have a deep technology with a reasonable connection to the university community. Examples are teams with technologies developed with funding from other federal agencies, such as NIH or DoD; or a deep technology venture founded by recent Ph.D. graduates in which the faculty member has opted not to participate in the commercialization. An HRT is expected to be funded by the current/active I-Corps Teams Solicitation (NSF 18-515), referencing the NSF Hub award for eligibility.

All Teams for a national cohort must apply through the I-Corps Teams Solicitation (NSF 18-515) process. To participate in a national cohort:

- o A HCT is funded through the current/active Teams solicitation (NSF 18-515), referencing its NSF research lineage for eligibility.
- o A HMT has research lineage that qualifies for the Teams solicitation (NSF 18-515), but as it lacks a mentor, it is funded directly through the Hub and has a mentor provided by the Hub
- o A HRT is funded through the current/active Teams solicitation (NSF 18-515), referencing the Hub award for eligibility.

In other words, HCTs and HRTs will be funded through the I-Corps Teams Solicitation (NSF 18-515), whereas the HMT will be funded **through the Hub as part of the Hub award in the form of Participant Support Costs**. To address the suitability of supporting this Activity 3 contribution, discuss the following:

- a. **Recruiting process.** Describe proposed programs to identify and vet qualified teams for national cohorts. Include estimates of annual capacity and processes to ensure the success of achieving the projected numbers of recruited teams. Discuss creative ideas for recruiting new teams. **Each Hub is expected to generate 5 teams per year from the Principal, 4 teams from each Partner, and 3 teams per year per Affiliate.** Hubs may recruit teams from the three types (i.e., HCT, HRT, or HMT) previously described. The Hub may elect to meet its expected number of generated teams through any combination of these populations.
- b. **Synergistic organizational expansion.** Describe proposed programs to identify synergistic partners such as non-profit trade associations, public incubators, private incubators, professional societies, and other potential sources of DTV. Teams recruited through these relationships should participate in regional cohorts and the screening process and will count toward the aggregate Hub requirement for team generation.
- c. **Screening experience.** Describe the prior experience of the Principal and Partners in evaluating teams for appropriateness in deep technology venture entrepreneurship education programs, such as competitions, prizes, and/or I-Corps cohorts. Discuss existing processes that include elements of peer review and specify how such panels operate (i.e., virtually, in competition settings, or other processes).
- d. **Mentor assignment.** Describe the experience of the Principal and Partners in assigning or pairing mentors with teams in competitions, prizes, I-Corps activities, and related programs. Discuss the pool from which mentors would be drawn for partnering with prospective teams and the Principal and/or Partner existing relationships with organizations serving as mentor talent pools (i.e., angel investment groups, mentor networks and services, and related groups).
- e. **HMT award management.** Describe the capacity of the Principal and Partners to distribute, manage, and provide appropriate oversight of small awards to entrepreneurial teams, particularly for industry and customer discovery exercises, including competitions, prizes, and/or I-Corps activities. HMT awards must be distributed from the Principal and/or the Partners (not Affiliates).

4. Activity 4: NIN evaluation, assessment, and blue-sky research

An important element of I-Corps is the evaluation and assessment of the program, as well as the capability to conduct research related to national support of entrepreneurial ecosystems. The Hub is responsible for creating leadership in generating data, analysis, and recommendations to accelerate the growth of the national ecosystem. Describe the following:

- a. **Research Lead.** Identify a Research Lead; it is not required that this Lead is otherwise involved in Hub training and NIN expansion, although it is permitted. The Research Lead must be a faculty member at the Principal or a Partner of the Hub and must be identified as Senior Personnel. The Hub Director or another FL may serve as the Research Lead, but this is not required. Discuss the engagement of the Research Lead with the Hub Leadership Team.
- b. **Metrics development and use in program refinement.** Describe the systems used by the Principal and the Partners to track deep technology venture entrepreneurial activities, with examples from competitions, prizes, regular university courses, I-Corps activities, and/or related activities. Discuss the evolution of these programs as a result of such tracking and the methods to be adopted by the Hub.
- c. **Tracking of regional teams.** It is anticipated that the Hub will identify promising deep technology ventures that participate only in regional cohorts and opt not to submit applications to national cohorts. It is desirable to track these teams in the spirit of the American Innovation and Competitiveness Act. Discuss the Hub's experience in long-term tracking of nascent ventures including communication channels, timing, methods, and related aspects of Hub processes and systems. The requirements for tracking and reporting of these ventures is undergoing the information collection process and the clearance number will be included with the reporting requirements when awards are issued.
- d. **Scholarship.** Discuss research conducted on entrepreneurial ecosystems and the potential for impact in policy and practice at the national level, particularly on deep technology ventures.

5. Summary budget table

Include a summary table of the estimated budget for each of the four Activities. See the Proposal Budget and Budget Justification for budgetary guidelines for each Activity.

Biographical Sketches:

A biographical sketch for each team member (two pages maximum per team member) must be provided, highlighting technical expertise and track records in successful technology and business development and be prepared in accordance with the requirements specified in the PAPPG. Academic resumes longer than two pages are not appropriate. Biographical sketches are required for: PIs, co-PIs, and Senior Personnel (regardless of the level of support to be provided through this award); Principal and Partner Faculty Leads; Affiliate Faculty Leads; Hub Director, Lead Instructor, and Research Lead.

A biographical sketch for each team member identified above must be submitted as a separate document. Multiple biographical sketches submitted as a single document will not be accepted.

Proposal Budget and Budget Justification:

NSF I-Corps Hub awardees will be supported at a level of up to \$3,000,000 per year for up to five years. Additional restrictions include:

Activity 1: NIN Training

A maximum of 55% of the budget may be allocated to Activity 1. In addition to the Principal, a minimum of two (2) Partners must be identified. Hub budgets should include funds for the Hub Leadership Team (Hub Director, Lead Instructor, Principal Faculty Lead, and Partner Faculty Leads) to attend two separate meetings each year: 1) the annual NIN meeting, to be held in the Washington, DC area; and 2) an annual meeting of the Hub, to be held in the Hub's home region or a location agreed upon by the Principal, Partners, and Affiliates.

Activity 2: Institutional expansion of the NIN

A minimum of 15% of the budget must be allocated to Activity 2 activities supporting Hub Affiliates, and a minimum of five (5) Affiliates must be named. Hub budgets should include support for each Affiliate subaward PI (serving as an AFL) to attend two separate meetings each year: 1) the annual NIN meeting, to be held in the Washington, DC area; and 2) an annual meeting of the Hub, to be held in the Hub's home region or a location agreed upon by the Principal, Partners, and Affiliates.

Activity 3: Team expansion of the NIN

A minimum of 15% of the budget must be allocated to Activity 3. These activities include but are not limited to hosting information sessions, travel as needed (e.g., technical conferences with innovation sessions, universities unaffiliated with I-Corps); and delivery of abbreviated I-Corps courses. All programs should be executed with a goal of identifying scientists and engineers with potential DTV, assisting in recruiting a complete I-Corps team, and assessing the team's suitability for the National I-Corps program as either HCTs, HRTs, or HMTs.

Funding for Hub-Mentored Teams should be included as part of Activity 3. The HMT's award will be provided through the Hub. For these teams, a minimum of \$55,000 per team should be allocated, with an expectation of generating at least 3 of these specific teams per year. This allocation may include a stipend for the entrepreneurial lead not to exceed \$15,000 and a stipend for the mentor not to exceed \$10,000. Participant support costs should be calculated from this allocation to include registration for the national I-Corps course (https://www.nsf.gov/news/special_reports/i-corps/teams.jsp), travel to the course's in-person meetings, and travel for customer discovery including conference fees.

No stipends, salary, or other compensation should be budgeted as participant support costs.

Activity 4: NIN evaluation, assessment, and blue-sky research

A minimum of 15% of the budget must be allocated to Activity 4 activities supporting scholarship studying the national innovation ecosystem and disseminating best practices. The budget should include funds for all Hub Research Leads to attend one annual research meeting (to be held in the Washington, DC area) each year.

For each Activity, funds may be allocated for project management by the Hub Coordinator.

The NSF I-Corps Hubs Program will NOT fund legal expenses associated with commercialization.

Supplementary Documents:

Supplementary Documents should include the following:

Data Management Plan

Discuss capabilities and experience tracking teams into and through Hub programs, as well as beyond to subsequent commercial activity. Data should be collected to satisfy the reporting requirements.

Diversity and Inclusion Plan

A detailed plan of no more than two pages should describe the Hub's history and approach to generating diversity and inclusion in deep technology venture entrepreneurship, with a discussion of the diversity of the leadership team, the instructional team, the research team, and the nascent ventures. This plan should describe strategies to promote diversity and inclusion in all aspects of Hub activities. Partners should demonstrate clear alignment between their innovation activities and senior administrators (Vice President, Vice Provost, Associate Dean, etc.) with responsibility and oversight for supporting a campus climate of inclusion.

Memoranda of Understanding

Each Partner and Affiliate should provide an executed Memorandum of Understanding (MOU) with the Principal. Each MOU should demonstrate alignment with the overall NSF I-Corps Program vision and the specific mission of the Hub. The MOU should communicate a commitment to I-Corps from senior administration, provide overviews of each institution's strategic relationship within the Hub, and highlight important shared resources that will be made available within the Hub. The senior administrators should provide statements as to how the proposed Hub will align with the greater strategic directions of their respective institutions.

Postdoctoral Mentoring Plan

It is expected that the Research Lead will lead a scholarly effort to understand and accelerate the growth of deep technology entrepreneurial ecosystems, and that this effort will support junior scholars, including postdoctoral scholars. A Mentoring Plan is required for postdoctoral scholars included in the budget.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Other budgetary limitations apply. Please see Section V.A of this solicitation for further information.

C. Due Dates

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

August 13, 2020

August 25, 2021

April 07, 2022

First Thursday in April, Annually Thereafter

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 standard review criteria, a demonstrated command of the currently-deployed I-Corps curriculum (https://www.nsf.gov/news/special_reports/i-corps/resources.jsp) will be part of the review process.

Coordinating features of NSF I-Corps Hubs also are important aspects. Consequently, proposals must clearly demonstrate a track record, ability, and willingness to enable these:

- Appropriate mixture of geographically distributed personnel and institutions that provide diverse and complementary capabilities to support current and anticipated needs for fostering innovation across a broad spectrum of science and engineering domains;
- A robust plan for the promotion of diversity and inclusion among students, faculty, staff, management, and outreach activities;
- Exchange of personnel, programs, and other methods to accelerate dissemination of best practices;
- Coordination of innovation research, education, outreach and commercial development programs;
- Engagement of current and future prospective Affiliates;
- Engagement of synergistic organizations, such as non-profit trade organizations, professional societies, public incubators, private incubators, etc.;
- Seamless methods of operation of projects across multiple universities, through development and utilization of compatible Internet-based networking/collaboration tools and approaches;

- Dissemination of shared knowledge to communities of practice, scholarly communities, and policy makers;
- Methods for assessment and metrics of Hub/network performance and impacts;
- Planning processes to accommodate emerging areas and future growth, including the requirement of an additional Affiliate per year;
- Detailed plan for scale and growth; and
- Collaboration strategy for the Principal and Partner institutions within the Hub and throughout the National Innovation Network.

B. Review and Selection Process

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

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:

To provide oversight, the NSF Program Director and a site visit team will visit the Hub at least once during the course of the award.

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.

Additional Reporting Requirements:

This requirement is undergoing the Office of Management and Budget (OMB) information collection review and approval process and the clearance number will be included with the reporting requirements.

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:

- Ruth Shuman, telephone: (703) 292-2160, email: rshuman@nsf.gov
- Rebecca Shearman, telephone: (703) 292-7403, email: rshearman@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.

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 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 (FASSED) 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.

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