

EPSCoR Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC)

PROGRAM SOLICITATION NSF 21-518

REPLACES DOCUMENT(S): NSF 20-504



National Science Foundation
Office of Integrative Activities

Letter of Intent Due Date(s) (required) (due by 5 p.m. submitter's local time):

December 18, 2020

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

January 25, 2021

IMPORTANT INFORMATION AND REVISION NOTES

Only jurisdictions that meet the EPSCoR [eligibility](#) criteria may submit proposals to the Research Infrastructure Improvement Program Track-2 (RII Track-2) competition.

- There is a limit of a single proposal from each submitting organization.
- Each proposal must have at least one collaborator from an academic institution or organization in a different RII-eligible EPSCoR jurisdiction as a co-Principal Investigator (co-PI).
- There must be one co-PI listed on the cover page from each participating jurisdiction. Proposals that depart from these guidelines will be returned without review.
- For the FY 2021 RII Track-2 FEC competition, all proposals must promote collaborations among researchers in EPSCoR jurisdictions and emphasize the recruitment/development of diverse early career faculty and STEM education and workforce development on the single topic: **"Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions."**
- Inclusion of Primarily Undergraduate Institutions and/or Minority Serving Institutions as partners is strongly encouraged.
- The extent and quality of the inter-jurisdictional collaborations must be clearly articulated.
- A letter of Intent (LOI) is required for the FY 2021 RII Track-2 FEC competition. LOIs must be submitted by the Authorized Organizational Representative of the submitting organization via FastLane on or before the LOI due date. Any proposal submitted without a prior Letter of Intent will be returned without review.
- An investigator may serve as Principal Investigator (PI) or Co-PI on only one RII Track-2 award at any given time.
- Proposals must be submitted as "Submission of a collaborative proposal from one organization" with support for non-lead collaborating organizations requested as subawards (PAPPG Chapter II.D.3.a). Proposals that depart from these guidelines will be returned without review.
- The project title must begin with "RII Track-2 FEC:" and follow with an informative title in the topic area.
- Allowable RII Track-2 FEC award amounts depend on the number of participating EPSCoR jurisdictions. If two RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1 million per year. If three or more RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1.5 million per year. In either case, awards are for a maximum of four years.
- The project team must cooperate with NSF EPSCoR's programmatic evaluation and assessment activities. Awardees are expected to work with EPSCoR and/or its designated entity for centralized project data collection and provide all required data in a timely manner. See Section V.B for corresponding budget requirements. This data collection complements but does not replace individual evaluation and assessment activities. Awardees are still required to fulfill NSF Reporting requirements as well as engaging with an independent project evaluator.
- Page limits apply. See Section V.
- At the bottom of the Project Summary, PIs should indicate the Letter of Intent (LOI) number, and the NSF Directorate(s), Division(s), and Program(s) that most closely aligns with the proposal's research focus
- No Letter of Collaboration should be included in the Supplementary Documents. See Section V.A.10. A maximum of five letters of support may be included. See Section V.A.10.
- The list of all organizations and companies involved in the project must include locations.
- Collaborators and Other Affiliations Information : Proposers should follow the guidance specified in PAPPG Chapter II.C.1.e.

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 June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

EPSCoR Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC)

Synopsis of Program:

The Established Program to Stimulate Competitive Research (EPSCoR) is designed to fulfill the mandate of the National Science Foundation (NSF) to promote scientific progress nationwide. A jurisdiction is eligible to participate in NSF EPSCoR if their most recent 5-year level of total NSF funding is equal to or less than 0.75% of the total NSF budget subject to certain exclusions. Jurisdictions above 0.75% but less than 0.80% are allowed to remain EPSCoR-eligible for up to 5 years. For more details, see:

https://www.nsf.gov/od/oia/programs/epscor/Eligibility_Tables/FY2021_Eligibility.pdf. Through this program, NSF establishes partnerships with government, higher education, and industry that are designed to effect sustainable improvements in a jurisdiction's research infrastructure, Research and Development (R&D) capacity, and hence, its R&D competitiveness.

RII Track-2 FEC builds interjurisdictional collaborative teams of EPSCoR investigators in scientific focus areas consistent with NSF priorities. Projects are investigator-driven and must include researchers from at least two EPSCoR eligible jurisdictions with complementary expertise and resources necessary to address challenges, which neither party could address as well or rapidly independently. The Science, Technology, Engineering, and Mathematics (STEM) research and education activities should seek to broaden participation through the strategic inclusion and integration of diverse individuals, institutions, and sectors throughout the project. Proposals must describe a comprehensive and integrated vision to drive discovery and build sustainable STEM capacity that exemplifies diversity of all types (individual, institutional, geographic, and disciplinary). The development of diverse early-career faculty is a critical component of this sustainable STEM capacity. For FY 2021, RII Track-2 FEC proposals are invited on a single topic: **"Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions."**

A single proposal is submitted for a project. Support for non-lead collaborating organizations should be requested as subawards. Separately submitted collaborative proposals are not allowed. Each participating EPSCoR jurisdiction must have at least one co-PI on the project. Proposals that do not comply with these requirements will be considered not responsive, and will be returned without review.

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.

- John-David Swanson, telephone: (703) 292-2898, email: jswanson@nsf.gov
- Jose Colom-Ustariz, telephone: (703) 292-7088, email: jcolom@nsf.gov
- Eric W. Lindquist, telephone: (703) 292-7838, email: elindqui@nsf.gov
- Subrata Acharya, telephone: (703) 292-2451, email: acharyas@nsf.gov
- Andrea Johnson, telephone: (703) 292-5164, email: ANDJOHNS@nsf.gov
- Jeanne Small, telephone: (703) 292-8623, email: jsmall@nsf.gov
- Timothy M. VanReken, telephone: (703) 292-7378, email: tvandreke@nsf.gov
- Chinonye Whitley, telephone: (703) 292-8458, email: cnnakwe@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: 7 in FY 2021

Anticipated Funding Amount: \$7,000,000 to \$10,500,000

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

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only jurisdictions that meet the EPSCoR [eligibility](#) criteria may submit proposals to the Research Infrastructure Improvement Program Track-2 (RII Track-2) competition.

Organizations located in RII-eligible jurisdictions:

- Institutions of higher education (Ph.D.-granting and non-Ph.D. -granting), acting on behalf of their faculty members, that are accredited in and have a campus in the United States, its territories or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions. Campuses that plan to submit a proposal through the Sponsored Projects Office of other campuses or organizations should contact NSF to discuss eligibility as early as possible and at least six weeks before submitting such a proposal.
- Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, that include (but are not limited to) independent museums and science centers, observatories, research laboratories, professional societies, and similar organizations that are directly associated with the Nation's research or educational activities. These organizations must have an independent, permanent administrative organization (e.g., an office of sponsored research) located in the United States, its territories or possessions, and have 501(c)(3) tax status.

Who May Serve as PI:

PIs and Co-PIs of proposed RII Track-2 FEC projects must be affiliated with eligible organizations in EPSCoR jurisdictions. In addition, the lead PI must be employed by the proposing organization.

Each EPSCoR jurisdiction participating in a proposed project must be represented by a PI or at least one co-PI. The PI and co-PIs must all have research expertise relevant to the focus area of the research being proposed.

PIs and Co-PIs on current NSF EPSCoR RII Track-2 awards with end dates later than October 31, 2021 are not eligible to submit proposals as a PI or Co-PI in this competition.

Limit on Number of Proposals per Organization: 1

Only one RII Track-2 FEC proposal may be submitted in response to this solicitation by an organization in a RII-eligible jurisdiction.

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

Investigators cannot be PI or co-PI on more than one RII Track-2 project, both currently awarded or in this competition, but may serve as senior personnel on any number of RII Track-2 proposals.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. submitter's local time):

December 18, 2020

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

January 25, 2021

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

A. EPSCoR Mission and Goals

The mission of EPSCoR is to assist the National Science Foundation in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education." EPSCoR goals are to:

- Catalyze the development of research capabilities and the creation of new knowledge that expands jurisdictions' contributions to scientific discovery, innovation, learning, and knowledge-based prosperity;
- Establish sustainable Science, Technology, Engineering, and Mathematics (STEM) education, training, and professional development pathways that advance jurisdiction-identified research areas and workforce development;
- Broaden direct participation of diverse individuals, institutions, and organizations in the project science and engineering research and education initiatives;
- Effect sustainable engagement of project participants and partners, the jurisdiction, the national research community, and the general public through data-sharing, communication, outreach, and dissemination; and
- Impact research, education, and economic development beyond the project at academic, government, and private sector levels.

B. Criteria for Eligibility to Participate in the Research Infrastructure Improvement Track-2: Focused EPSCoR Collaborations (RII Track-2 FEC)

Research Infrastructure Improvement Program Track-2 (RII Track-2) eligibility is based on a jurisdiction's most recent five-year history of research funds awarded by NSF relative to the Foundation's total research budget for that same period subject to certain exclusions. A jurisdiction is eligible to participate in NSF EPSCoR if their most recent 5-year level of total NSF funding is equal to or less than 0.75% of the total NSF budget. Jurisdictions above 0.75% but less than 0.80% are allowed to remain EPSCoR-eligible for up to 5 years. (See RII [eligibility](#)).

C. RII Track-2 FEC Program

Well-designed collaborative strategies are essential to EPSCoR's goal of enhancing the competitive position of research and research-based education in science and engineering. This approach can help overcome impediments posed by limited infrastructure or human capital within a single jurisdiction and can enable broad engagement at the frontiers of discovery and innovation in science and engineering.

This Research Infrastructure Improvement Track-2: Focused EPSCoR Collaborations (RII Track-2 FEC) solicitation responds directly to national studies and community input, including reports from the National Academy of Sciences, the EPSCoR 2020 workshop, the EPSCoR 2030 workshop and NSF priorities. RII Track-2 FEC seeks to build nationally and internationally competitive collaborative teams of EPSCoR investigators by providing a mechanism to coalesce investigator expertise into a critical mass for a sustained, effective research and education partnership.

EPSCoR support of a proposed research infrastructure improvement activity should not duplicate other available federal, jurisdictional, or institutional resources and should add significant value to increase scientific competitiveness at the national or regional level.

II. PROGRAM DESCRIPTION

RII Track-2 FEC Program Description

The primary driver for RII Track-2 FEC investments is the need to build investigator-driven, interjurisdictional research collaborations with the potential to be nationally and internationally competitive. The project description should include a strong rationale for the collaboration and demonstrate that the partnership is designed to facilitate discovery and innovation in the focus area, which neither party could address as well, or as rapidly, alone. RII Track-2 FEC proposals are unique in their integration of researchers into collaborative teams across EPSCoR jurisdictions, and must develop a diverse, well-prepared, STEM-enabled workforce necessary to sustain research competitiveness. Moreover, NSF EPSCoR recognizes that the demographic of the United States is changing and therefore to be competitive, EPSCoR jurisdictions need to be intentional regarding the involvement of diverse individuals as they consider the future. In addition, the recruitment and/or development of early-career faculty that are traditionally underrepresented in STEM fields as well as the involvement of traditionally underrepresented groups at all levels of this project are critical in achieving this goal and must be an integral component of the proposed project.

Over the long term, RII Track-2 FEC investments are expected to result in sustained improvements in research competitiveness, enabling EPSCoR investigators to successfully pursue significant opportunities of national and international importance in science and engineering research and education. Moreover, specific to this solicitation, it is expected that previous NSF and other federal agency investments will be leveraged and translate into advancing Industries of the Future in the involved jurisdiction(s). Non-EPSCoR and international collaborations may be included, but no EPSCoR funds should be directed to these organizations.

Central to the success of the proposal is the clear demonstration that the collaboration is well-positioned to produce outcomes that cannot be obtained through the efforts of a team in a single jurisdiction working alone. The proposal must clearly identify the roles and contributions of each partner in the project, the anticipated increases in research capacity and competitiveness, the projected workforce development and educational plan and outcomes, and the benefits to the jurisdictions, nation, and society. It is expected that these collaborations be balanced, with participating jurisdictions each contributing to and benefitting from projects at levels that are appropriate to their capabilities.

To ensure maximum impact of limited EPSCoR funds, requests for RII Track-2 FEC funding must:

- Add significantly to the research capability of the participating jurisdictions in the designated focus area;
- Contribute to the advancement of research and innovation in the proposal's focus area;
- Illustrate how the participating jurisdictions' research capacities will be positively impacted by the collaborative effort;
- Outline clear plans for the recruitment and/or development of early-career faculty that are underrepresented in the chosen STEM field;
- Engage the diversity of the participating jurisdictions' resources including two- and four-year colleges, minority serving institutions, and local and state industry in STEM workforce development; and
- Present a detailed sustainability plan to show the economic impact of the endeavor and also will generate subsequent, sustained non-EPSCoR funding from federal, jurisdictional, or private sector sources.

Note: In all instances, clear specification of research and education goals, performance metrics, evaluation, management, and a timetable for achieving goals is a requirement for EPSCoR support.

RII Track-2 FEC proposals are expected to be investigator-driven collaborations and the PI and co-PIs must all be active researchers in the focus area of the proposal. Proposals should clearly specify research, education and workforce development goals, and the expected leveraging of the proposed research to aid in the development of a chosen industry of the future in the target jurisdiction(s). A timetable for achieving those goals, and an evaluation plan with measurable performance metrics is required.

In FY 2021, RII Track-2 FEC proposals must be aligned with the following focus area: **"Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions."** According to the 2021 [OMB/OSTP Research and Development priorities memo](#), "Industries of the Future" are a key component to the country's economic and national security.

For the [National Science Foundation](#), these industries have been defined across several categories and include: Advanced Manufacturing; Advanced Wireless; Artificial Intelligence; Biotechnology; Quantum Information Science; and Spectrum Innovation Science. Moreover, these industries will require new advances in and integration of artificial intelligence and machine learning, new cyber infrastructure, new approaches for mathematical and computational modeling, new dynamics and control methodologies, new ways to integrate systems biology, synthetic biology and bioprocessing, and new ways to contribute to influence the economy, workforce, and society. For this solicitation, research focused in these areas is strongly encouraged, however, in rare cases, additional industries relevant to a Jurisdiction's Science and Technology Plan can be considered for this solicitation with appropriate strong justification.

NSF EPSCoR has stated that one of its driving goals is to enhance research competitiveness by strengthening STEM capacity and capability which "impacts jurisdictional economic development." Therefore, by leveraging current and previous NSF as well as other federal agencies substantial investments in the industries and investments in the research underlying or supporting these industries, this solicitation seeks to create a significant and collective impact at targeted jurisdictions by advancing future investments towards jurisdictions' socio-economic growth. Proposals submitted for the FY21 RII Track-2 FEC competition should leverage already documented outcomes from any project (or projects) related to the industries of the future topics across multiple jurisdictions and collectively bring those together to address new economic opportunities either within those jurisdictions, or in additional EPSCoR jurisdictions.

As a result, these projects are expected to create or establish a solid pathway towards impacting the jurisdictions at an economic scale guided by a diverse STEM workforce.

Moreover, to understand the impacts of these industries in the jurisdiction(s), it is critical to understand their influence from a social perspective. This could include understanding and assessing any specific disruptive impact of the technology on the industry, developing innovative educational plans to prepare a skilled technical workforce (K-12, two year colleges, undergraduate and graduate students to university faculty), or understanding the social and political impacts of this technology on the environment or current social-economic demographic that is present in the jurisdiction. To do this NSF EPSCoR envisions the convergence of multidisciplinary and diverse teams that span the sciences, engineering, social sciences, and innovation research to understand and build the science, scale it up, and ground it within the economic and societal realms both directly and indirectly influenced by the technology. In addition, partnerships with companies, innovation experts, or relevant local and State government and other stakeholders would be expected to allow this proposal to have the anticipated economic scale impact required for this solicitation.

Furthermore, the anticipated needs of the future workforce mandate that data science skills be incorporated broadly across education programs; therefore, projects should develop strong educational programs in these emerging areas that can be implemented across institutions of higher learning in participating jurisdictions. Additionally, NSF and EPSCoR recognize that STEM talent must be cultivated in underrepresented populations of individuals in order for jurisdictions to keep pace with industries of the future's changing workforce needs. Accordingly, proposals should include a strong commitment to building a diverse workforce. The inclusion and involvement of two- and four-year colleges, Primarily Undergraduate Institutions and Minority Serving Institutions that serve under-represented minorities in STEM is strongly recommended. Involvement and mentoring of early-career faculty is required and a detailed mentoring plan that leverages national best practices for STEM mentoring is expected. More information on NSF's commitment to broadening participation can be found in the ["Framework for Action Report."](#)

Proposals that do not align with this focus area will be returned without review. The proposed research, and education activities, innovation, workforce development, diversity, sustainability, and other project activities should be closely tied to the focus area of **"Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions"**

The proposed RII Track-2 FEC activities should not duplicate other ongoing RII activities or any other activities in the jurisdictions but may leverage and build upon the existing infrastructure.

Eligible Organizations and Activities

RII Track-2 FEC proposals may include support for academic, jurisdictional, profit and non-profit organizations, as well as eligible individuals employed by such organizations. In addition, cooperative programs among research institutions within or across EPSCoR jurisdictions, or between jurisdictions' research and predominantly undergraduate institutions, especially minority serving institutions within the jurisdictions, qualify for EPSCoR support.

In all cases, PIs of proposed EPSCoR projects must be affiliated with institutions of higher education, agencies, or organizations within the participating jurisdictions. The PI and co-PIs must all have disciplinary expertise in the research area being proposed. Whereas the proposed project may employ collaborations between EPSCoR and non-EPSCoR participants, EPSCoR funding can only be requested and used for the EPSCoR-based components. In addition, all activities carried out under an EPSCoR award are subject to the restrictions concerning eligible STEM disciplines and activities detailed in the NSF PAPPG found on the NSF website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg

III. AWARD INFORMATION

The RII Track-2 FEC award amount is restricted based on the number of eligible jurisdictions participating in the project. If organizations from two RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1 million per year for up to four years. If organizations from three or more RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1.5 million per year for up to four years. Program budget, number of awards and average award size/duration are subject to the quality of proposals and availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only jurisdictions that meet the EPSCoR [eligibility](#) criteria may submit proposals to the Research Infrastructure Improvement Program Track-2 (RII Track-2) competition.

Organizations located in RII-eligible jurisdictions:

- Institutions of higher education (Ph.D.-granting and non-Ph.D. -granting), acting on behalf of their faculty members, that are accredited in and have a campus in the United States, its territories or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions. Campuses that plan to submit a proposal through the Sponsored Projects Office of other campuses or organizations should contact NSF to discuss eligibility as early as possible and at least six weeks before submitting such a proposal.
- Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, that include (but are not limited to) independent museums and science centers, observatories, research laboratories, professional societies, and similar organizations that are directly associated with the Nation's research or educational activities. These organizations must have an independent, permanent administrative organization (e.g., an office of sponsored research) located in the United States, its territories or possessions, and have 501(c)(3) tax status.

Who May Serve as PI:

PIs and Co-PIs of proposed RII Track-2 FEC projects must be affiliated with eligible organizations in EPSCoR jurisdictions. In addition, the lead PI must be employed by the proposing organization.

Each EPSCoR jurisdiction participating in a proposed project must be represented by a PI or at least one co-PI. The PI and co-PIs must all have research expertise relevant to the focus area of the research being proposed.

PIs and Co-PIs on current NSF EPSCoR RII Track-2 awards with end dates later than October 31, 2021 are not eligible to submit proposals as a PI or Co-PI in this competition.

Limit on Number of Proposals per Organization: 1

Only one RII Track-2 FEC proposal may be submitted in response to this solicitation by an organization in a RII-eligible jurisdiction.

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

Investigators cannot be PI or co-PI on more than one RII Track-2 project, both currently awarded or in this competition, but may serve as senior personnel on any number of RII Track-2 proposals.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (required):

Letter of Intent (LOI) must be submitted by the Authorized Organizational Representative (AOR) of the submitting organization by the LOI due date. Proposals received that are not preceded by an LOI from the AOR of the submitting organization will be returned without review.

The LOI contains "Synopsis" and "Other Comments" text data fields, each of which is limited by FastLane to 2,500 characters. LOIs should use these fields to describe, in as much detail as possible, the research to be addressed by the proposal. LOIs will be used solely in preparation for merit review. LOIs will not be seen by reviewers or used in any manner to judge the merit of the proposed research. Due to the space limitations, it is in the proposers' best interest to provide information on the proposed research topics only and to avoid providing extraneous information such as: prior accomplishments, motivation for the research, information on the qualifications of the project participants, etc. However, the LOI should indicate which EPSCoR jurisdictions are participating in the proposal.

A list of science/research keywords should be entered under the "research keywords" entry to assist NSF EPSCoR staff in preparing for proposal review. For additional information regarding LOI submission please see the PAPPG Chapter I.D.1.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Submission by an Authorized Organizational Representative (AOR) is required when submitting Letters of Intent.
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are permitted
- A Minimum of 0 and Maximum of 99 Other Participating Organizations are permitted
- Research keywords are required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not permitted

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) 292-8134 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.

The following instructions are specific to proposals submitted to the Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC) competition and supplement the NSF PAPPG and NSF Grants.gov Application Guide:

- RII Track-2 FEC proposals may only be submitted by organizations in the RII-eligible EPSCoR jurisdictions listed in Section IV of this solicitation. No

- organization may submit more than one proposal.
- The proposal section labeled Project Description may not exceed 20 pages, including text, as well as any graphic or illustrative materials. Page limitations also apply to specific subsections of the proposal. Proposals that exceed the page limitations or that do not contain all items described below will be returned without review.

Note: Proposals that use the maximum number of pages in each subsection of the Project Description will not be in compliance with the overall 20 page limitation.

The RII Track-2 FEC proposal must include the following elements:

- NSF Cover Sheet.** The project title must begin with "RII Track-2 FEC:" and follow with an informative title in the topic area. The PI must be a researcher from the submitting jurisdiction and all other participating jurisdictions should have at least one co-PI listed on the cover sheet.
- Project Summary (1 page maximum).** Provide an overview, which briefly describes: the vision and goals of the collaboration; a statement of the objectives and methods to be employed; expected impacts of the proposed activities; and plans for sustaining collaborations and impacts beyond the award period. In separate statements provide a succinct summary of the intellectual merit and broader impacts of the proposed project. Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review. At the bottom of the Project Summary, PIs should indicate the Letter of Intent (LOI) number, and the NSF Directorate(s), Division(s), and Program(s) that most closely aligns with the proposal's research focus.
- Table of Contents.** The Table of Contents is automatically generated and cannot be edited.
- Project Description (20 pages maximum).** The project description is the centerpiece of the RII Track-2 FEC proposal. This section should present the proposed activities in a clear, compelling way and describe how the activities for which NSF support is being requested will lead to long-lasting impacts. In addition to the requirements contained in PAPPG Chapter II C.2.d, the project description must articulate clear plans for research, broadening participation in STEM (with particular emphasis on early-career faculty; see Section 4.3.3), project evaluation, and sustainability of activities beyond the project period. Proposals should also include a strong rationale for the establishment of the interjurisdictional collaboration and demonstrate that the collaboration is well positioned to produce results that cannot be obtained by researchers in a single jurisdiction. The project description must clearly document the role of each jurisdiction and organization in the project activities as well as the expected contributions of each faculty-level participant in achieving the proposed collaborative activities and goals. It should also define the leveraging role for the proposed NSF EPSCoR RII Track-2 FEC project within the broader context of other NSF investments and present a viable plan for increasing competitiveness in the focus area of the proposal. A timeline for meeting the project goals and milestones must be included. The requested NSF support should be consistent with the project scope and activities. The project description must include an implementation plan that details how the collaboration will be coordinated and the roles and responsibilities of key personnel. A clear description of how the project builds future leadership in the focus area of the proposal through the recruitment, training, and participation of junior faculty should be provided. Separate management and evaluation plans should be included that describes how the project will be administered as well as mechanisms for formative and summative evaluation of the project's progress and how the project leadership will respond to evaluation findings and adjust strategies, if needed, to accomplish goals during the course of the project.

Elements of the project description are:

4.1 Status and Overview (2 pages maximum). Describe the motivation and rationale for establishing the collaboration, and how the proposed project addresses the identified research focus area for the FY 2021 competition. This section should also include clear identification of the industry the project is focusing on and how the proposed research will be linked and implemented into the jurisdiction(s) economy.

4.2 Results from Relevant Prior Support (2 pages maximum). A section on results from relevant prior NSF support and other prior federal or other investments towards the chosen industry must be included and the relevance of that support to the proposed activities explained. This section should include a description of the activities and impacts of previous NSF awards, including major accomplishments in both intellectual merit and broader impacts. In addition, this section should summarize the coordination and synergy among EPSCoR and other NSF investments in the jurisdiction. This prior support should clearly link to the chosen industry of the future and provide a clear sense of how the outcomes from that prior support will be leveraged into this project leading to its eventual implementation into the chosen industry.

4.3 Research, Collaboration, and Workforce Development (18 pages maximum). The Research, Collaboration, and Workforce Development program is the focal point from which all other project elements derive. This plan is the primary element that will be judged during the merit review process for intellectual merit and broader impacts according to NSF merit review procedures. Provide a concise description of the long-term research and education goals and intellectual focus, and describe the planned activities in sufficient detail to enable their scientific merit and broader impacts to be assessed. Present proposed research in the context of other efforts in the field (with appropriate references), state the major challenges and how they will be addressed, and comment on novelty and/or originality of the proposed approach. Include detailed plans for recruitment or development of diverse early-career faculty with strategies for recruiting and retraining faculty from underrepresented populations, and plans to prepare them for future leadership roles. The Research, Collaboration, and Workforce Development description must contain sufficient details regarding the scientific hypotheses, goals, and research and training methods (laboratory, field, theoretical, computational, or other) such that experts in the field of proposed research or closely related fields may accurately judge the intellectual merit and broader impacts of the proposed research.

In addition to providing explicit evidence for the intellectual merit and broader impacts of the research and education activities, this section should:

- Identify the faculty-level participants and estimate the numbers of postdoctoral, graduate, and undergraduate research participants. Briefly outline the resources (available and planned) to accomplish the research goals.
- Clearly establish the means of developing a coordinated, collaborative approach involving investigators across different organizations and jurisdictions. Describe interactions with other groups and organizations among the jurisdictions, and at the national and international levels, as appropriate. The research and education program description must demonstrate how the collaboration will advance research, education, and workforce development. The narrative should demonstrate how the collaboration's activities would advance the frontiers of knowledge and future research competitiveness of the participating jurisdictions in the proposed research areas.
- Provide relevant baseline data regarding any of the research, education, workforce development, or other project targets and goals. (For example, in cases where quantitative goals or targets are proposed, baseline data regarding the current situation or past performance should be given).

4.3.1 Interjurisdictional Collaborations and Partnerships. Interdisciplinary collaborative research brings with it the challenge of developing productive high-performing research teams involving multiple researchers from different organizations and disciplinary expertise. This section must clearly present the rationale for the composition of the teams, a description of the leadership structure, and the context for establishing the collaboration. The research expertise of the PIs and co-PIs must be explained in the context of the proposed research activities. Coordination and synergy among the collaborators should be summarized and the role of each of the faculty-level investigators should be clearly defined. Mechanisms that foster collaboration across the teams, such as all hands meetings, and risk-mitigation strategies should be described. The compelling ways in which the project leadership plans to coordinate the activities into a cohesive project should be presented, with well-articulated goals and strategies to achieve them.

This section must include a specific discussion of how the collaborative effort will positively impact each participating jurisdiction and its respective economy by leveraging the chosen industry of the future. Explain how each participating jurisdiction will contribute to and benefit from the proposed collaboration in a meaningful and distinct way. Specify how the project will benefit from the RII Track-2 FEC framework for pursuing the collaborative activities.

4.3.2 Economic impact and Sustainability. Given the topic of this solicitation “Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions,” proposals must describe their plan for long-term economic impact and sustainability of the proposed activities. Describe the strategies for sustaining the impacts and achievements of the project beyond the award performance period. This should clearly delineate what the expected impacts will be on the industry and jurisdiction(s) involved and how they will holistically tie into the economic development of the jurisdiction(s) involved. The plan must provide realistic, annual metrics to assess the long-term economic impacts of this project. This could include realistic plans submissions of proposals to specific NSF and other federal and State programs by the project team in the focus area topic, industry and state partnerships that lead to sustainability. The plan should also include how proposed new faculty hires, if any, will be supported beyond the award period.

4.3.3 Workforce Development. The scope of RII Track-2 FEC activities must include STEM workforce development activities that are integrated with the research and education components of the project and contribute to the preparation of a diverse, new cadre of skilled researchers, innovators, and educators that represents the diversity of the nation.

The workforce development plan must include explicit efforts for the recruitment and/or development of early-career faculty in the project’s research activities. Describe in detail the mechanisms to attract and mentor these individuals, to enable their development and success as educators and researchers, and their specific contributions to achieving the project’s goals in the focus area. For the purposes of this solicitation, early-career faculty are defined as those who are employed as assistant professors in tenure track (or equivalent) positions, or research assistant professors at the time of submission of the proposal, or who are hired in to such a position during the award period.

The research and educational training for postdoctoral, graduate and undergraduate trainees should be designed to develop a workforce that is able to integrate as appropriate within the chosen industry as defined by the project. This should provide them with skills to work easily across disciplinary and other perceived boundaries and to interface with stakeholders such as academe, industry, government, and the general public. This can include training at K-12, two- year and four-year colleges as well as minority serving institutions to develop an inclusive workforce appropriate to populate the Industries of the Future. In particular, the proposed program should present an implementation strategy, informed by national best practices for building research competencies, research mentoring. The implementation strategy should include an initial baseline assessment, clearly articulated goals, milestones, and timelines.

4.4 Evaluation and Assessment Plan (2 pages maximum). It is required that an independent expert evaluator will provide annual evaluation and assessment on all aspects of the project. In addition, quantitative collection is required as part of the centralized project output data-collection (see below) and should be used in concert with any additional quantitative or qualitative data collected by the evaluator.

The Evaluation and Assessment plan should be an integral part of the project design to aid in the identification of outcomes and impacts of the project’s goals and objectives as well as a tool for providing effective feedback to the management team. Evaluation plans should include strategies for formative and summative assessments, including goals, metrics, and milestones. The plan must include metrics for the strength of the collaboration and workforce development, including submission of collaborative proposals and associated awards, collaborative publications, progression of early-career faculty, innovations, research results, longitudinal tracking of undergraduates, graduate students, and post docs, and it should document how the collaborative efforts evolve over time.

In addition to the project-specific evaluation, all RII Track-2 FEC awardees will also be required to participate in a centralized project outcomes data-collection activity coordinated by NSF EPSCoR and carried out by its designated entity. This activity is intended to facilitate standardized, accurate metrics tracking across projects and to complement the projects’ individual evaluation and assessment efforts. The proposal budget must include funds for this activity. See Budget Information (section B below).

4.5 Management and Implementation Plan (2 pages Maximum). RII Track-2 FEC projects inherently carry a high administrative burden that must be managed effectively for the projects to succeed. Proposals must include a comprehensive plan for the project’s management, including the roles and responsibilities of key personnel, how the PI and Co-PIs plan on communicating and coordinating with each other and the project team, how the centralized project output data-collection will be integrated into their evaluation mechanisms as described above, and how the project’s administrative requirements will be managed across all areas. Describe the responsibilities of any administrative staff that are expected to support the project on a full or part-time basis.

Proposals will also include a clear implementation plan and timeline that will contain an outline for how this project will bring together previous documented research outcomes and build on them through this proposal. This should contain details of how the research will be coordinated across jurisdictions to bring it to meet the needs of the target industry and relevant jurisdiction(s) for eventual implementation.

5. References Cited. All references cited in the Project Description should be listed here. See [PAPPG Part I Chapter II section C.2.e](#). While there is no page limitation for references, this section must include bibliographic citations only and must not be used to provide parenthetical information outside of the Project Description page limitations.

6. Biographical Sketches. Include biographical sketches for all key personnel including each faculty and equivalent-level participant according to [standard NSF proposal guidelines](#). It is permitted to include biographical sketches for any named collaborators (“Other Personnel”) whose expertise is crucial to the success of the project, including the external evaluator(s). If doing so, these biographical sketches must be uploaded under Supplementary Documentation and they must conform to NSF guidelines for biographical sketches (including being limited to two pages each). Do not include biographical sketches for members of External Advisory Committees or Boards, as they are not considered project participants.

7. Budget Pages and Budget Justification. The budget should be consistent with and appropriate to the scope of the activities presented in the project description. Prepare budget pages for each year of support and a budget justification (not to exceed five pages). A cumulative budget page will be automatically generated. Budgets for participating organizations in the collaboration should be included in the lead organization’s budget as subawards. Each organization that receives a subaward must also submit a separate budget and budget justification (not to exceed five pages). See Budget Information (section B below).

8. Current and Pending Support. List current and pending support for each faculty-level and equivalent investigator. See [PAPPG Part I Chapter II section C.2.h](#).

9. Facilities, Equipment, and Other Resources. Each EPSCoR jurisdiction in the collaboration should provide a description of available facilities, equipment, and other resources relevant to the project. See [PAPPG Part I Chapter II section C.2.i](#).

10. Supplementary Documentation (in addition to those required by the PAPPG)

- List of Participants. Provide a list of participating senior investigators (faculty level and equivalent) by name, organization, and departmental affiliation.
- List of all institutions and companies involved in the project (including location).
- No Letters of Collaboration should be included; for both the established and new collaborations included in this project, the role and extent of involvement should be clearly outlined in the project description.
- Up to a maximum of five Letters of Support from partnering institutions/organizations or jurisdictional officials may be included.

11. Single Copy Documents (Collaborators & Other Affiliations - COA - Information)

Proposers should follow the guidance specified in Chapter II.C.1.e of the NSF PAPPG. Grants.gov Users: The COA information must be provided through use of the COA template and uploaded as a PDF attachment.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

- Funding requests can be for durations of up to 4 years. The allowed RII Track-2 FEC award amount depends on the number of participating EPSCoR jurisdictions. If organizations from two RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1 million per year. If institutions from three or more RII-eligible EPSCoR jurisdictions collaborate on a proposal, the award amount may not exceed \$1.5 million per year.
- Budgets should include sufficient funding for participation in annual jurisdictional and regional EPSCoR conferences, and in one kickoff meeting for all PIs and at least one of each jurisdictional co-PIs at the NSF Headquarters in Year 1 only.
- RII Track-2 projects are expected to host or facilitate project-wide meetings such as EPSCoR all-hands workshops and/or science symposia which include support for student (undergraduate and graduate as appropriate) participants of the RII Track-2 project.
- Budgets for participating organizations must be included as subawards to the budget of the submitting organization. Only the budget of the submitting organization may include subawards (i.e., no subawards may appear in the budgets of subawardee organizations). Each subaward must include a separate budget justification of no more than five pages (see PAPPG Chapter II section 2.g).
- Subawards to institutions in non-EPSCoR jurisdictions are not allowed. NSF EPSCoR reserves the right to disallow any such costs prior to making an award.
- Budgets should include support for NSF centralized project data collection activities for the life of the award including any no-cost-extensions (estimated at \$12,500 per year to be entered in budget line G.6:Other).
- In addition to NSF centralized project data collection activities an external evaluator is required of all RII Track-2 projects. Financial compensation for any external evaluator(s) involved in the project must be included in the budget of the submitting organization under NSF budget line G.3(Consultant Services). No other form of financial compensation for external evaluation services is allowed.
- **Proposals with budgets that departs from these instructions will be considered not responsive, and may be returned without review.**

C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. submitter's local time):

December 18, 2020

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

January 25, 2021

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

Reviewers for the RII Track-2 FEC competition will also consider the following specific aspects of intellectual merit and broader impacts, as applicable:

- The responsiveness of the proposed project to the identified programmatic focus area: **"Advancing research towards Industries of the Future to ensure economic growth for EPSCoR jurisdictions."** Does the project bring together several researchers and jurisdictions that have documented outcomes in a particular Industry of the Future, and will the project move them towards being able to leverage their industry to contribute to the economic growth of a jurisdiction(s)? Does this involve understanding the societal implications of expanding this industry? Does this involve the development of a well-trained workforce that can contribute to the industry within that jurisdiction?
- Research Capacity – What is the potential of the project to advance the relevant fields of science and engineering while simultaneously enhancing research competitiveness and developing research capacity and infrastructure in the jurisdictions (including physical, cyber, and human resources)? How will the proposed activities contribute to the national and international reputations of the project participants and participating institutions? What is the potential of the project to improve the ability of the participating institutions and participants to compete for and successfully conduct innovative research projects in the future?
- Interjurisdictional Collaboration - Are the PI and co-PIs active researchers in the focus areas being proposed, with recent publications or extramural awards in the focus area indicating that they can form the intellectual nucleus for a sustained collaborative effort? How do the research activities in different jurisdictions support and foster a sustained collaborative effort? Is the scope of work such that no single jurisdiction could accomplish the goals individually? Is the collaboration balanced, among jurisdictions and institutions, such that each participant is contributing to and benefitting from the project at an appropriate level? Are the projects well administered and does the project present plans to be able to sustain the industry in the jurisdiction(s) beyond the scope of the award?
- Workforce Development – What is the potential for the proposed activities to recruit and/or develop early-career faculty in the focus area of the proposal and prepare them for sustained productivity? What is the potential for the proposed activities to sustain a pipeline of highly skilled students and postdoctoral fellows that can excel in this focus area and succeed in careers in academia and/or industry? In an effort to prepare a workforce that is able to engage in the industries of the future, how effectively will diverse populations (e.g., of women and underrepresented groups in STEM, persons with disabilities, economically disadvantaged, rural, and/or first-generation college students) and institutions (e.g., minority serving institutions and 2- and 4-year institutions) be engaged in the research and education activities? What novel and effective ways are proposed to achieve the workforce development goals?
- Jurisdictional Impacts - What is the potential to achieve meaningful and sustained impacts within the jurisdictions with respect to their education capacity, economic development, and quality of life? How will the plans and activities lead to sustainable improvements in workforce preparation and research competitiveness of the jurisdictions? How do the proposed activities promote organizational connections and linkages within the jurisdictions, and between private and public sectors? How does the project advance innovation, technology transfer, and potential commercialization?
- Integration of Project Elements - How well are the different aspects - research, education, innovation, workforce development, sustainability, project coordination, and evaluation - described and integrated in the project? What are the innovative ways in which the project addresses these components in tandem? What benefits or added value will be realized as a result of integrating the project elements? What is the potential of the project to reach its education and workforce development goals and objectives as a result of the proposed research, and vice versa? What is the level of integration among shared facilities and research partners?

B. Review and Selection Process

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

Reviewers will be asked to 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=papppg.

Special Award Conditions:

The annual and final reports must include identification of numbers of women and members of other underrepresented groups in faculty and staff positions and as participants in the activities funded by the award.

TBD - Programmatic Terms and Conditions:

Programmatic Terms and Conditions, if applicable, are outcomes of the proposal specific merit review process.

TBD - Financial and Administrative Terms and Conditions:

EPSCoR funds must be expended within EPSCoR jurisdictions.

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 apply. Please see the "Special Award Conditions" section.

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:

- John-David Swanson, telephone: (703) 292-2898, email: jswanson@nsf.gov
- Jose Colom-Ustariz, telephone: (703) 292-7088, email: jcolom@nsf.gov
- Eric W. Lindquist, telephone: (703) 292-7838, email: elindqui@nsf.gov
- Subrata Acharya, telephone: (703) 292-2451, email: acharyas@nsf.gov
- Andrea Johnson, telephone: (703) 292-5164, email: ANDJOHNS@nsf.gov
- Jeanne Small, telephone: (703) 292-8623, email: jsmall@nsf.gov
- Timothy M. VanReken, telephone: (703) 292-7378, email: tvanreke@nsf.gov
- Chinonye Whitley, telephone: (703) 292-8458, email: cnnakwe@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>.

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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.

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.

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- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
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- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-8134
- **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
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