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NSF Convergence Accelerator Phases I and II for the 2021 Cohort

PROGRAM SOLICITATION
NSF 21-572

National Science Foundation

Convergence Accelerator Office

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

May 05, 2021

Letter of Intent (required for Phase I Full Proposals only)

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

June 14, 2021

Phase I Full Proposals

May 25, 2022

Phase II Full Proposals, only Phase I awardees are eligible to apply

IMPORTANT INFORMATION AND REVISION NOTES

IMPORTANT INFORMATION

A key aspect of Convergence Accelerator projects is the innovation curriculum that requires a significant time investment and frequent participation of all partners such as academia, industry, non-profit, government, and other sectors under the guidance of coaches (see section V and a link to a sample curriculum can be found here). The curriculum includes a team science and human-centered design approach that rapidly moves projects towards deliverables in both Phase I and Phase II that will have broad scale national impact.

REVISION NOTES

The substantive changes in this FY 2021 solicitation include:

- The Phase I preliminary proposal in the previous solicitation has been replaced by a Letter of Intent that is required for all Phase I Full Proposals. The Letter of Intent due date is May 5, 2021. Submitting a letter of intent is required in order to submit a Phase I Full Proposal.
- The solicitation has been revised to provide more details regarding the innovation curriculum and the significant time investment associated with this activity.
- Meetings, including those associated with the curriculum, Pitch Presentations, and Expo reflect changes in format resulting from the COVID-19 pandemic.
- In the Proposal Preparation Section for Phase I Full Proposals and Phase II Full Proposals, elements that were previously asked for in Supplementary Documents, have been moved to the Project Description that now includes a list of sections.
- In Full Proposals, *Letters of Collaboration* are now submitted in a standard format. The participation of any unfunded collaborators in the project must be substantive and their roles and responsibilities should be clearly described in appropriate sections of the Project Description.

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:

NSF Convergence Accelerator Phases I and II for the 2021 Cohort

Synopsis of Program:

The NSF Convergence Accelerator program addresses national-scale societal challenges through use-inspired convergence research. Using a convergence approach and innovation processes like human-centered design, user discovery, and team science and integration of multidisciplinary research, the Convergence Accelerator program seeks to transition basic research and discovery into practice—to solve high-impact societal challenges aligned with specific research themes (tracks).

NSF Convergence Accelerator tracks are chosen in concordance with the themes identified during the program's ideation process that have the potential for significant national impact. The NSF Convergence Accelerator implements a two-phase program. Both phases are described in this solicitation and are covered by this single solicitation and corresponding Broad Agency Announcement. The link to the Broad Agency Announcement can be found here. The purpose of this parallel activity is to provide increased opportunities for proposals that are led by non-academic entities. Proposals that are led by Institutions of Higher Education (IHEs), non-profits, independent museums, observatories, research labs, professional societies and similar organizations should respond to this solicitation. Proposals led by for-profit or similar organizations should respond to the BAA. Phase I awardees receive significant resources to further develop their convergence research ideas and to identify important partnerships and resources to accelerate their projects, leading to deliverable research prototypes in Phase II.

This solicitation for FY 2021 invites proposals for the following Track Topics:

Networked Blue Economy (Track E)

The overarching goal of Track E is to interconnect the Blue Economy and accelerate convergence across ocean sectors. This track aims to create a smart, integrated, connected, and open ecosystem for ocean innovation, exploration, and sustainable utilization. It will provide a highly innovative set of interconnected tools, techniques, methods, and educational resources, as well as improve human engagement with ocean resources. The cohort of projects supported through this track will ultimately lead to a range of innovative partnerships involving stakeholders in ocean-related science and engineering, coastal communities and a diverse set of entities and organizations engaged in the Networked Blue Economy. Collectively, this cohort will produce products, processes, and resources that will allow the US to develop avenues for a more sustainable engagement with the ocean both as an environment and as a resource. The cohort of synergistic projects funded through this track will help our nation and our citizens effectively combat challenges in the ocean while simultaneously unleashing the power of the Networked Blue Economy.

Trust & Authenticity in Communications Systems (Track F)

The overarching goal of Track F is to develop prototype(s) of novel research platforms forming integrated collection(s) of tools, techniques, and educational materials and programs to support increased citizen trust in public information of all sorts (health, climate, news, etc.), through more effectively preventing, mitigating, and adapting to critical threats in our communications systems. The cohort of projects supported through this track will catalyze innovative partnerships involving the full range of information consumers and a diverse set of organizations focused on engendering trust and authenticity in communications systems. Collectively, the cohort of projects will produce products, processes, and resources to enable a more trustworthy communications ecosystem by focusing on the range of content platforms, new and enhanced services to improve the fidelity of communications between platforms and information consumers, and education and training materials to create better informed consumers.

In each track (E or F) it must be evident how the proposed work will be integrated to achieve success of the entire track. Each proposal should include a description of how the proposed project will contribute to an integrated environment that will deliver beneficial outputs for the track. It should also be clear how the projects will convergently align with the overarching goal of each track rather than as independent projects.

Proposers are required to submit a Letter of Intent in order to submit a Phase I Full Proposal. The information required in the Letter of Intent is described in section V.

Letters of Intent should identity a team with the appropriate mix of disciplinary and cross-sector expertise required to build a convergence research effort. Letters of Intent must identify one or more deliverables, how those research outputs could impact society at scale, and the team that will be formed to carry this out.

Phase I proposals must describe the deliverables, a research plan, and the process of team formation that will help lead to a proof-of-concept during Phase I.

If selected, Phase I awards may receive funding up to $750,000 for 12 months duration, of which nine months includes intense hands-on activities, centering around the Program's innovation curriculum (for additional details regarding the innovation curriculum refer to section V.A.), and three months of other activities such as participation in the NSF Convergence Accelerator Pitch Presentations and Expo.

During the nine-month intensive planning phase, teams will participate in a curriculum that will assist them in strengthening team convergence and accelerating the identified idea toward Phase II. The curriculum provides modules on innovation processes, including human-centered design, user discovery, team science, and integration of multidisciplinary partnerships. Teams will also be provided with coaches who will support them in Phase I and who may continue with them into Phase II if the teams wish to continue with the same coach. Alternatively, the teams can request to work with a different coach.

Only awardees of Phase I awards under this solicitation may submit a Phase II proposal. Phase II proposals must outline a 24-month research and development plan that transitions research into practice through convergence activities, multi-sector partnerships, and collaboration with other partners and end-users.

If selected for Phase II, teams will be expected to apply program fundamentals and innovation processes gained in Phase I to enhance partnerships, develop a solution prototype, and build a sustainability model to continue societal impact beyond NSF support.

Phase II awards may be up to $5 million for 24 months. Phase II proposals must clearly describe deliverables that will be produced within 24 months. The Phase II teams must include partnerships critical for success and end-users (e.g., industry, Institutions of Higher Education (IHEs), non-profits, government, and others), each with a specific role(s) in deliverable development and facilitating the transition of research outputs into practical uses. Successful Phase II proposals will be funded initially for 12 months, with a second year being provided on the basis of an assessment of performance (see below).

Each Phase II team's progress will be assessed during the year through approximately four virtual and/or in-person meetings with NSF program staff. At the end of 12 months, overall progress will be evaluated based on a report and presentation that the team presents to a panel of internal and/or external reviewers. Phase II teams that show significant progress during the first year in accordance with the agreed

timetable of milestones and deliverables will receive funding for a second year. Phase II teams must plan on completing the effort within 24 months. No-cost extensions are **not** permitted except under clearly documented exceptional circumstances. Grantees must first contact the cognizant Program Officer prior to submitting a request.

The NSF Convergence Accelerator program is committed to research that derives expertise from and provides broad benefits to everyone. The program places a very strong emphasis on broadening participation by encouraging proposals from, and partnerships with, minority-serving institutions (e.g., Historically Black Colleges and Universities (HBCUs), Tribal Colleges, Hispanic Serving Institutions, Alaska Native-Serving Institutions, and Native Hawaiian-Serving Institutions), and other organizations.

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.

- Chaitanya K. Baru, telephone: (703) 292-2473, email: cbaru@nsf.gov
- Lara A. Campbell, telephone: (703) 292-7049, email: lcampbel@nsf.gov
- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov
- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov
- Michael Pozmantier, telephone: (703) 292-4475, email: mpozmant@nsf.gov
- Christopher Sanford, telephone: (703) 292-7512, email: csanford@nsf.gov

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

- 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Standard Grant or Cooperative Agreement

Estimated Number of Awards: 30 to 38

25-30 Phase I Awards made as standard grants and 5-8 Phase II Awards made as cooperative agreements.

Anticipated Funding Amount: $22,000,000

Anticipated funding is $22,000,000, pending availability of funds, to support Phase I awards in FY 2021. Proposers may request up to $750,000 for Phase I.

Phase II awards depend on the availability of funds and the number of Phase II awards. Phase II proposals may request up to $3,000,000 for year 1 and up to $5,000,000 in total for the 24 month Phase II project.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- All Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges), IHEs in EPSCoR jurisdictions, Minority Serving Institutions (MSIs) including Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities, and Asian American and Pacific Islander Servicing Institutions (AAPISIs) 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.

  Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

  For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

The PI and any co-PIs must hold an appointment at an organization that is eligible to submit as described under "Who May Submit Proposals." At least one PI or co-PI from a Phase I award must be included as a PI or co-PI on a Phase II proposal. The same individual who served as PI for the Phase I award does not have to be PI for the Phase II proposal. Any change of PI and co-PI should be fully explained in the proposal.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

Phase I proposals

An individual may serve as PI or co-PI on no more than two Phase I proposals. Submissions to the BAA are included in this number.

Phase II proposals
Anyone may serve as a PI or co-PI on only one Phase II proposal. This limitation includes PIs and co-PIs listed for the proposing organization or any subaward submitted as part of the proposal. There are no restrictions or limits on serving as other Senior Personnel.

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):

    May 05, 2021

        Letter of Intent (required for Phase I Full Proposals only)

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

    June 14, 2021

        Phase I Full Proposals

    May 25, 2022

        Phase II Full Proposals, only Phase I awardees are eligible to apply

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:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

Research is often driven by a compelling societal or scientific challenge; however, it may take the researcher community years to develop a solution. To deliver tangible solutions that have a societal impact and at a faster pace, the NSF Convergence Accelerator brings together multiple disciplines, expertise, and partnerships from academia, industry, non-profit, government, and other sectors together to develop solutions to solve national grand challenges through convergence research.

Convergence Research is a critical mechanism for solving many vexing research problems, especially those stemming from complex societal and/or scientific challenges. In this NSF Convergence Accelerator Phase I and Phase II solicitation for FY 2021, NSF seeks to support and facilitate research that advances ideas from concept to deliverables in two overall convergence research topics (tracks).

The FY 2021 NSF Convergence Accelerator consists of two tracks as follows:

Networked Blue Economy (Track E)

Trust & Authenticity in Communications Systems (Track F)

The NSF Convergence Accelerator seeks to support use-inspired research and enable the accelerated transition of that research into benefits for society through a two-phase process.

Phase I: Learning + Applying the Convergence Accelerator Fundamentals, Convergence Research Planning
Phase I is for funding up to $750,000 for 12 months duration. Nine months of effort are required for planning to further develop the initial concept, identify new team members, participate in the innovation curriculum, and develop an initial prototype. The innovation curriculum consists of training with professional coaches in human-centered design, team science activities, inter-team communications, pitch preparation, developing a Public Executive Summary and presentation coaching—all of which are essential components of the Convergence Accelerator's model. This training helps the teams better prepare to be successful in the next phase. At the end of Phase I, teams will spend the remaining three months presenting to a pitch review panel as part of their Phase II proposal, and participating in the NSF Convergence Accelerator Expo (Expo) and other activities.

Phase II: Continued Application of the Convergence Accelerator Fundamentals, Prototyping and Sustainability Planning
Teams from Phase I will be selected to proceed to Phase II, with potential funding up to $5 million under a cooperative agreement for 24 months. Phase II teams will continue to apply Convergence Accelerator fundamentals, including identifying new team members and end-user partnerships to further develop solution prototypes and to build a sustainability model to continue impact beyond NSF support. Near the 12-month mark, the NSF Convergence Accelerator Office will review the projects to ensure each team is working towards the expected deliverables. By the end of Phase II, teams are expected to provide some form of prototype or deliverable that will have broad scale national impact.

II. PROGRAM DESCRIPTION

This NSF Convergence Accelerator Phase I and Phase II solicitation seeks to address topics described in the convergence tracks identified above and detailed below. Phase I awards are grants for planning and preliminary prototyping of projects that leverage basic research investments. Phase II awards are cooperative agreements for projects that build upon the Phase I efforts, leading to rapid research advances to deliver useful results and impactful solutions to society.

The guiding rationale of the NSF Convergence Accelerator is that a high level of interdisciplinarity and engagement with multiple diverse stakeholders, including researchers and the ultimate users of research products, is essential to deliver progress on scientific challenges of societal relevance — such as those embodied by the two tracks in this solicitation.

Successful NSF Convergence Accelerator proposals are expected to have four important characteristics: 1) *convergence* research approach; 2) strong, multi-organization *partnerships* involving researchers, users, and other stakeholders; 3) high probability of successful *deliverables within a 24 month period* that will ultimately benefit society (such as those discussed under the Tracks in Section II, Program Description), and 4) *strong alignment with the track goals* as described in this solicitation.

TRACKS

Networked Blue Economy (Track E)

The overarching goal of Track E is to interconnect the Blue Economy and accelerate convergence across ocean sectors. This track aims to create a smart, integrated, connected, and open ecosystem for ocean innovation, exploration, and sustainable utilization. It will provide a highly innovative set of interconnected tools, techniques, methods, and educational resources, as well as improve human engagement with ocean resources. The cohort of projects supported through this track will ultimately lead to a range of innovative partnerships involving stakeholders in ocean-related science and engineering, coastal communities and a diverse set of entities and organizations engaged in the Networked Blue Economy. Collectively, this cohort will produce products, processes, and resources that will allow the US to develop avenues for a more sustainable engagement with the ocean both as an environment and as a resource. The cohort of synergistic projects funded through this track will help our nation and our citizens effectively combat challenges in the ocean while simultaneously unleashing the power of the Networked Blue Economy.

Ocean-related industries and resources have always been important for humanity; and they are expected to play a central role over the next decades in addressing challenges related to climate, sustainability, food, energy, pollution, and the economy. Recognizing this opportunity, Track E of the NSF Convergence Accelerator seeks proposals to create use-inspired, integrative solutions to enable a *Networked Blue Economy*. The goal of this undertaking is to facilitate making connections between ocean resources, data, technologies, training, and impacted communities. In developing a sustainable *Networked Blue Economy* that provides societal impact, there are presently many obstacles and challenges to overcome. Addressing these requires deep integration and collaboration among many disciplines as well as transformative and innovative partnerships across academia, industry, the public, local/regional communities, non-profit organizations, and federal, state, and local government agencies. Successful projects in this track should incorporate expertise, insights, methods, facilities, and tools from multiple disciplines as well as direct participation from impacted communities.

Building upon the strength of the United States in ocean sciences, with its extensive offshore economic zone and sea and seabed assets (~12 million km^2) and marking the start of the UN Decade of Ocean Science for Sustainable Development, this track seeks to fulfill its promise by accelerating the development of bold, new, interconnected projects that tackle the obstacles imposed by the disconnected and fragmented nature of the many ocean-related sectors, technologies, and communities. These challenges have been noted by recent national and international reports, including those from the National Academy of Engineering (2018, Ocean Exploration and its Engineering Challenges), the US Department of Energy (2019, Powering the Blue Economy), the UN Decade of Ocean Science (https://en.unesco.org/ocean-decade), and the Smart Oceans 2020 workshop sponsored by NSF (https://www.media.mit.edu/events/smart-oceans-2020/, http://www.mit.edu/~fadel/papers/Executive_Summary_Ocean_IoT.pdf).

Acceleration of a *Networked Blue Economy*, one that advances both ocean-related economic interests and environmental preservation and sustainability, is a challenge that requires effort and collaboration among disparate disciplines. Achieving this vision requires an accelerated and concentrated effort focused on creativity; innovative ideas and technologies; the ability to collect, aggregate, process, and interpret data and information such that stakeholders from across the spectrum of users can readily obtain the information they need; and improved means to measure and monitor all aspects (chemical, physical, and biological) of the ocean and their interconnections. This track is intended to serve as a platform that offers an opportunity to the community to bring in expertise, insights, methods, and tools from multiple areas including, but not limited to, observational oceanography, biology, health sciences, cultural issues, engineering, computer/data science, social sciences, behavioral sciences, ethics, public policy, and economics. The resulting collaborative projects must be directed toward ensuring more sustainable use of ocean resources.

Convergence Research, Deliverables, and Diversity and Inclusion. The *Networked Blue Economy* track focuses on use-inspired, translational research. Projects must embrace and display a culture of convergence among disciplinary approaches, and must include partners from multiple sectors. Projects must articulate one or more clear deliverables that will help transition research into practice with measurable impacts and benefits to society within the less than 3-year effort of a Convergence Accelerator track—9 months of Phase I and 24 months of Phase II. Deliverables must address challenges in sustainable ocean utilization while providing significant benefits to society. Each project should incorporate community engagement and strive to include an education or training component that connects user communities. Such connections could include, but are not limited to, citizen science, co-designing projects so they provide benefits to local communities or provide user-friendly data products and services, or creating workforce training programs. Projects should consider potential benefits to local communities from the data and insights produced by project efforts and by enabling communities to participate in project evaluation activities. Projects that focus specifically on community engagement and education are also encouraged. Proposals should be explicit in how diversity, equity, and inclusion will be incorporated into the overall project.

Outcomes and sample topics of *a Networked Blue Economy* might include, but are not limited to:

- Sustainable Utilization : In industries such as aquaculture, fisheries, energy, mapping, tourism & recreation, shipping & maritime transportation and commerce, preservation efforts (plastics, marine debris, & unexploded ordnance)
- Climate & Ecology : Leverage, reuse, and network existing data and modeling capabilities and resources to develop monitoring and forecasting processes for weather, air-sea interaction, corals, marine ecosystems, marine animals and plants, carbon/acidification, currents & waves, aerosols, and sea ice.
- Networked, Cost-Effective, and Interoperable Ocean Systems & Technologies: Networked infrastructures (e.g., communications, power, localization), novel instrumentation, distributed and interoperable sensors (e.g., ultra-low- power or self-powered sensor networks, low-cost underwater GPS, reliable sensors for aquaculture, waste, carbon, optical, chemical), instrumentation (e.g., imaging, remote sensing, autonomous robotics).
- Data aggregation techniques for Ocean Big Data: Algorithms and Artificial Intelligence for deployment, inference, and decision-making, high resolution/largescale observation & prediction tools – for disaster risk reduction, pollution mitigation, sensors and robotics tools & technology, and IoT (Internet of Things) integration into ocean environments.
- Empowerment and Engagement : Scalable efforts at the community level in topics such as sustainability, resiliency, increasing awareness and public participation in science, engagement at the policy level, scalable efforts in literacy, and workforce education and training.
- Interconnected People, Communities, and Curricula : Projects to empower communities to deal with local/regional issues including disaster risk reduction, coastal resilience, and coastal restoration. These efforts may develop and implement a variety of approaches, including place-based strategies, accessible tools for engaging public participation in ocean STEM, hubs for engaging with local communities, Networked Blue Economy curricula that address, for example, policy, mentorship, technology translation, and social engagement.

Trust & Authenticity in Communications Systems (Track F)

The overarching goal of Track F is to develop prototype(s) of novel research platforms forming integrated collection(s) of tools, techniques, and educational materials and programs to support increased citizen trust in public information of all sorts (health, climate, news, etc.), through more effectively preventing, mitigating, and adapting to critical threats in our communications systems. The cohort of projects supported through this track will catalyze innovative partnerships involving the full range of information consumers and a diverse set of organizations focused on engendering trust and authenticity in communications systems. Collectively, the cohort of projects will produce products, processes, and resources to enable a more trustworthy communications ecosystem by focusing on the range of content platforms, new and enhanced services to improve the fidelity of communications between platforms and information consumers, and education and training materials to create better informed consumers.

Modern life is increasingly dependent on access to communications systems that offer trustworthy and accurate information. Economic growth and opportunity depend on dynamic innovation and transaction networks that connect American families, communities, and businesses to an expanding range of goods and services that improve the quality of life. Yet these systems face a common threat; communication systems can be manipulated or can have unanticipated negative effects. Hackers can attempt to disrupt information exchanges, either by targeting an entire system or working to reduce the reliability of, or confidence in, the information that is being exchanged. Introducing misinformation into communication flows can disrupt the performance of a wide range of activities and the functioning of civil society. Although false claims and other inauthentic behaviors have existed throughout history, the problems that they cause have reached critical proportions resulting from the massive scale of targeting and personalization, the rapid speed of information exchange, and the ability to automate information dissemination. These problems have been discussed in a number of venues including a recent NSF-funded workshop on Inauthentic Behavior in Online and Digital Systems [IBODS2020] and a 2020 workshop on Addressing Health Misinformation Through Health Literacy Practices conducted by the National Academies of Science [NAS2020].

The Convergence Accelerator Track F will address the urgent need for tools and techniques that help our nation more effectively prevent, mitigate, and adapt to critical threats to communication systems. There is urgent need for strategies that increase the verifiability of different types of data and content, improve our understanding of the incentives, organizational, cultural, and governance contexts associated with inauthentic behaviors, and increase individual and organizational capacity to prevent or mitigate the impact of false claims, content, and identities. More broadly, democratic societies must educate individuals across all populations and all segments of society to respect both accurate information and freedom of expression. Projects in Track F will pursue a convergence research agenda and leverage multi-sector partnerships to address issues of trust and authenticity in communication systems, including predicting, preventing, detecting, correcting, and mitigating the spread of inaccurate information that harms people and society. Convergence is essential across a range of disciplines that inform this issue including, but not limited to, psychology, economics, policy science, law, computer science, biological sciences, engineering, and others. Education is essential to ensure that students (and adults) are equipped with critical thinking skills to discern fact from fiction. High quality STEM education is important for public science literacy: https://www.nap.edu/read/23595/chapter/2. Projects must articulate one or more clear deliverables that will help transition research into practice with measurable impacts and benefits to society within the less than 3-year effort of a Convergence Accelerator track—9 months of Phase I and 24 months of Phase II. Projects are strongly encouraged to consider the full range of audiences across all segments of society that may be impacted by inauthentic communications.

Convergence Research, Deliverables, and Diversity and Inclusion. One area for convergence research is to more clearly identify challenges faced by existing communications systems and platforms that seek to establish and maintain high levels of trust. New methods of encouraging accurate representations of people and products, improving privacy protection, improving the performance of adversary tolerant systems, and many related activities can give many stakeholders improved capacity to detect, monitor, manage, and mitigate inauthentic behaviors and misinformation campaigns before they cause significant damage. Deliverables may include solutions to be implemented by organizations that own or operate communication platforms. They may include data-intensive techniques to detect and validate accurate and inaccurate information, development of effective user or consumer alert systems, and tools to help people interpret the information they receive. Also, deliverables might include third-party tools and techniques located between content platforms and consumers to assist consumers in identifying trustworthy information and sources and misinformation. Solutions should identify which groups in society they seek to address. Another important set of deliverables could be education and training programs for a better-informed citizenry for children and adults of all ages and at all levels of understanding. Consideration of the needs of diverse populations is essential. Different populations may hew to different standards of trust, may exhibit different vulnerabilities to disinformation methods, and may hold different notions of authenticity. Projects should define their concepts and be explicit about their approach to addressing diversity and inclusion, describing which segment(s) of the population they wish to address with their solutions.

Outcomes and sample topics of *Trust and Authenticity in Communication Systems* might include, but are not limited to:

- Data-driven models of trust, authenticity, and authentic behaviors in communications systems: Development and deployment of advanced analytics- and AI/ML-based techniques to enable content platform providers to detect and delineate indicators of misinformation and inauthenticity.
- Software tools and services that use a range of techniques, including use of big data and AI/ML, to help establish trust and authenticity of sources and channels in communications systems.
- Tools/services capable of alerting consumers to a range of misinformation, including misinformation campaigns and/or other inauthentic behaviors.
- Services situated between the sources (content platforms) and information consumer to provide independent verification of the information being conveyed to the consumer, as well as provide an assessment of the general trustworthiness of information sources.
- Data curation tools and processes that help improve trust in data and information.
- Education and training materials, tools, and environments targeted at various segments of the user community including K-12 education programs; and education and training programs and strategies for adult information consumers of various ages, and diverse experience and other demographic factors.
- Organization- and community-level policies on trust, authenticity, and inauthentic behaviors.

KEY COMPONENTS OF THE NSF CONVERGENCE ACCELERATOR

Letters of Intent, Phase I proposals, and Phase II proposals must address the following key components. See section VI.A (solicitation specific review criteria) for more detail.

Convergence Research
Research and development efforts proposed must represent the highest level of multidisciplinary expertise in convergent research needed to encompass the full scope of the topic selected. Since transition to practice is a core goal of the Convergence Accelerator, projects need to include personnel with expertise relevant to applications and use, as well as the technologies themselves. Teams must include the necessary expertise in appropriate areas of the physical sciences, math, engineering, data and computer sciences, biological sciences, geological sciences, social and behavioral sciences, General education and science education, and other disciplines to ensure success.

Partnerships
Convergence Accelerator projects should embody use-inspired research that seeks to accelerate research to practice in ways that benefit society at a national scale. The Convergence Accelerator program seeks to encourage partnerships with many types of organizations from academia, industry, government, non-profit, and other sectors, to ensure that research efforts are use-inspired and have a clear path to transition to practice. Therefore, stakeholders from multiple types of organizations and sectors must be involved in ways that allow the project to identify and work with end users.

Letters of Intent should describe envisioned partnerships and a path to expand relationships as needed.

Phase I proposals must include non-academic partners who are directly engaged in the activities described and should include letters of collaboration, where necessary (refer to section V.A.). The proposal must also describe how additional partners would be identified and recruited, as needed.

Phase II proposals may engage cross-cutting partners in multiple ways:

As part of the effort described in the proposal. Partners may contribute effort and/or resources that are described under Facilities, Equipment and Other Resources. The NSF review process will consider the team qualifications and resources of the full effort described in the proposal.

- After a proposal is submitted, but before awards are made . Additional partners may provide an "*Expression of Interest*" especially following the Expo Presentations. Expressions of interest will be one element of NSF's decision-making process but are not a requirement for an award. An Expression of Interest could lead to an agreement directly with the proposing organization or a sub-awardee.
- An Expression of Interest from other units of the same organization that has already been identified as partners on a project will not be accepted due to potential conflicts of interest.
- Note that an *Expression of Interest*, as described above, does not guarantee an opportunity for partnership with one or more teams. Potential partnerships suggested by Expressions of Interest will be developed in collaboration with awardee teams. NSF's award-making process will not be tied to negotiation of agreements based on Expressions of Interest, and an Expression of Interest is not a requirement for a Phase II award.
- After awards are made. Partners or contributors may join projects through agreements developed directly with awardee organizations or NSF after an award has been made. These partnership agreements may be subject to terms and conditions of the NSF award.

Partnerships supported under this solicitation are not intended as a mechanism to conduct corporate sponsored research, though they may take advantage of synergistic activities. While NSF encourages engagement and submissions from for-profit entities, including sharing of data, tools, expertise, or other resources, fees or profit may not be requested in NSF proposals submitted under this solicitation.

Deliverables
Proposers must clearly identify the deliverables that will results from the proposed project and describe how those outputs will benefit society at a national scale . While deliverables may take many forms (e.g., hardware, software, data, services, processes, protocols, standards, and more) projects must clearly articulate how benefits to society would result from deliverables developed by the end of Phase II.

Track Alignment
The proposed effort must clearly match the goals described in one of the track descriptions. Track alignment and contributions to track success must be clearly described. The proposer must clearly describe both the track relevance (fit within the overall track topic or specific subtopic as described for Track E or F) and, also, how the proposed work fits into the overall goals of that Track to enable the transition of convergence research into practice.

Intellectual Property
Partnerships that facilitate the research effort and transition to practice of research results are a key component of the Convergence Accelerator program. Phase II proposals have a required Intellectual Property Management Plan which is essential for current and future partnerships.

The disposition of rights to inventions made by small business firms, large business firms, and non-profit organizations, including universities, during NSF-assisted research is governed by Chapter 18 of Title 35 of the USC, commonly called the Bayh-Dole Act and EO12591, as amended by EO 12618. Additional information can be found in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG Chapter XI.D). Potential awardees and their partners should familiarize themselves with the information in these documents. Intellectual property (IP) developed with funds from this award is subject to the Bayh-Dole Act and should be differentiated from IP developed separately and contributed by partners. An Intellectual Property Management Plan is a required element of every proposal (see supplementary documents below), and appropriate IP agreements will be required to be in place prior to an award being made.

The Intellectual Property Management Plan should clearly describe the management of (1) any pre-existing IP that is relevant to the project and (2) IP that may be developed during the award. The Intellectual Property Management Plan should also indicate the path through which any partners who join later could access IP when appropriate and allowed.

Broadening Participation in the NSF Convergence Accelerator
NSF is committed to broadening the participation in Science, Technology, Engineering, and Mathematics (STEM) fields and research endeavors of members of underrepresented groups—including women, Blacks and African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons with disabilities.

Broadening participation is a critical element to a successful Convergence Accelerator project capturing a diverse set of perspectives, ideas, and strengths. The Convergence Accelerator focuses on key elements (e.g., end-users, impact, convergence, acceleration, and deliverables), that include capturing all team member perspectives and expertise when determining the deliverables and project impact to society at scale. All proposal phases (e.g., Phase I proposals, and Phase II proposals) will be assessed on Broader Impacts and Intellectual Merit.

This solicitation requires that each project, in either Phase I or II, include a prepared *Broadening Participation Plan* (under Broader Impacts) that describes activities that will be undertaken to increase the participation of underrepresented groups in the project's research efforts. Examples of ways to engage groups and/or individuals that are underrepresented may include: through the expertise of personnel, via partnerships, through work with users and user groups, via engagement with stakeholders, through use of datasets that represent information about underrepresented groups, etc. The Broadening Participation Plan must include: (1) the context of the proposed broadening participation activity(ies), (2) the intended target population(s) for the activity, (3) the plan of activities over the project duration, (4) prior experience (if any) with broadening participation, and/or intended plan for preparation/training of project members in broadening participation, and (5) plans for the measurement and dissemination of outcomes in broadening participation. We particularly encourage partnerships with NSF INCLUDES Alliances and/or the National Network. More information, including potential metrics for activities and examples, can be found at the following links:

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289
https://www.nsf.gov/od/broadeningparticipation/bp.jsp
https://www.nsf.gov/od/broadeningparticipation/BIO_BroadeningParticipation_v4mt_508.pdf
https://www.nsf.gov/mps/broadening_participation/index.jsp
https://www.nsf.gov/cise/bpc/

III. AWARD INFORMATION

Anticipated Type of Award: Phase I: Standard Grant, Phase II: Cooperative Agreement

Estimated Number of Awards: 30 to 38

25-30 Phase I Awards, 5-8 Phase II Awards

Anticipated Funding Amount: $22,000,000

Anticipated funding is $22,000,000, pending availability of funds, to support Phase I awards in FY 2021. Proposers may request up to $750,000 for Phase I.

Phase II awards depend on the availability of funds and the number of Phase II awards. Phase II proposals may request up to $3,000,000 for year 1 and up to $5,000,000 in total for the 24 month Phase II project.

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

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- All Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges), IHEs in EPSCoR jurisdictions, Minority Serving Institutions (MSIs) including Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities, and Asian American and Pacific Islander Servicing Institutions (AAPISIs) 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.

  Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

  For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

The PI and any co-PIs must hold an appointment at an organization that is eligible to submit as described under "Who May Submit Proposals." At least one PI or co-PI from a Phase I award must be included as a PI or co-PI on a Phase II proposal. The same individual who served as PI for the Phase I award does not have to be PI for the Phase II proposal. Any change of PI and co-PI should be fully explained in the proposal.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

Phase I proposals
An individual may serve as PI or co-PI on no more than two Phase I proposals. Submissions to the BAA are included in this number.

Phase II proposals
Anyone may serve as a PI or co-PI on only one Phase II proposal. This limitation includes PIs and co-PIs listed for the proposing organization or any subaward submitted as part of the proposal. There are no restrictions or limits on serving as other Senior Personnel.

Additional Eligibility Info:

Phase II proposals
Eligibility to submit a Phase II proposal is limited to proposers who receive a Phase I Award under this solicitation. The organization that received the Phase I award does not have to be the proposing (lead) organization for the Phase II proposal, however they must have been part of the Phase I team. Any change of proposing organization from Phase I should be explained in the proposal.

Only one Phase II proposal may be submitted per Phase I award.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required)*:

Letters of Intent for Phase I are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

Letters of Intent for all tracks must be submitted via FastLane by 5:00 p.m. submitter's local time on the due date indicated elsewhere in this solicitation.

Letters of Intent are non-binding with respect to the team members, title, and specific goals of the research, but the track and thrust area(s) of the research in the Phase I proposal must match what was stated in the Letter of Intent. The Letters of Intent will not be used as pre-approval mechanisms for the submission of proposals, and no feedback will be provided to submitters. The Letters of Intent will be used by NSF to assess requirements for proposal review. For more

information on Letters of Intent, please review the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Note that no Supplementary Documents are allowed.

Letters of Intent should identity a team with the appropriate mix of disciplinary and cross-sector expertise required to build a convergence research effort. Letters of Intent must identify one or more deliverables, how those research outputs could impact society at scale, and the team that will be formed to carry this out.

A one-page Letter of Intent is required. The subject heading of the letter should include a brief title of the proposal and the name of the lead organization. Each letter must include the following:

1. The title must begin with "NSF Convergence Accelerator Track" followed by the track identifier (E or F) followed by a colon (e.g., NSF Convergence Accelerator Track E or F: Project Title).
2. Names, departmental and organizational affiliations, and expertise of the Principal Investigator and co-Principal Investigators. For proposals involving multiple organizations and partnerships, the same information should be provided for all subawardees; and
3. A brief description of the specific goals of the proposal and how the proposed convergence research and broad partnerships will lead to a deliverable that would be refined during Phase I and describe how the deliverable(s) would impact society.

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 not 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 4 Other Participating Organizations are permitted
- Submission of multiple Letters of Intent is permitted

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.

Collaborative proposals submitted as separate submissions from multiple organizations will not be accepted.

Phase I Full Proposals

Phase I efforts will focus on research plan development and team formation leading to a proof-of-concept and will include NSF-organized convenings for training and cross-cohort collaboration. The Phase I innovation curriculum is a significant time investment with frequent participation of all partners under the guidance of coaches (a link to a sample curriculum can be found here).

Proposers are strongly encouraged to consult the proposal preparation and submission instructions in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) or NSF Grants.gov Application Guide as they prepare their proposal. Proposals not compliant with the proposal preparation guidelines, as supplemented by the following instructions, may be returned without review.

Full proposals will be reviewed in accordance with the merit review criteria approved by the National Science Board (intellectual merit and broader impacts), and solicitation-specific criteria described below in Section VI.A.

Letters of Intent (LOI) are required for all Phase I proposals in response to this solicitation. A Phase I proposal submitted without a corresponding LOI will be returned without review.

Proposal Title: The title of the proposal must begin with "NSF Convergence Accelerator Track" followed by the track identifier (E or F) followed by a colon (e.g., NSF Convergence Accelerator Track E or F: Project Title). The rest of the title of the proposal should describe the project in concise, informative language, without use of acronyms, so that a technically literate reader can understand the project. The title should emphasize the science and engineering work to be undertaken and be suitable for use in the public press. The title does not need to be the same as the Letter of Intent, but it should reference the Letter of Intent if the title is not the same.

Personnel Listed on the Cover Sheet: Provide complete information requested on the cover sheet for the PI and up to four co-PIs.

Project Summary: Prepare as described in the PAPPG.

Project Description:

Project descriptions are a maximum of 15 pages and must contain a separate "Broader Impacts" section. Results from prior NSF support must be discussed (see PAPPG for guidelines).

The project description should include the following sections in the following order (a through g):

a. **Objectives and Significance of the Proposed Activity**
b. **Convergence Research**: Explain how the work conducted in Phase I represents research at the highest level of integration and interdisciplinarity. Explain how your project uses a convergent research approach, including discussing the intellectually distinct disciplines and areas of expertise needed. Discuss how you will identify additional areas of expertise that may be needed.

   Proposing teams MUST be comprised of researchers and stakeholders from different disciplines that can help catalyze the proposed scientific discovery and accelerate the transition of that innovation into practical use. Phase I teams can involve different partners than were mentioned in the Letter of Intent. However, at least one of the PI or co-PIs in the Phase I proposal must have been identified as a PI or co-PI in the Letter of Intent.

c. **Partnerships including a Roles and Responsibilities Table**: Describe how stakeholders from multiple kinds of organizations, including academic and non-academic partners, are poised to form deep and diverse partnerships in support of the proposed use-inspired research. Every team is expected to include at least two types of organizations (e.g., industry, government, academia). Describe the roles of different partners and team members in developing deliverables. The Roles and Responsibilities Table should also clearly identify the roles and responsibilities of all individuals and major groups and entities included in the project. The inclusion of a qualified project manager for effective oversight is strongly encouraged for Phase I proposals.

d. **Coordination Plan**: Describe a mechanism for how collaboration and team effectiveness will be promoted.
e. **Deliverables**: Describe potential future deliverables should the project continue beyond Phase I and describe the timeline for those deliverables. Phase II will end ~July 2024 and your deliverables are expected at that time. You should also discuss preliminary deliverables that will be developed in Phase I. Explain why there is a high probability that this plan will be achieved.
f. **Track Alignment**: Explain fully the alignment to one of the tracks in this solicitation (E or F) and how the proposed work in Phase I will assist in the success of the entire track.
g. **Broader Impacts that includes a Broadening Participation Plan**: As broadening participation is an important aspect of the Convergence Accelerator program (see section II) the Broader Impacts section MUST include a separate sub-section outlining a specific plan for broadening participation.

Supplementary Documents:

The proposal should include applicable supplementary documents as instructed in the PAPPG. The following items are to be provided as additional supplementary documents and do not count against the 15-page limit for the project description.

Letters of Collaboration:

Letters of support or endorsement for the project are not acceptable and will be cause for return without review.

Individuals whose role is discussed in the Project Description as providing assistance or collaboration to the project that is substantive in nature (but are not included in the budget, refer to PAPPG Section II.C.2.d.iv. Unfunded Collaborations) must verify their participation and role with a document in the following format.

To: Convergence Accelerator Program Director(s),

By signing below, I acknowledge that I will provide the assistance or collaborate as indicated in the proposal, entitled "_____" with _____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources described.

Signed: _____ Print Name:_____

Date: _____ Organization:_____

There is no limit on the number of letters of collaboration.

The role and involvement of the collaborator must be evident from relevant sections of the project description.

Data Management Plan: (*up to two pages*) In addition to the general elements of the data management plan described in the PAPPG, proposals should address within the Data Management Plan their plans for data-sharing across their team, across the track with other teams, and with the general public, during the project and after its completion as well.

Postdoctoral Researcher Mentoring Plan: (*up to one page*) As described in PAPPG Chapter II.C.2.j, each proposal that requests funding to support postdoctoral researchers must upload under "Mentoring Plan" in the supplementary documentation section, a description of the mentoring activities that will be provided for such individuals. Note that the Convergence Accelerator program differs in duration and goals from traditional academic research efforts. The Postdoctoral Research Mentoring Plan should reflect how mentoring will be appropriate for the specific roles of postdoctoral researchers in this project effort.

Personnel List Spreadsheet. The spreadsheet template can be downloaded by clicking **here**. Please read the instructions carefully. Using the Excel file template, compile information for all persons identified in the proposal as: "PI or co-PI" (i.e., those listed on the cover page); "Other Senior Personnel/Subawardee"; or "Other Personnel" who have a biosketch included in the proposal; or "Collaborators" for individuals who formally submitted a Letters of Collaboration. Only one spreadsheet should be submitted per proposal. The file must include the FastLane proposal ID assigned after submission of your proposal (i.e., not the Temporary ID # or Grants.gov ID #). Once completed, the file should be submitted by email to **Convergence-Accelerator@nsf.gov within one business day of proposal submission.** The purpose of this document is to assist the program manage reviewer selection. There are likely to be additional individuals and organizations in the COA (see single copy documents below) that are not included in the Personnel List Spreadsheet. If you are unsure of whether to include someone in the Personnel List Spreadsheet, err on the side of including the person.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers.

- **Collaborators & Other Affiliations (COA) Information.** As detailed in the PAPPG (II.C.1.e), information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. If you have correctly added biographical sketches for all persons, there should be a separate space within Single Copy Documents to upload each individual's file. The COA information must be provided through use of the COA template.
- **Suggested Reviewers and Reviewers Not to Include (optional).**

Phase II Full Proposals

Proposal Title: The title of the proposal must begin with NSF Convergence Accelerator Track" followed by the track identifier (E or F) followed by a colon (e.g., NSF Convergence Accelerator Track E or F: Project Title). The rest of the title of the proposal should describe the project in concise, informative language, without use of acronyms, so that a technically literate reader can understand the project. The title should emphasize the science and engineering work to be undertaken and be suitable for use in the public press. The title does not need to be the same as the Phase I proposal title.

Personnel Listed on the Cover Sheet: Provide complete information requested on the cover sheet for the PI and up to four co-PIs.

Project Summary: Prepare as described in the PAPPG.

Project Description:

Project descriptions are a maximum of 20 pages. Proposals should clearly describe the specific role and contribution of each team member or group. Proposals should describe how the proposer will organize collaboration among project members to promote team effectiveness, taking into account lessons learned from Phase I activities, such as human-centered design, user interviews, team science techniques, as well as domain-specific activities.

Proposing teams MUST be comprised of researchers and stakeholders from different disciplines that can help catalyze the proposed scientific discovery and accelerate the transition of that innovation into practical use. Phase II teams can involve different partners than were part of the Phase I proposal. However, at least one of the PI or co-PIs in the Phase II proposal must have served as a PI or co-PI for that project in Phase I. Any exception to this must be discussed with NSF in advance of proposal submission.

Results from prior NSF support must be discussed including work conducted during Phase I (see PAPPG for guidelines). The proposal must also include the following sections in the following order (a through k):

a. **Objectives and Significance of the Proposed Activity**
b. **Convergence Research**: Explain how the work conducted in Phase I and the work proposed in Phase II represent research at the highest level of integration and interdisciplinarity.
c. **Partnerships including a Roles and Responsibilities Table**: Describe how stakeholders from multiple kinds of organizations, including academic and non-academic partners, form deep and diverse partnerships in support of the proposed use-inspired research. Proposers should include a qualified project manager for effective oversight in Phase II projects.
d. **Coordination Plan:** (up to two pages) Each proposal must contain a *Convergence Coordination and Management Plan* that describes how the project will be managed across disciplines, institutions, and stakeholder entities over time. This plan should identify specific convergence activities that will enable cross-disciplinary and cross-sectoral integration of teams, such as mentoring and/or professional development/training to support convergent outcomes, and the plan should provide a timeline showing principal tasks and associated interactions. The plan must address the specific roles and responsibilities of the collaborating PI, Co-PIs, other Senior Personnel, paid consultants, partners, and any other participants, and describe the timing and how tasks will be integrated over the course of the project.

e. **Phase I Portfolio**: (up to two pages) Each proposal should provide discussion of the participation of the project team in the Phase I curriculum, meetings and webinars, discussion of how Phase I efforts may have modified the project path, and documentation of any creative products or preliminary results developed during Phase I and how they will be incorporated into the Phase II work plan.
f. **Timeline of Milestones and Deliverables:** (one page) Along with the Convergence Coordination and Management Plan, each proposal must provide a visual representation (e.g., Gantt chart or alternative) of key milestones during the 24 month award period, including creation of specific deliverables.
g. **Deliverables**: In alignment with the timeline above state clearly what are the planned, tangible deliverables, along with milestones, during the 24 month award period as well as after 24 months of funding. Explain why there is a high probability that this plan will be achieved.
h. **Track Alignment**: Explain the close match to one of the tracks in this solicitation (E or F) and how the proposed work in Phase II will assist in the success of the entire track. Each proposal should include a description of how the proposed project will contribute to an integrated environment that will deliver beneficial outputs for the track. It should be evident how the projects will convergently align with the overarching goal of each track rather than as independent projects. This section should also describe the types of activities undertaken that directly promote track integration.
i. **Intellectual Property Management Plan:** (up to three pages) Partnerships that facilitate the research effort and transition to practice of research results are a key element of the Convergence Accelerator program and a clear Intellectual Property Management Plan is essential for current and future partnerships. Both ownership and management of IP should be addressed in the Intellectual Property Management Plan. The plan should include (1) IP contributed by partners included in this proposal, (2) IP that may be developed during the project, and (3) a plan for access to IP from (1) and (2) by potential future partners. Current and future partners may include, but are not limited to, institutions of higher education, non-profit organizations such as foundations or community organizations, for-profit organizations such as companies or investment groups, local/state/federal government, and others. The Intellectual Property Management Plan must articulate how potential future partners will access intellectual property within the project. Appropriate agreements must be in place before an award is made. Similarly, commitments from partner organizations for sharing of resources (such as data, research instrumentation, or any other required elements for carrying out the proposed work) should be described and formal agreements must be in place before an award is made. The Intellectual Property Management Plan is protected by the Privacy Act (as is the full proposal) and is the type of non-public information that NSF typically will not release beyond the closed, confidential review process, even under FOIA or other request. The Intellectual Property Management Plan will NOT be shared with organizations attending the Expo, but appropriate information that can be shared should be included in the Public Executive Summary document.
j. **Broader Impacts that includes a Broadening Participation Plan:** (up to two pages) This solicitation requests that each proposal include, as part of the Broader Impacts section, a Broadening Participation Plan that describes activities that will be undertaken to increase the participation of underrepresented groups in the project's research and development efforts. Examples of ways to engage groups and/or individuals that are typically underrepresented could include: through the expertise of personnel, via partnerships, through work with users and user groups, via engagement with stakeholders, through use of datasets that represent information about underrepresented groups, etc. The Broadening Participation Plans should include: (1) the context of the proposed broadening participation activity(ies), (2) the intended participants for the activity(ies), (3) the plan of activities over the project duration, (4) prior experience (if any) with broadening participation, and/or intended plan for preparation/training of project members in broadening participation, and (5) plans for the measurement and dissemination of outcomes in broadening participation.
k. **Public Executive Summary** (public document, for open sharing): (up to two pages) Because the NSF is interested in partnering with industry, foundations, the investment community, and others in Phase II, the proposal must include a Public Executive Summary that will be posted publicly and shared with potential NSF partners prior to the Expo. A Public Executive Summary is developed during Phase I with the help of your coaches. This section is the only element of the Phase II proposal that will be shared with attendees at the Expo and may also be posted publicly on the NSF Convergence Accelerator website. At a minimum, the Public Executive Summary should include the following: (1) Summary of the project's objectives and deliverables; (2) Current status of the intellectual property associated with the project; (3) Summary of the Intellectual Property Management Plan; (4) A description of the current industry partners and how they are participating in the current Phase I activities and their expected participation in Phase II; (5) A clear and concise description of how the proposed project is different from other research and a comparison to other similar work the team is aware of; and (6) A description of the timeline for proposed milestones and deliverables of the project. The Public Executive Summary may include other information to help potential NSF partners decide about possible co-funding or provision of resources to the project. Potential partners will

not receive any additional documentation from NSF other than the Public Executive Summary, but additional information may be requested from the proposer. The Public Executive Summary must not include proprietary information.

Supplementary Documents:

The proposal should include applicable supplementary documents as instructed in the PAPPG. The following items are to be provided as additional supplementary documents and do not count against the 20-page limit for the project description.

Letters of Collaboration:

Support or endorsement letters are not acceptable and will be cause for return without review.

Individuals whose role is discussed in the Project Description as providing assistance or collaboration to the project that is substantive in nature (but are not included in the budget, refer to PAPPG Section II.C.2.d.iv. Unfunded Collaborations) must verify their participation and role with a document in the following format.

To: Convergence Accelerator Program Director(s),

By signing below, I acknowledge that I will provide the assistance or collaborate as indicated in the proposal, entitled "_____" with _____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources described.

Signed: _____ Print Name:_____

Date: _____ Organization:_____

There is no limit on the number of letters of collaboration.

The role and involvement of the collaborator must be evident from relevant sections of the project description.

Data Management Plan: (*up to two pages*) In addition to the general elements of the data management plan described in the PAPPG, proposals should address within the Data Management Plan their plans for data-sharing across their team, across the track with other teams, and with the general public, during the project and after its completion as well.

Postdoctoral Researcher Mentoring Plan: *(up to one page)* As described in PAPPG Chapter II.C.2.j, each proposal that requests funding to support postdoctoral researchers must upload under "Mentoring Plan" in the supplementary documentation section, a description of the mentoring activities that will be provided for such individuals. Note that the Convergence Accelerator program differs in duration and goals from traditional academic research efforts. The Postdoctoral Research Mentoring Plan is expected to reflect a mentoring plan that is will be appropriate for the specific roles of postdoctoral researchers in this project effort.

Personnel List Spreadsheet. The spreadsheet template can be downloaded by clicking **here**. Please read the instructions carefully. Using the Excel file template, compile information for all persons identified in the proposal as: "PI or co-PI" (i.e., those listed on the cover page); "Other Senior Personnel/Subawardee"; or "Other Personnel" who have a biosketch included in the proposal; or "Collaborators" (Letters of Collaboration or Expressions of Interest). Only one spreadsheet should be submitted per proposal. The file must include the FastLane proposal ID assigned after submission of your proposal (i.e., not the Temporary ID # or Grants.gov ID #). Once completed, the file should be submitted by email to **Convergence-Accelerator@nsf.gov within one business day of proposal submission.** The purpose of this document is to help NSF staff manage reviewer selection. There are likely to be additional individuals and organizations in the COA (see single copy documents) that are not included in the Personnel List Spreadsheet. If you are unsure of whether to include someone in the Personnel List Spreadsheet, err on the side of including the person.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers.

- **Collaborators & Other Affiliations (COA) Information.** As detailed in the PAPPG (II.C.1.e), information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. If you have correctly added biographical sketches for all persons, there should be a separate space within Single Copy Documents to upload each individual's file. The COA information must be provided through use of the COA template.
- **Suggested Reviewers and Reviewers Not to Include (optional).**

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Budget Preparation Instructions:

Phase II proposals should include a two-year budget. The budget for year 1 should not exceed $3,000,000 for the first year and the total budget for the two-year project should not exceed $5,000,000. Teams that show significant progress during the first year, in accordance with the agreed timetable of milestones and deliverables, may receive funding for a second year. Teams should plan on completing the effort within two years; no cost extensions will be authorized only in extraordinary circumstances.

Budgets for all projects must include funding for Senior Personnel to attend at least three meetings per year in the Washington, DC area.

Because a **significant level of personnel effort is expected** in order to achieve deliverables that benefit the American people in two years, PIs, Co-PIs and other Senior Personnel **may request more than two months of salary support**. The NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter II.C.2.g.(i)(a) contains NSF's policy on Senior Personnel salaries and wages. Any compensation for Senior Personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be

specifically approved by NSF in the award notice budget.

Approximately 10% of the overall budget amount, and no less than 5%, should be set aside for collaboration among Phase II projects for track integration and potential cross-track activities. The **Proposal** should describe the types of activities that are proposed to be undertaken to promote track integration, and/or other cross-track activities. After the awards are made, Phase II projects in each track will have the opportunity to interact and refine their plans for these activities, with approval from NSF.

Although many proposals to this solicitation will include the participation of for-profit entities, note that NSF award budgets may not include profit or fee as line items.

Contributions from Partners should be described in the Facilities, Equipment and Other Resources section of the proposal which is described in *NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter II.C.2.i.* It is not appropriate in this section to list funding amounts that may be contributed by partners. Instead, proposers should describe what facilities, equipment and other resources will be possible based on contributions (financial and otherwise) from any partners. Voluntary committed cost sharing is prohibited *NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter II.C.2.g.xii.*

C. Due Dates

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

    May 05, 2021

        Letter of Intent (required for Phase I Full Proposals only)

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

    June 14, 2021

        Phase I Full Proposals

    May 25, 2022

        Phase II Full Proposals, only Phase I awardees are eligible to apply

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 other underrepresented groups 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

Phase I Full Proposal
In addition to the Intellectual Merit and Broader Impacts criteria, reviewers will be asked to address the following questions:

- Convergence Research
    - Does the Project Description represent research at the highest level of interdisciplinarity and synergy, justifying this investment in supporting a convergence research team?
- Partnership
    - Does the Project Description make a strong case that stakeholders from multiple kinds of organizations, including academic and non-academic partners are poised to form a deep and diverse partnership that supports the use-inspired research proposed?
- Deliverables
    - Is the convergence research team likely to achieve results in Phase I that lead to development of a strong Phase II proposal?
- Track Alignment
    - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (E or F)?
    - Do the proposed ideas differ markedly from research supported by other NSF programs, initiatives, Big Ideas or other NSF funding mechanisms?

Phase II Full Proposal
In addition to the Intellectual Merit and Broader Impacts criteria, reviewers will be asked to address the following questions:

- Convergence Research
    - Do the Project Description, Convergence and Partnerships, Coordination Plan, and Phase I Portfolio represent research at the highest level of integration and interdisciplinarity, justifying this investment in supporting a convergence research team?
- Partnership
    - Does the Project Description make a strong case that stakeholders from multiple kinds of organizations, including academic and non-academic partners are poised to form a deep and diverse partnership that supports the use-inspired research proposed?
- Deliverables
    - Does the Project Description, Coordination Plan, and Timeline of Milestones and Deliverables indicate a high probability of deliverables within a 24 month period that will ultimately benefit society?
- Track Alignment
    - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (E or F)?
    - Do the proposed ideas differ markedly from research supported by other NSF programs, initiatives, Big Ideas or other NSF funding mechanisms?
    - Is there convincing evidence of how the effort in Phase II will contribute to the success of the entire track?

Phase II Full Proposals only will go through an additional Merit Review Process as described below:

Oral Pitch Presentation and Pitch Review Panel
Following the traditional NSF proposal review panels, the Convergence Accelerator will execute a virtual or in-person oral *pitch review presentation as part of the merit review process and will also hold a public Convergence Accelerator Expo each year.* The pitch review will consist of review panels, one for each track, Track E and Track F.

The pitch review panels will follow NSF merit review guidelines with review panels made up of members from academia, industry, and other sectors. The pitch review will include panel reviewers, NSF staff, and competing teams only. The review criteria for the pitch session are the same as those applied to the written proposal and described above. Intellectual Merit and Broader Impacts continue to be the key review criteria along with the solicitation specific review criteria: Convergence, Partnerships, Deliverables, and Track Alignment.

Schedule and Location for Pitch Presentations
The NSF Convergence Accelerator will notify all proposers of the schedule for the virtual or in-person oral pitch presentations and provide necessary details as they become available. Pitch presentations will either be virtual or in-person. If in-person, the pitch presentation will likely be held in or near Washington, DC., at a location near the NSF. Pitch presentations must comply with these instructions and any additional instructions that the NSF may provide prior to the presentation. The date of the pitch review will be approximately 2-4 weeks after the full proposal due date.

Participation and Attendance in the Pitch Session
A proposer's oral pitch presentation team may include the presenter and up to four other team members. Representatives may be from any of the Convergence Accelerator team members. The presenter must be a person regularly engaged with the project, such as the PI, a co-PI, or a Senior Personnel member. It is not required that the PI be the presenter, but the presenter cannot be a person engaged just to make the pitch.

Format of the Pitch Session
The Pitch Presentations will occur as follows: The presenter will have approximately 10 minutes to present their proposed Convergence Accelerator Phase II approach to the review panel. An additional amount of time will be allocated for the NSF pitch review panels to ask questions of the presenter and team following their 10-minute pitch. The question-and-answer period does not count against the oral Pitch Presentation time limit.

Expected Pitch Content

The oral pitch presentation should address the following:

1. Introduce the team number and name, names and titles of presenting personnel and their project roles, and provide a brief (one sentence) description of the Phase II project.
2. Provide a brief summary of the Convergence Accelerator Phase I project that includes:
   - The initial objectives of the project when it was funded.
   - Key learnings during the Phase I project and how they resulted in revision to project plans and deliverables and informed the Phase II application.
   - Any outcomes or outputs from the Phase I project.
3. Provide a brief summary of the proposed Convergence Accelerator Phase II project that includes:
   - A clear description of the innovation and problem it is solving.
   - The broader social impact of the project, including potential applications if the Phase II effort is successful.
   - The objectives for the project.
   - The key deliverables and expected outcomes (concrete and measurable).
   - The capacity and capabilities of the team to execute the project including management, staffing and necessary technical and other skills.
   - The current and expected partners making firm commitments that will help the team achieve the project goals. This may include collaborations with other teams.
   - A description of the project elements and activities that will contribute to integrating efforts among or across projects to achieve track success.
4. Any additional topics provided by the NSF prior to the oral Pitch Presentation.

The above topics should successfully address the Merit Review Criteria of Intellectual Merit and Broader Impacts, as well as the solicitation specific criteria, set forth previously in this solicitation.

Convergence Accelerator Expo

The Convergence Accelerator Expo (Expo) is a separate public event that provides the teams the opportunity to pitch and demonstrate their project and answer questions from an invited audience of potential partner organizations. The Expo will be presented to an invited audience of other potential funders and funding organizations from industry, foundations, other government agencies, and other members of the investment community, as well as the broader public (press, etc.). The Expo will be held as an in-person event, virtual, or a combination of the two depending on restrictions on in-person meetings. The Expo presentation format will be determined by the expo format (e.g., in-person, virtual or a combination of the two). The formats may be a timed pitch with Q&A or an exhibit booth, virtual or in person to be operated by the team, or some combination of these.

The date of the Expo will be held approximately 4-6 weeks after the full proposal due date and 2-4 weeks after the pitch panel review.

Expressions of Interest

Expo attendees will have the opportunity to provide "Expressions of Interest" aligned to specific projects. Invitations to attend the Expo will focus on organizations interested in potentially contributing resources to the specific research and development areas identified in the Phase II projects. Other interested groups and individuals may also attend. Accordingly, only information that is publicly available can be included in Expo content, presentations, and products. The format of the Expressions of Interest will be determined when the Expo format is decided and will be made available online and at the Expo. Additional Expo information will be provided when the Public Executive Summaries are made available on the NSF Convergence Accelerator website.

Note: Teams are encouraged to prepare different presentations, one for the Pitch Review and another for the Expo.

Presentation Media

Proposers shall prepare all materials to be used in the oral presentations using electronic presentation tools. The proposer shall provide electronic copies of the oral pitch presentation one week in advance of the presentation.

Overall Evaluation for Phase II awards

NSF will develop a list of recommended Phase II awards based on all review information available, including the written proposal reviews and the pitch presentation reviews. Expressions of Interest will be considered separately from the proposal and pitch panel reviews based on complementarity with NSF's mission and the specific goals of the Convergence Accelerator. Proposing teams can choose if and how to engage with any organization that seeks to interact with them directly or via an Expression of Interest. An Expression of Interest is not required for a Phase II award recommendation, and the presence of Expressions of Interest does not guarantee Phase II success. NSF will consider the extent to which Expressions of Interest complement NSF goals, seem likely to assist project success, are desired by the project team, and seem likely to increase the success of the overall track. These considerations may influence final award recommendations.

If Expressions of Interest lead to agreements to support projects between organizations and NSF, proposers potentially receiving support via those agreements will have a role in defining the list of materials that would be shared with any organizations providing support. Shared materials could include unattributed reviews (from proposal, pitch, or post- award site visits), progress reports, elements of the proposal itself, or other materials.

B. Review and Selection Process

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

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:

Phase I
This is a standard grant award. However, the innovation curriculum requires a significant time investment and frequent participation of all partners under the guidance of coaches (a link to a sample curriculum can be found here). Projects must ensure that they have set aside the necessary time for these activities. There is also significant engagement and oversight by the NSF Convergence Accelerator Program Directors during Phase I activities.

Phase II
NSF Convergence Accelerator Phase II awards will be made as cooperative agreements. The cooperative agreement awards will include Special Conditions relating to the period of performance, statement of work, awardee responsibilities, NSF responsibilities, joint NSF-awardee responsibilities, funding and funding schedule, reporting requirements, Senior Personnel, and other conditions. Within the first approximately 30 days of the Award, all Senior Personnel will be required to participate in an approximately two-day meeting at NSF or virtually. In addition, Senior Personnel will be required to attend an evaluation meeting for approximately two days at NSF or virtually near the end of year one. The purpose of the evaluation meeting is to assess progress the awardees have made towards advancing project goals via a well-functioning interdisciplinary and multi-organization team. Each awardee team will prepare briefing material (expected to be 10 pages or less) describing its accomplishments and make a short presentation which will be followed by questions and answers. The reviewers will evaluate the team's progress towards its stated goals and, in particular, progress towards creating deliverables. Taking into account reviewers' input, NSF will decide whether the team will receive funding for the second year. As noted in "Budget Preparation Instructions," budgets for all projects must include funding for Senior Personnel to attend three meetings per year at NSF or virtually. At least one of these meetings each year is likely to focus on track integration.

No-cost extensions are **not** permitted except under clearly documented exceptional circumstances. Grantees must first contact the cognizant Program Officer prior to submitting a request.

Awardees will be required to include appropriate acknowledgment of NSF support (and partners if appropriate) under the NSF Convergence Accelerator in any publication (including World Wide Web pages) of any material based on or developed under the project, in the following terms:

"This material is based upon work supported by the National Science Foundation Convergence Accelerator under Award No. (Grantee enters NSF award number.)"

Awardees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television and news magazines.

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.

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:

- Chaitanya K. Baru, telephone: (703) 292-2473, email: cbaru@nsf.gov

- Lara A. Campbell, telephone: (703) 292-7049, email: lcampbel@nsf.gov

- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov

- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov

- Michael Pozmantier, telephone: (703) 292-4475, email: mpozmant@nsf.gov

- Christopher Sanford, telephone: (703) 292-7512, email: csanford@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."

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