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NSF 23-590: NSF Convergence Accelerator Phases 1 and 2 for the 2023 Cohort - Tracks K, L, M

Program Solicitation

Document Information

Document History

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National Science Foundation

Directorate for Technology, Innovation and Partnerships

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

July 11, 2023

Letter of Intent (required for Phase 1 Full Proposals only)

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

August 22, 2023

Phase 1 Full Proposals

September 26, 2024

Phase 2 Full Proposals, only Phase 1 awardees are eligible to submit



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Important Information And Revision Notes

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). The curriculum includes a team science and human-centered design approach that rapidly moves projects towards deliverables in both Phase 1 and Phase 2 that will have broad scale national impact.

This solicitation and the corresponding BAA support both US-only proposals and proposals with international partnerships. For Track L only, this solicitation includes a collaboration with the Swedish Research Council (Vetenskapsrådet) and Vinnova, Sweden's Innovation Agency. Participants who would like to qualify for Vetenskapsrådet/Vinnova funding will submit their proposals as a single proposal, with the US Lead PIs submitting to NSF and the Swedish Participants sharing information with Vetenskapsrådet/Vinnova as described in the solicitation and the corresponding BAA.

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) that is in effect for the relevant due date to which the proposal is being submitted. The NSF PAPPG is regularly revised and it is the responsibility of the proposer to ensure that the proposal meets the requirements specified in this solicitation and the applicable version of the PAPPG. Submitting a proposal prior to a specified deadline does not negate this requirement.

Summary Of Program Requirements

General Information

Program Title:

NSF Convergence Accelerator Phases 1 and 2 for the 2023 Cohort - Tracks K, L, M

Synopsis of Program:

The National Science Foundation (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 corresponding Broad Agency Announcement can be found at <https://sam.gov/opp/0c859c722d1148a983447287ccd81c61/view>. The purpose of this parallel funding opportunity 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 1 awardees receive resources to further develop their convergence research ideas and to identify important partnerships and resources to accelerate their projects. Phase 2 awardees receive significant resources leading to deliverable research prototypes and sustainability plans.

This solicitation for FY 2023 invites proposals for the following Track Topics:

Track K: Equitable Water Solutions

The objective of the NSF's Convergence Accelerator Track K: Equitable Water Solutions is to build upon foundational knowledge and advancements in environmental sciences, geosciences, engineering, computing, social and behavioral sciences, as well as other areas to develop viable solutions for water quality, quantity, and equity issues.

Track L: Real-World Chemical Sensing Applications

The overarching goal of NSF's Convergence Accelerator Track L: Real-World Chemical Sensing Applications is to develop novel energy-efficient and miniaturized or portable biological and chemical sensors for tangible applications.

Track M: Bio-Inspired Design Innovations

The overarching goal of NSF's Convergence Accelerator Track M: Bio-Inspired Design Innovations is to bring together scientists and practitioners to develop concepts, approaches, and technologies that build and control in the same way nature does – capitalizing on millions of years of evolution – to find novel solutions to major societal and economic challenges.

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 1 Full Proposal. The information required in the Letter of Intent is described in Section V.

Letters of Intent should identify 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 1 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 1.

If selected, Phase 1 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, and three months of other activities, such as participation in the NSF Convergence Accelerator Pitch Presentations.

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 2. 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 1 and who may continue with them into Phase 2 if the teams choose to continue with the same coach. Alternatively, the teams can request to work with a different coach.

Only awardees of Phase 1 awards under this solicitation may submit a Phase 2 proposal. Phase 2 proposals must outline a 36-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 2, teams will be expected to apply program fundamentals and innovation processes gained in Phase 1 to enhance partnerships, develop a solution prototype, and build a sustainability model to continue societal impact beyond NSF support.

Phase 2 awards may be up to \$5 million for 36 months. Phase 2 proposals must clearly describe deliverables that will be produced within 36 months. The Phase 2 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 2 proposals will be funded initially for 12 months, with subsequent years being provided on the basis of an assessment of performance (see below).

Each Phase 2 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. The review panel will include NSF reviewers and staff, and competing teams only. Phase 2 teams that show significant progress during the first year in accordance with the agreed timetable of milestones and deliverables will receive funding for subsequent years. Phase 2 teams must plan on completing the effort within 36 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 (see [U.S. Department of Education](#)).

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.

- Douglas Maughan, telephone: (703) 292-2497, email: dmaughan@nsf.gov
- Aurali E. Dade, telephone: (703) 292-7049, email: adade@nsf.gov
- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov
- Jemin George, telephone: (703) 292-2251, email: jgeorge@nsf.gov
- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov

- Michael Pozmancier, telephone: (703) 292-4475, email: mpozmant@nsf.gov
- Michael Reksulak, telephone: (703) 292-8326, email: mreksula@nsf.gov
- Catherine O'Reilly, telephone: (703) 292-7934, email: coreilly@nsf.gov
- Christopher Sanford, telephone: (703) 292-8132, email: csanford@nsf.gov
- Edda Thiels, telephone: (703) 292-8421, email: ethiels@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: 36 to 48

NSF expects to make up to 48 Phase 1 awards across all topics as a result of this solicitation and the corresponding BAA.

NSF expects to make up to 6 Phase 2 awards for each topic as a result of this solicitation and the corresponding BAA.

Anticipated Funding Amount: \$36,000,000

Anticipated funding for \$36,000,000, pending availability of funds, to support Phase 1 awards. Proposers may request up to \$750,000 for Phase 1.

The estimated funding level for Phase 2 awards depends on the availability of funds and the number of Phase 1 awards. Phase 2 proposals may request up to \$2,000,000 for year 1, up to \$2,000,000 for year 2, and up to \$1,000,000 for year 3, for up to \$5,000,000 in total for the 36-month Phase 2 project.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.
- For-profit organizations: U.S.-based commercial organizations, including small businesses, with strong capabilities in scientific or engineering research or education and a passion for innovation.

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 1 award must be included as a PI or co-PI on a Phase 2 proposal based on that Phase 1 award. The same individual who served as PI for the Phase 1 award does not have to be PI for the Phase 2 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 1 proposals

An individual may serve as PI or co-PI on no more than two Phase 1 proposals. Submissions to the BAA are included in this number. However, it is unlikely that multiple Phase 1 awards would be made to organizations that include the same PI or co-PI on separate proposals.

Phase 2 proposals

Anyone may serve as a PI or co-PI on only one Phase 2 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.

See section IV. below for additional eligibility information.

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 Research.gov: *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. submitting organization's local time):

July 11, 2023

Letter of Intent (required for Phase 1 Full Proposals only)

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

August 22, 2023

Phase 1 Full Proposals

September 26, 2024

Phase 2 Full Proposals, only Phase 1 awardees are eligible to submit

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.

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 1 and Phase 2 solicitation for the 2023 cohort, NSF seeks to support and facilitate research that advances ideas from concept to deliverables within each of the convergence research topics (tracks).

The NSF Convergence Accelerator Phases 1 and 2 for the 2023 Cohort - Tracks K, L, M solicitation consists of three tracks as follows:

Track K: Equitable Water Solutions

Track L: Real-World Chemical Sensing Applications

Track M: Bio-Inspired Design Innovations

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 1: Learning Applying the Convergence Accelerator Fundamentals, Convergence Research Planning

Phase 1 funding is up to \$750,000 for 12 months duration. It supports nine months of planning effort to further develop the initial concept, identify new team members and partners, participate in the program's innovation curriculum, and refine an initial prototype. The innovation curriculum consists of training with professional experts and coaches in human-centered design, team science, inter-team communications, storytelling, and pitch preparation – all of which are essential components of the Convergence Accelerator's model.

Phase 1 efforts will focus on research plan development as well as team formation leading to a proof-of-concept and will include NSF-organized convenings for training and cross-cohort collaboration. The Phase 1 innovation curriculum is a significant time investment with weekly participation of all partners. A sample of the program's Innovation Curriculum schedule can be found [here](#).

In addition to weekly engagement, over the course of seven months of the curriculum, teams will also be expected to complete milestone assignments and deliverables, which include conducting and synthesizing user interviews, creating low-fidelity prototypes and obtaining feedback from stakeholders, developing a Collaboration Agreement amongst all partners, and designing marketing and communication materials including presentations, logos, informational videos, and pitch presentations. A sample of the program's Innovation Curriculum deliverables schedule can be found [here](#).

After nine months of effort, Phase 1 teams participate in a proposal and pitch presentation process, which is used in selecting teams for Phase 2.

Phase 2: Continued Application of the Convergence Accelerator Fundamentals, Prototyping and Sustainability Planning

Selected teams from Phase 1 will proceed to Phase 2, with potential funding of up to \$5 Million as a cooperative agreement for 36 months. Phase 2 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. Teams will also participate in an execution and sustainment curriculum that includes product development, intellectual property, financial resources, sustainability planning, and communications and outreach.

At the 12-month mark of Phase 2, the Convergence Accelerator will review the team projects to assess whether each team is working towards the expected deliverables. Assessments from the reviewers will be shared with the team along with the guidance/decision for the next steps. At the end of Phase 2, teams are expected to provide/demonstrate outcomes/solutions that were part of the proposal and which impact societal and economic needs and challenges at scale and are sustainable beyond NSF support.

II. Program Description

This NSF Convergence Accelerator Phase 1 and Phase 2 for the 2023 Cohort - Tracks K, L, M solicitation seeks to address the topics described in the convergence tracks identified above and detailed below. Phase 1 awards are grants for planning and preliminary prototyping of projects that leverage basic research investments. Phase 2 awards are cooperative agreements for projects that build upon the Phase 1 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 three 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 36 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.



Track K: Equitable Water Solutions

Research Background

The objective of NSF's Convergence Accelerator Track K: Equitable Water Solutions is to catalyze convergent partnerships in pursuit of engaged and sustainable solutions that address water quality, quantity, equity and policy. This track was selected based on an urgent need to develop solutions to the significant challenges facing freshwater systems in the United States, and the world, and draws upon the results of two NSF-funded workshops: [Managing Water for a Changing](#)

[Planet](#) and [Climate Resilience and Water Resources](#). Proposals in this track should build upon foundational knowledge and advancements in environmental sciences, geosciences, engineering, computing, social and behavioral sciences, as well as other areas to develop viable solutions for water quality, quantity, and equity issues.

Access to fit-for-purpose freshwater is one of the major challenges facing growing populations as climate change continues to drive changes in regional precipitation patterns, according to the United Nations' article [Water – at the center of the climate crisis](#) . In some cases, this means reduced availability and access to drinking water. In other cases, water is overabundant, causing deleterious impacts on human populations, agricultural activities, ecosystems, and infrastructure. Additionally, even where water is accessible, there are major ongoing concerns about water quality, especially in areas with historic and ongoing water contamination and saltwater intrusion due to rising sea levels, as noted in a [Centers for Disease Control and Prevention report on the Flint water crisis](#).

These changes and challenges to water systems have been thoroughly described by international and US experts. The [United Nations Sustainable Development Goal 6: Ensuring Access to Water and Sanitation](#)  has been a critical topic. The report from a working group of the [Intergovernmental Panel on Climate Change \(IPCC\) Sixth Assessment Report \(2022\)](#)  further highlights the key impacts that climate change is having on freshwater systems. There is evidence that temperatures are rising in lakes and streams, surface ice is less prevalent, and melting is occurring earlier in the spring season leading to ongoing concerns about water quality, quantity, and equity. There are often related challenges of infrastructure upgrades to public services, including drinking water and waste water. The lack of access to clean, safe water has the potential to impact many elements of thriving communities. As access to these resources is reduced, populations must be able to adapt and respond to this reduced access. Populations that are under-resourced have the least capacity to respond to these challenges and therefore are a special focus of this track.

The US has launched a [National Nature Assessment](#) which recognizes the significant and interconnected role of nature in climate change and the need to value nature to engage and also utilize the outputs of this work. While this is a recent effort, it may be an opportunity for researchers to engage. There are also organizations, such as the US Water Alliance, that are developing resources that provide examples of the type of multi-sector partnerships that the NSF Convergence Accelerator is championing.

Environmental changes have a significant impact on human health and wellbeing, especially for vulnerable and exposed populations that rely upon diminishing drinking water resources. Water security is a key factor in resilience planning for most US population centers, especially in the western half of the country, which is highlighted as a critical geographical area of concern internationally ([US Department of the Interior Report](#)). The quality of drinking water is impacted by scarcity due to warmer and dryer weather patterns, but also negatively impacted by extreme storm events where contaminants are washed into community water systems and infrastructure.

Additionally, agriculture, which is estimated to use 42-64% of freshwater resources in the US ([USGS Estimated Use of Water in the United States](#)), is significantly impacted by the changing climate with many regions experiencing dryer and hotter seasons, leading to additional use of already stretched water resources. Producers are utilizing adaptive strategies, such as planting drought and heat tolerant species that require less water, but even with these strategies, agriculture continues to be the major use of freshwater resources. Other industries that rely on freshwater resources include the energy sector, advanced manufacturing, healthcare, but there are many others.

Track K was developed with these factors and complexities in mind. Successful proposals will acknowledge the complex, challenging systems that are driving lack of access to water as well as the complex systems that must work together for effective solutions beneficial to society-at-scale. While it is not a requirement for a successful proposal, innovations from many NSF programs may be leveraged in pursuit of these goals including programs from various directorates and cross-cutting programs such as the Hydrologic Sciences Program (HS), Biodiversity on a Changing Planet (BoCP), Critical Aspects of Sustainability (CAS), Long Term Ecological Research (LTER), National Ecological Observatory Network (NEON), Established Program to Stimulate Competitive Research (EPSCoR), Environmental Engineering and others.

Partnerships and Engagements

Proposals submitted to this track should leverage not only national and international expertise, but also engage local communities to understand and address the most pressing challenges related to water access, equity, and security.

Projects that partner with and enhance water access for under-resourced communities are encouraged.

Partnerships engaging key stakeholders within federal, regional, state, local, and tribal agencies outside of NSF that focus on water resources should be considered. This could include investigator-initiated partnerships with a wide range of federal agencies such as, for instance, the US Geological Survey (USGS), the United States Environmental Protection Agency (EPA), the United States Department of Agriculture (USDA), National Oceanic and Atmospheric Administration (NOAA), the United States Bureau of Reclamation, the Federal Emergency Management Agency (FEMA), and the Department of Energy (DOE) among other federal agencies, as well as regional, state, local, and tribal entities with responsibility for managing water resources. Investigators are encouraged to connect with resources being developed through these more operational investments.

Private for-profit and nonprofit partners are encouraged to participate in this track. Not only are many elements of water resources managed by private entities and individuals, but the private sector also has significant expertise in the development of tools and technologies to address water issues.

This track serves as a platform for multidisciplinary teams to develop real-world solutions that address environmental justice challenges with water distribution, the safety of the water supply, and inequalities in the allocation of water resources.

Tasks and Deliverables

NSF is interested in solutions that leverage existing knowledge and infrastructure (physical and social) to address pressing water-related societal and economic challenges by developing novel solutions. Teams selected for this track will be expected to engage deeply with communities and decision makers in co-designing solutions. Through the Convergence Accelerator Phase 1 innovation curriculum, teams will develop cohesive end-user driven solutions that leverage expertise while integrating feedback from various sources including end-users, experts, policy makers, and others. Solutions must be socially, economically and culturally appropriate in order to realize the goal of wide-spread adoption. Because watersheds cross governance boundaries, successful solutions must have approaches to address disparate laws, policies, regulations, and infrastructure of various localities. Teams are encouraged to be transformative in their goals and include water literacy, education and workforce development efforts that lead to new and innovative solutions to the water crisis that are accessible to all.

Outcomes

The outcomes from this effort are expected to support sustainable, resilient water systems into the future. Ultimately, successful solutions will be able to be fully integrated into existing structures while addressing one or more challenges facing the future of water resource management, quality, supply, and equity.

Broad topics within this track may include – but are not limited to – solutions that support.

- Design of sustainable water supply systems by delivering novel, effective, unbiased data-driven decision support tools – leveraging artificial intelligence (AI) and machine learning – and other novel technical solutions, e.g., filtration devices, and new materials for transportation and storage among others.
- Development of tools, technologies, and approaches to address watersheds as a whole. Specifically in relation to water distribution, the safety of the water supply, and inequalities in the allocation of water resources are of interest, including new computational and technical as well as social and behavioral solutions to water sharing, such as quality and quantity projections and economic models.
- Creation of equitable access and engagement with freshwater resources, including engagement through training and workforce development, new models, and new technical solutions.
- Creation of solutions to respond to disturbances and disasters involving freshwater supplies including solutions that enable access to drinking water and remediation solutions.

Track L: Real-World Chemical Sensing Applications

Research Background

This track focuses on development of use-inspired, innovative, robust, energy-efficient, miniaturized/portable biological and chemical sensors that demonstrate a clear potential for deployment in real-world applications. The track builds on the wealth of foundational knowledge and recent advances in olfaction and chemical sensing, sensor technologies, digital olfaction, AI, neuromorphic systems, computational modeling, biomanufacturing, and robotics. The overarching track goal is to transform these scientific discoveries and technological innovations into practice with societal and/or economic benefits. This includes accelerating the development of biological and chemical sensor systems for deployment in areas of environmental sensing, agriculture and food production, homeland security, and human health and wellness. This topic was chosen based, in part, on two NSF-funded conferences: [Frontiers in Chemical Sensing: Synthetic, Neuromorphic and Cyborg Systems](#), and [Chemical Sensing with an Olfaction Analogue: High-dimensional, Bio-inspired Sensing and Computation](#).

Challenges related to environmental quality, natural resources, industrial agriculture, food safety and quality, disease and medicine, personal care and safety, and biological, chemical, and nuclear terrorism and other adversarial threats pose a burden for many sectors of the U.S. economy and society. For instance, poor air quality is estimated to result in 100,000 premature deaths annually and costs the nation approximately \$150 billion per year ([National Weather Service](#)). Thousands of chemical, gas, and oil spills occur on U.S. land and in its waters each year, and endanger human, animal, and plant health and the environment ([U.S. Environmental Protection Agency](#), [National Oceanic and Atmospheric Agency](#)). Food spoilage is a principal driver of food loss and cost the nation about \$162 billion in 2010 ([U.S. Department of Agriculture](#); [NASEM Report on National Strategy to Reduce Food Waste](#) [↗](#)), and each year, 48 million people get sick from food-borne illnesses, typically attributable to contamination by bacteria, fungi, or viruses ([Center for Disease Control and Prevention](#)). Each of these challenges is associated with chemical signatures, but these signatures often are difficult to detect because they are dynamic and complex, present at very low concentrations, and embedded in complex chemical backgrounds. Solutions to the problem of robust, reliable, and efficient chemical detection and identification can be found in biological systems. Many animals have evolved exquisite sensors, sensory representations, algorithms, and architectures to efficiently and reliably detect, decode, and make use of chemical signals across a wide concentration range in diverse, complex environments. The outstanding chemical sensing capabilities of animals are deployed regularly to address societal challenges. For instance, dogs are used routinely at airports to screen for illicit drugs and explosives ([U.S. Transportation Security Administration](#)), and their capabilities to differentiate between chemical signatures emitted by patients with various types of cancer or communicable diseases, such as COVID-19, and healthy controls have been used in medical disease diagnostics. However, the use of animals to accomplish the chemical detection, localization, and monitoring tasks faced by our nation is not cost-effective, cannot be applied to all situations, and does not lend itself to automation and use at large scale. The development of advanced, robust chemical sensing and identification technologies that operate with the high accuracy, speed, and reliability comparable to biological chemical detection systems and that can be made available at scale would benefit our ability immensely to address many of the nation's challenges related to the environment, food and agriculture, health and personal care, and safety and security.

Recognizing the opportunity for addressing these challenges by leveraging insights and advances in biological chemical sensing, synthetic biology, chemistry, physics, computing, AI and data science, material science, manufacturing, and robotics, Track L of the NSF Convergence Accelerator seeks proposals that bring together expertise from across these disciplines to develop innovative, transformative tools and resources for large-scale chemical sensing in real-world settings. This track seeks synergistic projects from experts in olfaction and other biological sensing, neuroscience, gene editing, synthetic biology, olfactory digitization and electronic nose technologies, materials science, physics, chemistry, geochemistry, analyte preparation technologies, signal transduction technologies, biomanufacturing, flexible/printed electronics, bio-hybrid systems, neuromorphic systems, detection algorithms, AI, machine learning, data science, brain-machine interfaces, and robotics, who work in academia or are stakeholders in government and industry, including those specialized in environmental, safety, security, agriculture, food, health, and personal wellness/health and related issues. While it is not a requirement for a successful proposal, innovations from many NSF programs may be leveraged in pursuit of these goals including programs from various directorates and cross-cutting programs in or related to Bio-sensing, Communications, Circuits, and Sensing-Systems (CCSS), and other programs including but not limited to Established Program to Stimulate Competitive Research (EPSCoR).

Partnerships and Engagements

Proposals submitted to this track should integrate expertise, insights, methods, facilities, and tools from multiple disciplines. Direct participation by government and industry partners and other constituent organizations, especially those that have a need for specific applications of biological and chemical sensors with an eye on speeding up the deployment of the sensor systems in real-world conditions, is strongly encouraged.

Leveraging resources and projects from industry, national laboratories, and/or federal, state, local, and tribal agencies, and non-profits, is encouraged but not required. Involvement of these organizations will increase the likelihood of ultimately translating innovative biological and chemical sensor technologies/methods/findings into implemented solutions. Proposals should be explicit on how diversity, equity, inclusion, and accessibility will be incorporated into the overall project.

Tasks and Deliverables

The goal of this track is to accelerate the development of tools and resources that facilitate cost-effective, versatile large-scale monitoring, rapid analysis, and classification of volatile compounds in indoor and outdoor environments, including air, water, and soil, for application to real-world challenges, ranging from climate change to safety and homeland security to health and personal care.

The deliverables and associated tasks for this track may include, but are not limited to:

- Miniaturized, mobile sensor devices and integrated analysis methods; calibration techniques and benchmarking; big data sets for machine olfaction and other purposes; data management platforms; systems or devices that leverage olfactory coding or architectures; and computational models to improve sensor function, inter-device transferability, and source localization in the field.
- An engineering framework for the predictable construction of a new generation of biosensors to detect hazardous chemicals and pathogens in the air, water resources, food, and other media. Complementing advancements in sensor and volatile organic compound (VOC) identification technologies, such as various types of high-resolution mass spectrometry, optical spectrometry, electro-chemistry, bio-hybrid systems, etc. can lead to these novel biosensors.
- A new class of bio-reporters based on genetically modified microorganisms might be developed in which the detection of a specific target analyte is linked to a detectable response, such as the expression states of target genes.
- Building on advancements in signal processing, machine learning, mathematical modeling, and neuromorphic computing, significant results might be achieved through the development of high-dimensional pattern recognition models to facilitate complex signal classification and digitization, and fate and transfer models to improve real-time source localization and monitoring.

Outcomes

The resulting collaborative projects should make significant contributions toward the goal of large-scale, cost-effective automation of the detection and identification of a few molecules among thousands, rendering the vast chemical world visible, and enabling rapid diagnosis, monitoring, and forecasting before, when, or after problems arise.

The following types of outcomes are expected from the cohort of projects funded through this track:

- Development of field-deployable biological or chemical sensing systems that can operate in air, water, or soil and hazardous or difficult to access environments. These will be based on building on advances in sample collection/concentration, autonomous or teleoperated robotics, bio-hybrid systems, miniature biological and chemical sensors, and battery and wireless technologies.
- Open repositories for big datasets generated with the participation of and exploitable by the broader community of researchers, developers, and users of biological and chemical sensor and digital olfaction systems in various industries, academia, and government are encouraged as well.

- Significant improvements in sensor applicability, performance, and scalability by lowering detection limits of volatile compounds in complex and changing environments, reducing false alarms, and enhancing signal identification and quantification capabilities. These will be expected to make use of the new computing- and AI-based technologies.
- Creation, dissemination, and community adoption of standardization and benchmarking methods for device calibration, and validation and annotation of data generated using sensor systems in real-world conditions. Community resources and practices are expected to play a key role in this particular type of outcome.

For Track L ONLY:

The [Swedish Research Council](#) (Vetenskapsrådet) and [Vinnova](#) are providing sponsorship for the participation of Swedish partners as specified below, either as a Principal Investigator or as a team member, in Track L. For this track only, the Principal Investigator may be a Swedish entity. All proposals that include Swedish entities that wish to be eligible for Vetenskapsrådet/Vinnova funding, whether as Principal Investigators or as partners in a US-based team, are required to submit a Letter of Intent to NSF, as specified below, and additional information to Vetenskapsrådet/Vinnova at <https://vinnova.se/nsf-convergence-accelerator>.

Track M: Bio-Inspired Design Innovations

Research Background

The overarching goal of NSF's Convergence Accelerator Track M: Bio-Inspired Design Innovations is to bring scientists and practitioners together to develop concepts, approaches, technologies, and products that are based on foundational knowledge of biological systems, capitalizing on millions of years of evolution, to find novel solutions for major societal challenges. This convergent research track topic was chosen based on the results of a NSF-funded conference: [Bio-Inspired Design](#).

Track M aims to accelerate use-inspired research and development in the broad field of bio-inspired design to tackle pressing national and global societal and economic challenges that have yet to be solved by existing approaches and technologies. The need to maintain and improve the wellbeing of societies faced with accelerating degradation of the natural environment and increasing demands on the built environment requires technological innovation and creative solutions beyond current capabilities. Bio-inspired design – the process of developing concepts, approaches and technologies that build and control the way nature does – offers new, potentially transformative solutions. Drawing inspiration from living systems opens new avenues to explore and leverage forms and functions tested through evolution.

Moreover, the design process is inherently convergent and use-inspired, driving innovation by uniting a wide range of scientists and engineers with practitioners to devise new approaches to understanding complex problem solving. The overarching track goal is to develop innovative bio-inspired design applications that could revolutionize efforts to benefit society in a myriad ways, including to mitigate the impacts of climate change (e.g., environmental monitoring, bioremediation and preservation), enhance infrastructure (e.g., sustainability, resilience, biomanufacturing), revamp agriculture and food production (e.g., nutrition, safety, sustainability), and improve human health (e.g., personalized healthcare, assistive technologies), among other advances. While it is not a requirement for a successful proposal, innovations from many NSF programs may be leveraged in pursuit of these goals including programs from various directorates and cross-cutting programs such as Biomechanics and Mechanobiology (BMMB), Advanced Manufacturing (AM), Engineering for Civil Infrastructure (ECI), Materials Engineering and Processing (MEP), Understanding the Rules of Life, Enabling Discovery through Genomics (EDGE), Designing Synthetic Cells Beyond the Bounds of Evolution (Designer Cells), Systems and Synthetic Biology, Bio-sensing, amongst others.

Partnerships and Engagements

The NSF Convergence Accelerator is seeking convergent teams that coalesce around a well-identified challenge, bringing the necessary expertise and engagement to move solutions from concept/early development stage to real-world implementation. Bio-inspired design challenges are expected to bring together life scientists (e.g., molecular, cellular, developmental, organismal, ecological and evolutionary biologists, biochemists, biophysicists, and biomechanists), physical scientists (e.g., physical, chemical, and materials scientists), social and behavior scientists, and engineers (e.g.,

biological, mechanical, electrical engineers, mechanobiologists, and roboticists) in search of solutions. Therefore, proposals submitted to this track are expected to integrate expertise, insights, methods, tools, and facilities from a range of applicable disciplines.

The NSF Convergence Accelerator also expects substantive and integrated engagement from end-users and practitioners, such as those from the fields of materials and manufacturing, environmental monitoring and bioremediation, infrastructure design and development, agriculture and food production, medicine, health, and personal care, as appropriate for a given project. The program's guiding principle is that researchers and innovators must not only learn from their end-users and other stakeholders in affected communities but must also work cooperatively and collaboratively with them to develop effective solutions to address major challenges. Therefore, a strong partnership between researchers, end-users and stakeholders, who will implement and benefit from the outcomes, is required for successful proposals.

Tasks and Deliverables

The projects aligned to Track M: Bio-Inspired Design Innovations should aim to deliver novel, effective, use-inspired research products that can help solve current societal challenges. The tasks and deliverables outlined by proposals in this track are expected to yield tangible benefits to a specific end-user community, which should be clearly identified in proposals. Within Phase 1 and through the NSF Convergence Accelerator curriculum, teams will be expected to engage with end-users, practitioners and other stakeholders to ensure that their innovations are use-inspired and solving key societal issues, teams will develop low-fidelity prototypes and obtain feedback from their stakeholders, teams will broaden their partnerships and areas of expertise to ensure they are considering the social, ethical, economical, and cultural implications of the implementation of their solution, and teams will formulate effective presentations and pitch decks to convey their solutions to a broad audience.

Additionally, teams should consider the following to strengthen their proposals:

- Educational activities aimed at community engagement that strengthen the connection between the research deliverables and the end-user community, as appropriate for the project.
- Incorporation of diversity, equity, inclusion and accessibility in all proposed activities.
- Inclusion of measures and mechanisms to assess the impacts of proposed bio-inspired design research and educational activities.

Note: This program is not intended to support clinical trials.

Outcomes

This track focuses on use-inspired, translational research that employs the bio-inspired design process defined above. NSF is seeking solutions to societal and economic challenges that will have major impacts and can be scaled nationally. Given the potential breadth of impactful solutions yet to be discovered through bio-inspired design, NSF has not constrained the societal challenges, application foci, or end-user communities. Outcomes may include, but are not limited to, materials, technologies, methods, services, and other products related to the broad topics outlined above as examples.

Examples of broad outcomes that would be considered within this track include, but are not limited to:

- Development of materials with features such as programmable self-assembly, multi-modal sensing, computation, memory, adaptability, healing/regenerative capabilities, sustainability.
- Novel manufacturing capabilities and processes that harness advances in synthetic biology, bioengineering, nanofabrication, 3D printing.
- Engineering complex systems with novel, emergent properties based on principles of synthetic biology, bioengineering, robotics or organismal biology (e.g., organoids, microbial consortia, collective swarms).
- Computational modeling and theory-enabled methods and tools for bio-inspired designs.

- Development of educational and training programs that broaden the participation of next generation scientists in bio-inspired design and use-inspired research and development to benefit society and the economy.

KEY COMPONENTS OF THE NSF CONVERGENCE ACCELERATOR

Letters of Intent, Phase 1 proposals, and Phase 2 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 and [convergence research](#) needed to encompass the full scope of the topic selected. A core program goal is transition to practice. Therefore, 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 scale. The Convergence Accelerator program requires cross-cutting partnerships to strengthen and synergize solutions. Partnerships can take many shapes and can be developed 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. Partnerships may take many forms and benefits of partnerships may include end-user insights, resources, services, infrastructure, and transition-to-practice pathways.

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 result from the proposed project and describe how those outputs will address national societal and economic challenges and benefit society at 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 2.

Track Alignment

The proposed effort must clearly match the goals described in the track description. 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) and, also, how the proposed work fits into the overall goals of the 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 2 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.

For Track L ONLY:

Please note that Vetenskapsrådet/Vinnova funding of Swedish teams is subject to Vetenskapsrådet/Vinnova approval of the IP Management Plan for Phase 2.

Broadening Participation in the NSF Convergence Accelerator

NSF welcomes submission of proposals to this funding opportunity that include the participation of the full spectrum of diverse talent in Science, Technology, Engineering, and Mathematics (STEM), e.g., as PI, co-PI, senior personnel, postdoctoral scholars, graduate or undergraduate students, or trainees.

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 proposals (e.g., Phase 1 proposals, and Phase 2 proposals) will be assessed on Broader Impacts and Intellectual Merit.

This solicitation requires that each project, in either Phase 1 or 2, include a *Broadening Participation Plan* (under Broader Impacts) that describes activities that will be undertaken to include the participation of the full spectrum of diverse talent in STEM 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. Context: Does the plan describe a goal using institutional or local data?
2. Strategy: Does the plan describe a strategy to include the participation of the full spectrum of diverse talent in STEM? Is there a clear role for each PI and co-PI?
3. Preparation: Does the plan describe how the PI is prepared (or will prepare or collaborate) to do the proposed work? Does the plan highlight prior experience with broadening participation?
4. Measurement: Is there a plan to measure and disseminate the outcome(s) of the activities?

We encourage partnerships that include IHEs in Established Program to Stimulate Competitive Research (EPSCoR) jurisdictions and Minority Serving Institutions (MSIs) accredited in, and having a campus located in the US, acting on behalf of their faculty members. 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/resources/BIO_BroadeningParticipation_2021_BR_v1Bmt_508_Final.pdf

https://www.nsf.gov/mps/broadening_participation/index.jsp

<https://www.nsf.gov/cise/bpc/>

III. Award Information

Anticipated Type of Award:

Cooperative Agreement or Standard Grant

Estimated Number of Awards: 36 to 48

NSF expects to make up to 48 Phase 1 awards across all topics as a result of this solicitation and the corresponding BAA.

NSF expects to make up to 6 Phase 2 awards for each topic as a result of this solicitation and the corresponding BAA.

Anticipated Funding Amount: \$36,000,000

Anticipated funding is \$36,000,000, pending availability of funds, to support Phase 1 awards. Proposers may request up to \$750,000 for Phase 1.

The estimated funding level for Phase 2 awards depends on the availability of funds and the number of Phase 1 awards. Phase 2 proposals may request up to \$2,000,000 for year 1, up to \$2,000,000 for year 2, and up to \$1,000,000 for year 3, for up to \$5,000,000 in total for the 36-month Phase 2 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:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.
- For-profit organizations: U.S.-based commercial organizations, including small businesses, with strong capabilities in scientific or engineering research or education and a passion for innovation.

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 1 award must be included as a PI or co-PI on a Phase 2 proposal based on that Phase 1 award. The same individual who served as PI for the Phase 1 award does not have to be PI for the Phase 2 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 1 proposals

An individual may serve as PI or co-PI on no more than two Phase 1 proposals. Submissions to the BAA are included in this number. However, it is unlikely that multiple Phase 1 awards would be made to organizations that include the same PI or co-PI on separate proposals.

Phase 2 proposals

Anyone may serve as a PI or co-PI on only one Phase 2 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.

See section IV. below for additional eligibility information.

Additional Eligibility Info:

For Track L ONLY:

NSF anticipates the following possible scenarios for Track L proposal preparation and submission. These scenarios are:

- 1. Proposals submitted with solely U.S. entities.*
- 2. Proposals submitted by a U.S. lead from academia with Swedish participants. These proposals could also be submitted through the BAA. The Swedish participants may be funded through Vetenskapsrådet/Vinnova.*
- 3. Proposals submitted by a U.S. lead from industry, non-profits, etc. with Swedish participants. The Swedish participants may be funded through Vetenskapsrådet/Vinnova.*
- 4. Proposals submitted by a Swedish lead with U.S. participants from academia, industry, etc.*
This type of proposal must be submitted through the BAA. If this type of proposal is recommended for award after the NSF-managed review process described below and Vetenskapsrådet/Vinnova funds the Swedish participants, then NSF will fund only the U.S. participants.

Phase 2 proposals

Eligibility to submit a Phase 2 proposal is limited to proposers who receive a Phase 1 Award under this solicitation. The organization that received the Phase 1 award does not have to be the proposing (lead) organization for the Phase 2 proposal, however they must have been part of the Phase 1 team. Any change of proposing organization from Phase 1 should be explained in the proposal.

Only one Phase 2 proposal may be submitted per Phase 1 award.

V. Proposal Preparation And Submission Instructions

A. Proposal Preparation Instructions

Letters of Intent (required):

Letters of Intent for Phase 1 are required and must be submitted via Research.gov, even if full proposals will be submitted via Grants.gov.

Letters of Intent must be submitted by 5:00 p.m. submitting organization'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 1 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 PAPPG. Note that no Supplementary Documents are allowed.

Letters of Intent should identify 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.

No project will be considered for an award without a Letter of Intent. Letters of Intent are not reviewed; however, in order to submit a Phase 1 proposal, the proposer must submit a Letter of Intent. Letters of Intent shall not exceed one page and **MUST** include the following:

- Title that includes "NSF Convergence Accelerator and the track identifier (K, L, or M)".
- Names, departmental and organizational affiliations, and expertise of the Principal Investigator and Co-Principal Investigators. For proposals with intent to involve multiple organizations and partnerships, the same information should be provided for all sub-awardees to the extent it is known at the time.
- 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 1 and describe how the deliverable would impact society at a national scale.

For Track L only:

The letter of intent for Track L projects that include Swedish participants must be simultaneously submitted to NSF as described above and to Vetenskapsrådet/Vinnova. Projects that include Swedish Participants to be funded through Vetenskapsrådet/Vinnova should consult <https://vinnova.se/nsf-convergence-accelerator>  for additional information.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through Research.gov 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 Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and 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. The Prepare New Proposal setup will prompt you for the program solicitation number.
- 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.D.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 1 Full Proposals

Phase 1 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 1 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](#)).

Letters of Intent (LOI) are required for all Phase 1 proposals in response to this solicitation. A Phase 1 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 (K, L, or M) followed by a colon (e.g., NSF Convergence Accelerator Track (K, L, or M): 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.

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 listed order (a through g):

a. Objectives and Significance of the Proposed Activity

b. **Convergence Research:** Explain how the work conducted in Phase 1 represents research at the highest level of integration and interdisciplinarity. Explain how your project uses a [convergence 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 1 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 1 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 1 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 1 and describe the timeline for those deliverables. Phase 2 will end approximately 24 months after Phase 2 award (Fall/Winter 2026) and your deliverables are expected at that time. You should also discuss preliminary deliverables that will be developed in Phase 1. Explain why there is a high probability that this plan will be achieved.
- f. **Track Alignment:** Explain fully the alignment to the track in this solicitation (K, L, or M) and how the proposed work in Phase 1 will assist in the success of the entire track.
- g. **Broader Impacts:** This section must include 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 Chapter II.D.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 in the proposal.

Signed: _____ Print Name: _____

Date: _____ Organization: _____

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

Priority will be placed on the quality and significance of the collaboration and the role and involvement of the collaborator must be evident from relevant sections of the project description.

Data Management and Sharing Plan: (*up to two pages*) In addition to the general elements of the data management and sharing plan described in the PAPPG, proposals should address within the Data Management and Sharing 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.D.2.i, each proposal that requests funding to support postdoctoral researchers must upload 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 Researcher Mentoring Plan should reflect how mentoring will be appropriate for the specific roles of postdoctoral researchers in this project effort.

Consolidated Personnel List: The Consolidated Personnel List is a spreadsheet with all key personnel, subaward and collaborations listed. 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/PD or co-PI/PD" (i.e., those listed on the cover page); "Other Senior Personnel"; "Subawardee Personnel"; or "Other Personnel" who

have a biographical sketch included in the proposal; or "Collaborators" (Letters of Collaboration). Only one spreadsheet should be submitted per proposal.

Prior to proposal submission:

(1) complete all columns in the spreadsheet. Convert the file into a PDF document. Filename for the PDF document should be "**Consolidated Personnel List**". Once completed, the file should be uploaded as a supplementary document when submitting the final proposal.

After proposal submission (once a proposal ID has been assigned):

(1) rename the Excel spreadsheet using the following naming convention: **[Proposal ID#]_[PI's last name]**;

and

(2) upload the Excel spreadsheet version of the file into the folder linked below. The Excel version of the Consolidated Personnel Spreadsheet should be submitted within 24 hours of the proposal submission deadline.

Folder link: <https://nsf.app.box.com/f/99c5e762f336421bbb7a6db306c77e55> 

The purpose of this document is to assist the program in the management of reviewer selection. There are likely to be additional individuals and organizations in the Collaborators and Other Affiliations Information (COA) 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.

- **Suggested Reviewers and Reviewers Not to Include (optional).**

Phase 2 Full Proposals

Proposal Title: The title of the proposal **MUST** begin with "NSF Convergence Accelerator Track" followed by the track identifier (K, L, or M) followed by a colon (e.g., NSF Convergence Accelerator Track (K, L, or M): 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 1 proposal title.

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 1 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 2 teams can involve different partners than were part of the Phase 1 proposal. However, at least one of the PI or co-PIs in the Phase 2 proposal must have served as a PI or co-PI for that project in Phase 1. 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 1 (see PAPPG for guidelines). The proposal must also include the following Sections in the order listed (a through i):

a. Objectives and Significance of the Proposed Activity

- b. **Convergence Research:** Explain how the work conducted in Phase 1 and the work proposed in Phase 2 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 2 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 1 curriculum, meetings and webinars, discussion of how Phase 1 efforts may have modified the project path, and documentation of any creative products or preliminary results developed during Phase 1 and how they will be incorporated into the Phase 2 work plan.
- f. **Timeline of Milestones and Deliverables** (*up to 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 36-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 36-month award period as well as after 36 months of funding. Explain why there is a high probability that this plan will be achieved.
- h. **Track Alignment:** Explain the close match to the track in this solicitation (K, L, or M) and how the proposed work in Phase 2 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. **Broader Impacts** (*up to two pages*): This section must include a Broadening Participation Plan. 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 the full spectrum of diverse talent in STEM 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.

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.D.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 in the proposal.

Signed: _____ Print Name: _____

Date: _____ Organization: _____

Note: 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 and Sharing Plan: (*up to two pages*): In addition to the general elements of the data management and sharing plan described in the PAPPG, proposals should address within the Data Management and Sharing 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.

Intellectual Property (IP) 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 Intellectual Property Management 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.

For Track L ONLY:

Please note that Vetenskapsrådet/Vinnova funding of Swedish teams is subject to Vetenskapsrådet/Vinnova approval of the IP Management Plan.

Mentoring Plan: (*up to one page*): As described in PAPPG Chapter II.D.2.i, each proposal that requests funding to support postdoctoral scholars or graduate students must upload 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 Mentoring Plan is expected to reflect a mentoring plan that is will be appropriate for the specific roles of postdoctoral scholars or graduate students in this project effort.

Consolidated Personnel List: The Consolidated Personnel List is a spreadsheet with all key personnel, subaward and collaborations listed. 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/PD or co-PI/PD" (i.e., those listed on the cover page); "Other Senior Personnel"; "Subawardee Personnel"; or "Other Personnel" who have a biographical sketch included in the proposal; or "Collaborators" (Letters of Collaboration). Only one spreadsheet should be submitted per proposal.

Prior to proposal submission:

(1) complete all columns in the spreadsheet. Convert the file into a PDF document. Filename for the PDF document should be "**Consolidated Personnel List**". Once completed, the file should be uploaded as a supplementary document when submitting the final proposal.

After proposal submission (once the proposal ID has been assigned):

(1) rename the Excel spreadsheet using the following naming convention: **[Proposal ID#]_[PI's last name]**;

and

(2) upload the Excel spreadsheet version of the file into the folder linked below. The Excel version of the Consolidated Personnel Spreadsheet should be submitted within 24 hours of the proposal submission deadline.

Folder link: <https://nsf.app.box.com/f/99c5e762f336421bbb7a6db306c77e55> 

The purpose of this document is to assist the program in the management of reviewer selection. There are likely to be additional individuals and organizations in the Collaborators and Other Affiliations Information (COA) 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.

Public Executive Summary (public document, for open sharing): (*up to two pages*) Because the NSF is interested in catalyzing partnerships with industry, foundations, the investment community, and others in Phase 2, the proposal must include a Public Executive Summary that will be posted publicly and shared with potential NSF partners. A Public Executive Summary is developed during Phase 1 with the help of your coaches. This Section is the only element of the Phase 2 proposal that will 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 1 activities and their expected participation in Phase 2; (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-catalyzed 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.

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

- **Suggested Reviewers and Reviewers Not to Include (optional).**

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

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

Budget Preparation Instructions:

After submitting a Letter of Intent, proposers may submit a Phase 1 full proposal. Phase 1 awards are limited to \$750,000 for a one-year period of performance.

For Track L ONLY:

Budgets for those parts of Phase 1 proposals conducted by the Swedish participants and to be funded by Vetenskapsrådet/Vinnova are not to exceed 7,600,000 SEK (5,000,000 SEK from Vinnova and 2,600,000 SEK from Vetenskapsrådet) of the possible total 750,000 USD dollars budget limit for Phase 1 proposals.

Phase 2 proposals should include a three-year budget. The budget for year 1 should not exceed \$2,000,000 and the total budget for the three-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 subsequent years. Teams should plan on completing the effort within a three years; no-cost extensions will be authorized only in extraordinary circumstances.

For Track L ONLY:

Budgets for those parts of Phase 2 proposals conducted by the Swedish participants and to be funded by Vinnova are not to exceed 10,000,000 SEK of the possible total 5,000,000 USD dollars budget limit for Phase 2 proposals.

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 three years, PIs, Co-PIs and other Senior/Key Personnel **may request more than two months of salary support**. The [NSF Proposal & Award Policies & Procedures Guide \(PAPPG\)](#) Chapter II.D.2.f.(i)(a) contains NSF's policy on Senior/Key Personnel salaries and wages. Any compensation for Senior/Key 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.

Not less than 5% of the overall budget amount (including direct and indirect costs) should be set aside for collaboration among Phase 2 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 2 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.D.2.g*. 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.D.2.f.xii*.

C. Due Dates

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

July 11, 2023

Letter of Intent (required for Phase 1 Full Proposals only)

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

August 22, 2023

Phase 1 Full Proposals

September 26, 2024

Phase 2 Full Proposals, only Phase 1 awardees are eligible to submit

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at:

[https://www.research.gov/research-portal/appmanager/base/desktop?](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparation)

[_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparation](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparation)

For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov.

The Research.gov Help Desk answers general technical questions related to the use of the Research.gov system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

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 Research.gov for further processing.

The NSF [Grants.gov Proposal Processing in Research.gov informational page](#) provides submission guidance to applicants and links to helpful resources including the NSF [Grants.gov Application Guide](#), [Grants.gov Proposal Processing in Research.gov how-to guide](#), and [Grants.gov Submitted Proposals Frequently Asked Questions](#). Grants.gov proposals must pass all NSF pre-check and post-check validations in order to be accepted by Research.gov at NSF.

When submitting via Grants.gov, NSF strongly recommends applicants initiate proposal submission at least five business days in advance of a deadline to allow adequate time to address NSF compliance errors and resubmissions by 5:00 p.m. submitting organization's local time on the deadline. Please note that some errors cannot be corrected in Grants.gov. Once a proposal passes pre-checks but fails any post-check, an applicant can only correct and submit the in-progress proposal in Research.gov.

Proposers that submitted via 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 *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. 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.D.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.D.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 Sharing Plan and the Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

Phase 1 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 1 that lead to development of a strong Phase 2 proposal?
- Track Alignment
 - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (K, L, M)?
 - Do the proposed ideas differ markedly from research supported by other NSF programs, initiatives, Big Ideas or other NSF funding mechanisms?

Phase 2 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 1 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 36-month period that will ultimately benefit society?
- Track Alignment and Track Integration
 - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (K, L, M)?
 - 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 2 will contribute to the success of the entire track and support potential track integration efforts?

Phase 2 Full Proposals only will go through an additional Review Process as described below:

Oral Pitch Presentation and Pitch Review Panel

Following the NSF proposal review panels, the Convergence Accelerator will execute a virtual or in-person oral *pitch review presentation as part of the evaluation process*. The pitch review will consist of a separate review panel for Tracks K, L, and M.

The pitch review panel will follow NSF merit review guidelines with the review panel made up of members from academia, industry, and other sectors. The pitch review will include NSF reviewers and 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 2 approach to the review panel. An additional amount of time will be allocated for the NSF pitch review panel 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 2 project.
2. Provide a brief summary of the Convergence Accelerator Phase 1 project that includes:

- The initial objectives of the project when it was funded.
 - Key learnings during the Phase 1 project and how they resulted in revision to project plans and deliverables and informed the Phase 2 application.
 - Any outcomes or outputs from the Phase 1 project.
3. Provide a brief summary of the proposed Convergence Accelerator Phase 2 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 2 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.

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 2 awards

NSF will develop a list of recommended Phase 2 awards based on all review information available, including the written proposal reviews and the pitch presentation reviews. Proposing teams can choose if and how to engage with any organization that seeks to interact with them directly. 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. NSF will consider the extent to which these interactions 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.

B. Review and Selection Process

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

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

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

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements or the Division of Acquisition and Cooperative Support 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 an NSF Grants and Agreements Officer. 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.

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, [Ensuring the Future is Made in All of America by All of America's Workers](#) (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's [Build America, Buy America](#) webpage.

Special Award Conditions:

Phase 1

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 1 activities.

For Track L ONLY:

In the event that a proposal with a Swedish participant is selected by NSF for funding, the Swedish Participant will submit the proposal to Vetenskapsrådet/Vinnova so that Vetenskapsrådet/Vinnova can proceed with the funding of the Swedish portion of the award.

Phase 2

NSF Convergence Accelerator Phase 2 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/Key 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 subsequent years. 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.

Recipients 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)."

Recipients 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 annual project report, and a project outcomes report for the general public.

Failure to provide the required annual or final annual 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 annual 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:

- Douglas Maughan, telephone: (703) 292-2497, email: dmaughan@nsf.gov
- Aurali E. Dade, telephone: (703) 292-7049, email: adade@nsf.gov
- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov
- Jemin George, telephone: (703) 292-2251, email: jgeorge@nsf.gov
- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov
- Michael Pozmantier, telephone: (703) 292-4475, email: mpozmant@nsf.gov
- Michael Reksulak, telephone: (703) 292-8326, email: mreksula@nsf.gov
- Catherine O'Reilly, telephone: (703) 292-7934, email: coreilly@nsf.gov
- Christopher Sanford, telephone: (703) 292-8132, email: csanford@nsf.gov
- Edda Thiels, telephone: (703) 292-8421, email: ethiels@nsf.gov

For questions related to the use of NSF systems contact:

- NSF Help Desk: 1-800-673-6188
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. Other Information

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on [NSF's website](#).

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

About The National Science Foundation

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

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.F.7 for instructions regarding preparation of these types of proposals.

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

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

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <https://www.nsf.gov>

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

Privacy Act And Public Burden Statements

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See [System of Record Notices, NSF-50](#), "Principal Investigator/Proposal File and Associated Records," and [NSF-51](#), "Reviewer/Proposal File and Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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

Suzanne H. Plimpton
Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314

[Vulnerability disclosure](#) | [Inspector General](#) | [Privacy](#) | [FOIA](#) | [No FEAR Act](#) | [USA.gov](#) | [Accessibility](#) |
[Plain language](#) |



National Science Foundation, 2415 Eisenhower Ave Alexandria, VA 22314
Tel: (703) 292-5111,