

UPR external funding success is of utmost importance to strengthen the connection between its investigators/faculty and funding entities who have the potential to sponsor their research and academic endeavors. This publication has been developed in order to summarize funding opportunities and promote the participation of faculty and collaborative research groups in their intent to apply for external funds. Such efforts are aligned with the UPR Strategic Plan 2017-2022: A New Era of Innovation and Transformation for Student Success; Certification 50 (2016-2017) of the Governing Board, December 19, 2016. Strategic Area: Research and Creative Work. Goal 2: Increase Applications for and awards of external funds for research and creative work.

SELECTED FUNDING OPPORTUNITIES

This is a selection of identified funding opportunities for the period ending 06/30/2020 and is in no way all-inclusive of funding opportunities available. Further information has been shared with External Resource Coordinators and Research Coordinators at each UPR campus by e-mail or MS Teams.

1. Computational and Data-Enabled Science and Engineering, National Science Foundation

Application Deadline: Multiple depending on program until November 2020

Advanced computational infrastructure and the ability to perform large-scale simulations and accumulate massive amounts of data have revolutionized scientific and engineering disciplines. The goal of the CDS&E program is to identify and capitalize on opportunities for major scientific and engineering breakthroughs through new computational and data analysis approaches. The intellectual drivers may be in an individual discipline or they may cut across more than one discipline in various Directorates. The key identifying factor is that the outcome relies on the development, adaptation, and utilization of one or more of the capabilities offered by advancement of both research and infrastructure in computation and data, either through cross-cutting or disciplinary programs.

The CDS&E program welcomes proposals in any area of research supported through the participating divisions that address at least one of the following criteria:

- Promote the creation, development, and application of the next generation of mathematical, computational and statistical theories and tools that are essential for addressing the challenges presented to the scientific and engineering communities by the ever-expanding role of computational modeling and simulation and the explosion and production of digital experimental and observational data.
- Promote and encourage integrated research projects that create, develop and apply novel computational, mathematical and statistical methods, algorithms, software, data curation, analysis, visualization and mining tools to address major, heretofore intractable questions in core science and engineering disciplines, including large-scale simulations and analysis of large and heterogeneous collections of data.
- Encourage adventurous ideas that generate new paradigms and that create and apply novel techniques, generating and utilizing digital data in innovative ways to complement or dramatically enhance traditional computational, experimental, observational, and theoretical tools for scientific discovery and application.
- Encourage ideas at the interface between scientific frameworks, computing capability, measurements and physical systems that enable advances well beyond the expected natural progression of individual activities, including development of science-driven algorithms to address pivotal problems in science and engineering and efficient methods to access, mine, and utilize large data sets.

Link to Additional Information: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504813

2. Digital Humanities Advancement Grants, National Endowment for the Humanities

Application Deadline: January 15, 2021

The National Endowment for the Humanities (NEH) Office of Digital Humanities is accepting applications for the Digital Humanities Advancement Grants program. The program supports innovative, experimental, and/or computationally challenging digital projects at different stages of their lifecycles, from early start-up phases through implementation and sustainability. Experimentation, reuse, and extensibility are valued in this program, leading to work that can scale to enhance scholarly research, teaching, and public programming in the humanities. The program also supports scholarship that examines the history, criticism, and philosophy of digital culture or technology and its impact on society. Proposals are welcome in any area of the humanities from organizations of all types and sizes.

DHAG proposals should respond to one or more of these programmatic priorities:

- creating or enhancing experimental, computationally-based methods, techniques, or infrastructure that contribute to the humanities;
- pursuing scholarship that examines the history, criticism, and philosophy of digital culture or technology and its impact on society; or
- conducting evaluative studies that investigate the practices and the impact of digital scholarship on research, pedagogy, scholarly communication, and public engagement.

Level I: Level I awards (up to \$50,000 and up to 24 months) support exploratory sessions, workshops, early alpha-level prototypes, and initial planning. In addition, Level I proposals can identify a problem or research question, explore a research agenda, or discover appropriate methodologies or technologies for both new projects and digital humanities projects in need of substantive revision or recovery. Outcomes for Level I projects may include reports, position papers, collaboration building, and plans for subsequent steps and future research or development. For projects pursuing scholarship that examines the history, criticism, and philosophy of digital culture or technology, outcomes might include articles, essays, books, edited volumes, or reports. Applicants planning for the revitalization and/or recovery of existing digital projects should apply for a Level I award for activities that might include testing and evaluation with target audiences to determine needs and priorities; consideration of how project data can be incorporated into a federated or discipline-specific platform; or planning for a redesign of a project's interface to align with current web design and accessibility standards.

Level II: Level II awards (from \$50,001 to \$100,000 and up to 24 months) support projects that have completed an initial planning phase. Level II proposals should include a well-defined plan of work leading to concrete and tangible outcomes, such as working prototypes or code, sample data sets or models, methodological workflows, and/or documentation.

Level III: Level III awards (from \$100,001 to \$325,000 and up to 36 months) support scaling-up and expansion of established projects. Level III projects must already have completed a start-up or prototyping phase prior to submitting an application, and must demonstrate project success, discuss targeted user communities, and offer strong plans for accessibility, dissemination beyond the applicant institution, and documentation based on user needs. The earlier phases of the project's development may or may not have been supported by NEH or other funding sources. Level III applicants may request an additional \$50,000 in federal matching funds above the \$325,000 ceiling to leverage external funding to support digital initiatives and ensure long-term sustainability of digital projects.

Link to Additional Information: <https://www.neh.gov/grants/odh/digital-humanities-advancement-grants>

3. Using Human Cell Animal Chimera Brains to Study HIV Latency and Pathology, Department of Health and Human Services, National Institutes of Health

Application Deadline: November 13, 2020

Recent technical advancements have enabled generating human cell-mice chimeric brains by engrafting human iPSC-derived primitive neural progenitor cells and/or cord blood-derived microglial progenitor cells into neonatal mouse. In the chimeric brain, human neural progenitor cells or microglial cells differentiate, migrate, and distribute throughout the mouse brain. They are eventually functionally integrated into various brain regions. Such successes provide opportunities to define the structure, function, genetics and plasticity of functional neural networks containing human cells. It can also serve as a rodent model to study HIV infectivity, provirus activity, reservoir formation, and the neuropathogenesis of HIV infection. It allows the study of HIV and substance abuse comorbidity in the brain of a fully functional, awake, behaving animal from the single cell to neural circuitry levels.

This FOA is intended to foster the development of an improved rodent model to advance the studies of HIV virology and latency, and to advance mechanistic studies of HIV neuropathology and its comorbidity with SUD. The ultimate goal is to understand how HIV and SUD impact human neurons, glia and microglia in a fully functional, awake, behaving animal from single cell to neural circuits levels, to behavior. Another goal is to provide resources of such chimeric animal models to the research community for optimizing and validating the chimera brain research platforms for HIV studies and its eradication.

Investigators are encouraged to explore the lymphocyte reprogramming resource using de-identified repository lymphocyte specimens at NIDA Center for Genetic Studies at Rutgers DNA an <https://nidagenetics.org/>. NIDA Center for Genetics Studies offers services to generate high quality induced pluripotent stem cells (iPSC) derived from patients with disorders using abused substances including nicotine, cannabinoids, opioids and cocaine and methamphetamine. iPSCs are derived by episomal, retroviral, or Sendai viral reprogramming of cryopreserved lymphocytes. These cells may be differentiated into many different cell types including neurons, glial cells and immune cell progenitors for neurobiological, pharmacological and toxicity studies that are relevant to addiction research.

The major thrust of the proposed project MUST involve the exploitation of technologies engrafting into neonatal mice 1. human neuroprogenitor cells derived from induced pluripotent stem cells (iPSC) either from patients or healthy individuals, and 2. human cord blood hematopoietic stem cells to be differentiated into microglia and macrophages and distributed into the brain as the future host for HIV infection. Additionally, at least one aim or sub-aim MUST also involve either 1. opioid, cannabinoid, methamphetamine, nicotinic, dopaminergic, or other signaling pathways relevant to addictive substance use, or 2. exposure to addictive substances. Addictive substances of interest include: opioids, nicotine, cocaine, methamphetamine, stimulants, prescription drugs, cannabinoids, or combinations of these drugs. Applications focused solely on alcohol exposure will be considered non-responsive to this FOA.

The research areas that are pertinent to this FOA include, but are not limited to:

- How HIV-infected microglia alter neural tissue structure, physiology, and function in HIV-latent, HIV infected, and HIV-free chimeric brain;
- Identifying the evolving mechanisms of HIV Neuropathogenesis in the chronically cART managed long-term condition, including the viral genetic or host epigenetic studies relating to the establishment and maintenance of viral latency and reservoirs in chimeric brain
- Synaptodendritic degenerative changes and neuronal and glial cell losses in the setting of chronic HIV infection and abused substances, and effects of those changes when microglia are infected by HIV, analyzed at the single cell level;
- Neuronal excitability, synaptic plasticity, and neural circuit activity that contribute to the development of neuropathology of HAND, with and without the HIV-infected microglia, and with and without the presence of abused substances, analyzed at the single cell level;
- The impact of substances of abuse on the cellular and molecular mechanisms associated with the neuropathology underlying HAND, including HIV trafficking in neural tissues, neuron-glia communication, cell signaling, membrane traffic, protein chemistry and neurophysiologic changes and excitability, and neuroplasticity;
- The cellular, molecular and cell imaging markers of chronic HIV-associated neurological changes, with and without the exposure to the abused substances;
- Cellular changes, differentiation and activity of microglia and their interactions with host cells with and without cART and with and without the abused substances, validated with what is discovered from other in vivo models and in human studies;
- Processes and pathways of inflammatory mediators, cytokines, viral factors, excitotoxicity and signaling mechanisms leading to neuronal toxicity by active and latent HIV with cART maintenance in chimeric brains;
- Host gene regulation in neuronal and glial cells following exposure to exosomes released from HIV-infected microglial cells and astrocytes, with and without the presence of abused substances;
- Genetic and genomic editing, aided by technologies such as CRISPR, to alleviate the cellular and molecular disorders associated with the neuropathology underlying HAND;
- Genetic and genomic editing, aided by technologies such as CRISPR, to eradicate the virus in HIV-infected neural tissues in the chimeric brain, especially the viral factors in HIV-infected microglia in the setting of chronic HIV-infection and cART maintenance, with and without the presence of abused substances.

Link to Additional Information: <https://grants.nih.gov/grants/guide/rfa-files/RFA-DA-21-026.html>

4. Promoting Research on Music and Health: Phased Innovation Award for Music Interventions

Application Deadline: October 02, 2020; June 02, 2021; October 04, 2021; June 02, 2022; October 03, 2022; June 02, 2023

The purpose of this Funding Opportunity Announcement (FOA) is to promote innovative research on music and health with an emphasis on developing music interventions aimed at understanding their mechanisms of action and clinical applications for the

treatment of many diseases, disorders, and conditions. Given the emphasis on innovation, little or no preliminary data are needed to apply under this FOA. Because of the need for a multidisciplinary approach, collaborations among basic researchers, translational science researchers, music intervention experts, other clinical researchers, music health professionals, and technology development researchers are encouraged. The FOA utilizes a phased R61/R33 funding mechanism to support mechanistic research and to evaluate the clinical relevance of music interventions. The R61 phase will provide funding to either investigate the biological mechanisms or behavioral processes underlying music interventions in relevant animal models, healthy human subjects, and/or clinical populations, or can be used to develop innovative technology or approaches to enhance music intervention research. The second R33 phase will provide support for further mechanistic investigations in human subjects or animal models, intervention development, or pilot clinical studies. The pilot clinical studies may focus on intervention optimization/refinement, feasibility, adherence, and/or identification of appropriate outcome measures to inform future clinical research. Transition from the R61 to the R33 phase of the award will depend on successful completion of pre-specified milestones established in the R61.

Research Objectives and Specific Requirements

The R61 Phase

The primary objective of the R61 phase supported under this FOA is to promote innovative basic/mechanistic research on music interventions. The R61 phase can be a basic, mechanistic, or technology development study in relevant animal models, human subjects, or both. Preliminary data are not required for a R61 phase application. However, applicants may include preliminary data if they are available.

Examples of topics of high interests for the R61 phase include, but are not limited to:

- The mechanisms of music interventions for pain, opioid misuse, management of other symptoms, or palliative care
- The mechanisms of music interventions for visual impairments, hearing restoration; voice, speech, language rehabilitation; or spatial orientation
- The mechanisms of music interventions for obesity treatment and appetite control or parasympathetic neural stimulation for stress relief for patients or caregivers
- The mechanisms of music interventions on promoting well-being or behaviors associated with health and well-being, such as exercise; or improving the emotional/behavioral status of individuals with dementia (e.g. Alzheimer's disease (AD) or Alzheimer's disease related dementias (ADRD))
- The mechanisms of music interventions for motor disorders across the lifespan, including stroke and Parkinson's disease
- The mechanisms of music interventions for general brain disorders or memory improvement
- Individual differences in the mechanisms and outcome effects of music interventions
- Development and testing of new technology for music intervention delivery

Applicants are expected to develop a detailed description of the music intervention they propose to use in the study. For mechanistic studies, in animal models or human subjects, investigators are encouraged to properly define the distinct components of a complex music intervention or provide adequate description and justification of focusing on a specific component (e.g., rhythm, melody, harmonic structure, pitch, or other individual motor or components) of complex music interventions. The proposed mechanism(s) or process(es), when appropriate, are expected to be assessed using objective, quantifiable, and reproducible measures. Applicants are also expected to provide detailed descriptions of the measures and a strong rationale for choosing such measures.

The R33 Phase

The primary objective of the R33 phase is to support the development and implementation of rigorous, evidence-based proof-of-concept studies of music interventions in healthy human subjects or appropriate clinical populations, or innovative in-depth mechanistic studies in relevant animal models to investigate how components of music interventions may work. Examples of R33 phase projects include, but are not limited to:

- Further mechanistic studies of music interventions in human subjects or in-depth analysis in animal models, if the R61 phase focuses on a basic mechanistic study in animal models. For instance, the R61 phase may examine whether specific musical structures (e.g., pitch, rhythm, harmonic structures, and/or chord) may activate discrete neural correlates in a relevant animal model, while the R33 phase would explore the mechanistic effects of such musical structures in modulating parallel brain activities in a relevant clinical population.
- Optimization or in-depth studies of mechanistic effects of music interventions, if the R61 phase focuses on a preliminary mechanistic study in human subjects. For instance, the R61 phase may examine whether active music engagement coactivates auditory and motor cortices in a clinical population, while the R33 phase may study whether additional brain stimulation of the cortical connections may enhance or impair the auditory/motor connectivity as well as the associated clinical effects.

- Pilot feasibility studies of music interventions, if the R61 phase focuses on novel technology development or basic research. For instance, if the R61 phase develops an app-delivered music intervention, the R33 phase could involve a randomized trial of the music intervention app versus a comparator app in the target population to assess feasibility (e.g., recruitment and retention rates, fidelity of implementation, participant adherence rates, data collection procedures, etc.) and acceptability (e.g., qualitative assessments, reasons for dropouts, preference ratings, participant burden, credibility).
- Pilot clinical studies of music interventions including proof of principle, if the R61 phase focuses on a basic mechanistic study in human models. For instance, if the R61 phase examines whether a music intervention is associated with basal ganglia activity, the R33 phase could involve a randomized trial of the music intervention vs. a standard care comparator among Parkinson’s disease patients to assess feasibility and acceptability parameters, examine within-group pre-post changes in clinically relevant measures, and/or examine correlations between changes in basal ganglia activity and clinically relevant measures as proof-of-principle.

In the R33 phase, human mechanistic studies are encouraged to be statistically powered for the hypothesized mechanisms or processes. Pilot feasibility studies are not expected to be powered for the proposed mechanistic or clinical outcomes; instead they should be primarily focused on examining important questions about feasibility and acceptability that will directly inform the design and conduct of a future, fully-powered clinical efficacy or effectiveness study. Examination of within group pre-post changes in clinical outcomes or the correlation of mechanistic outcomes with clinical outcomes may be included in pilot clinical studies as indication of proof-of-principle of the proposed music intervention on hypothesized clinical outcomes. Pilot clinical studies are not meant to be definitive trials and should not propose to examine clinical efficacy or effectiveness in an underpowered sample.

Link to Additional Information: <https://grants.nih.gov/grants/guide/pa-files/PAR-20-266.html>

5. Cyberinfrastructure for Sustained Scientific Innovation (CSSI), National Science Foundation

Application Deadline: October 28, 2020

The Cyberinfrastructure for Sustained Scientific Innovation (CSSI) umbrella program seeks to enable funding opportunities that are flexible and responsive to the evolving and emerging needs in cyberinfrastructure (CI). This program continues the CSSI program by removing the distinction between software and data elements/framework implementations, and instead emphasizing integrated CI services, quantitative metrics with targets for delivery and usage of these services, and community creation. The CSSI umbrella program anticipates two classes of awards:

- Elements: These awards target small groups that will create and deploy robust services for which there is a demonstrated need, and that will advance one or more significant areas of science and engineering.
- Framework Implementations: These awards target larger, interdisciplinary teams organized around the development and application of services aimed at solving common research problems faced by NSF researchers in one or more areas of science and engineering, and resulting in a sustainable community framework providing CI services to a diverse community or communities.

Prospective Principal Investigators (PIs) should be aware that this is a multi-directorate activity and that they are encouraged to submit proposals with broad, interdisciplinary interests. Further, not all divisions are participating at the same level and division-specific priorities differ. Prospective PIs should also refer to the directorate/division-specific descriptions contained in Section II of this solicitation. Finally, it is strongly recommended that prospective PIs contact program officer(s) from the list of Cognizant Program Officers in the division(s) that typically support the scientists and engineers who would make use of the proposed work, to gain insight into the priorities for the relevant areas of science and engineering to which their proposals should be responsive. As part of contacting Cognizant Program Officers, prospective PIs are also encouraged to ascertain that the focus and budget of their proposed work are appropriate for this solicitation.

NSF envisions an agile, integrated, robust, trustworthy, and sustainable CI ecosystem that drives new thinking and transformative discoveries in all areas of S&E research and education (as summarized in the Transforming Science Through Cyberinfrastructure: NSF’s Blueprint for a National Cyberinfrastructure Ecosystem for Science and Engineering in the 21st Century). Supporting this vision, OAC seeks to fund projects that translate core innovations into tools and services that enable a sustainable CI for broad use by the S&E research communities. OAC’s Data and Software programs have been long-term investments, focused on catalyzing new thinking, paradigms, and practices in developing and using data and software CI services to understand natural, human, and engineered systems. Science and engineering challenges and use cases drive CI development, and successful CI systems strike a balance that reflects, both the underlying technology and disciplinary research needs. OAC’s Data and Software programs have also continued to evolve in response to rapid changes in the underlying hardware and networks, the accelerated use of new data representations and processing paradigms and the convergence of data, software and services into unified instruments essential to all science and engineering domains.

The CSSI program targets services that address all aspects of CI, from embedded sensor systems and instruments, to desktops and high-end data and computing systems, and on to major instruments and facilities. The program will continue to nurture the interdisciplinary processes required to support the entire data and software lifecycle and will successfully integrate the development, deployment, and support of CI services with innovation and research.

Furthermore, the program aims to catalyze the development of sustainable CI communities that transcend scientific and geographical boundaries. To that end, the CSSI program aims to create a software and data CI ecosystem that scales from individuals or small groups of researchers/innovators to large communities. Recognizing the need to rapidly respond to evolving research community priorities, NSF envisions support for the creation of such an ecosystem to be complemented by investments in foundational CI community services.

The program envisions vibrant partnerships among academia, government laboratories and industry, including international entities, for the development and stewardship of sustainable CI services that can enhance productivity and accelerate innovation in science and engineering. Furthermore, the program also envisions integrated education activities that will play a key role in developing and sustaining the CI over time and in creating a workforce capable of fully realizing its potential to transform science and engineering.

Link to Additional Information: <https://www.nsf.gov/pubs/2020/nsf20592/nsf20592.pdf>

6. NSF/VMware Partnership on The Next Generation of Sustainable Digital Infrastructure, National Science Foundation

Application Deadline: October 28, 2020

The goal of this joint solicitation between NSF and VMware is to foster novel, transformative research in fundamental and systematic approaches that bring dramatic increases in the environmental sustainability of the Digital Infrastructure leading to practical methodologies and tools. The Digital Infrastructure is broadly defined as the totality of software, hardware, and the methods for managing them for the purpose of efficient computation. This research includes, but is not limited to, computer software and systems; management of distributed software, the Digital Infrastructure, and data center power sourcing; and resource allocation and scheduling. Critical to initiating such research is to set its objectives through the definition of novel metrics and benchmarks that capture the sustainability challenges of all components in the entire computation chain. The program also aims to support a research community committed to advancing research and education at the confluence of management technologies for software, hardware and power for Sustainable Digital Infrastructure, and to transition research findings into practice. A new generation of innovation would build on many recent advances such as passive and active measurements, statistical analysis and inference, learning for automated control and complex optimization, workload isolation and management, agile development, convergence of development and production environments, and architecture-optimized language translation.

In recent years, along with the rapid expansion of data centers and cloud computing, there has been an increased interest in making this expansion environmentally sustainable. According to a recent report, compute workload has grown six-fold between 2010 and 2018 [https://datacenters.lbl.gov/sites/default/files/Masanet_et_al_Science_2020.full_.pdf] with tremendous consumer and societal benefits. While some cloud-based applications increased overall sustainability (such as reduced emissions from cloud-enabled telecommuting, including VMware's Virtual Desktop Infrastructure, VDI [<https://www.vmware.com/topics/glossary/content/virtual-desktop-infrastructure-vgi>]), there has been a high interest and effort in increasing the sustainability of data center operations. The LBNL US Data Center Energy Report [<https://eta.lbl.gov/publications/united-states-data-center-energy>] finds that the annual growth of data center power consumption decreased from 90% in 2000-2005 to 4% in 2010-2014 and is forecasted to remain at 4% for 2015-2020. The report mainly attributes this reduction in growth rate to industry adoption of server virtualization and hardware improvements. For example, VMware's advances in virtualization and resource management technologies resulted in customer server consolidation, reducing power consumption by 120 million MWh and saving 67 million Metric Tons of CO₂ in 2015 alone [<https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/sustainability/vmware-greenit-virtualization-delivers-energy-carbon-emissions.pdf>].

The next generation of innovation in sustainability of Digital Infrastructure will consider the full range of research areas, including

- 1) metrics, benchmarks and measurement methods to capture the wide variety of applications;
- 2) infrastructure architectures and approaches to incorporate sustainability concerns across the full Development and Operations (DevOps) lifecycle; and
- 3) methods to manage the aggregate Digital Infrastructure environment and workloads.

NSF and VMware will support multiple projects with funding of up to \$3,000,000 each over three years, and it is intended that NSF and VMware will co-fund each project. This NSF/VMware partnership combines CISE's experience in developing and managing successful large, diverse research portfolios with VMware's significant expertise in management of virtualized workloads,

virtualization technology, distributed systems, cloud computing, and other aspects of large-scale software infrastructure and infrastructure management.

Link to Additional Information: <https://www.nsf.gov/pubs/2020/nsf20594/nsf20594.pdf>

7. Public Humanities Projects, National Endowment for the Humanities

Application Deadline: January 6, 2021

The National Endowment for the Humanities (NEH) Division of Public Programs is accepting applications for the Public Humanities Projects program. The purpose of this program is to support projects that bring the ideas and insights of the humanities to life for general audiences through in-person programming. Projects must engage humanities scholarship to analyze significant themes in disciplines such as history, literature, ethics, and art history. NOTE: This funding opportunity includes two application deadlines: September 8, 2020 and January 6, 2021. Please select the appropriate application package under the “Package” tab.

This notice solicits applications for the Public Humanities Projects program. This program supports projects that bring the ideas and insights of the humanities to life for general audiences through in-person programming. Projects must engage humanities scholarship to analyze significant themes in disciplines such as history, literature, ethics, and art history. Public Humanities Projects supports projects in three program categories and at two funding levels. Regardless of proposed activity, NEH encourages applicants to explore humanities ideas through multiple formats. Proposed projects may include complementary components: for example, a museum exhibition might be accompanied by a website or mobile app.

Small and mid-sized organizations are especially encouraged to apply. We likewise welcome humanities projects tailored to particular groups, such as families, youth (including K-12 students in informal educational settings), underserved communities, and veterans.

To be competitive for funding, locally focused projects should address topics that are of regional or national relevance by drawing connections to broad themes or historical questions. Projects that don’t address issues of concern to wider regional or national audiences might consider local sources of funding, such as their state humanities councils. The size of an award offered to a successful applicant will reflect the project’s scope and the size of its expected audiences. Applicants are advised to consider developing partnerships with other institutions, particularly organizations such as cultural alliances, broadcast media stations, cultural heritage centers, state humanities councils, veterans’ centers, and libraries.

Program categories - This program supports projects in three categories: Exhibitions (permanent, temporary, or traveling); interpretive programs at Historic Places; and Humanities Discussions.

- The Exhibitions category supports the creation of permanent exhibitions (on view for at least three years) and single-site temporary exhibitions (open to the public for a minimum of two months), as well as traveling exhibitions that will be available to public audiences in at least two venues in the United States (including the originating location). NEH expects applicants for Exhibitions awards to provide at least twenty hours of free admission each month to NEH-supported exhibitions.
- The Historic Places category supports long-term interpretive programs for historic sites, houses, neighborhoods, and regions that are intended to be presented to the public for at least three years. Such programs might include living history presentations, guided tours, exhibitions, and public programs.
- The Humanities Discussions category supports series of at least six in-person public programs related to “A More Perfect Union”: NEH Special Initiative Advancing Civic Education and Commemorating the Nation’s 250th Anniversary. These programs should engage diverse public audiences with humanities resources such as historic artifacts, artwork, or documents, and should be anchored in perspectives presented by humanities experts as speakers, panelists, or discussion leaders, providing context and analysis of program themes. Projects may include, but are not limited to, symposiums, lecture series, reading and discussion programs, analytical discussions of museum collections or theater/musical performances, lifelong learning programs, or other methods of face-to-face audience engagement or informal education. The proposed series should occur over a period of three months to two years.

Link to Additional Information: <https://www.neh.gov/grants/public/public-humanities-projects>

8. Mathematical Sciences Infrastructure Program, National Science Foundation

Application Deadline: December 15, 2020

The primary aim of the Mathematical Sciences Infrastructure Program is to foster the continuing health of the mathematical sciences research community as a whole. In addition, the program complements the [Workforce Program in the Mathematical Sciences](#) in its goal to increase the number of well-prepared U.S. based individuals who successfully pursue careers in the mathematical sciences and in other professions in which expertise in the mathematical sciences plays an increasingly important role. The DMS Infrastructure program invites projects that support core research in the mathematical sciences, including: 1) novel projects supporting research infrastructure across the mathematical sciences community; 2) training projects complementing the Workforce Program, and 3) conference, workshop, and travel support requests that include cross-disciplinary activities or have an impact at the national scale.

- (1) Novel projects that serve to strengthen the research infrastructure: The DMS Infrastructure Program will consider novel projects that support and strengthen the research infrastructure across the mathematical sciences community. These projects most often cut across multiple sub-disciplines supported by DMS or involve interdisciplinary collaborations. The main goal of these projects should be to create a new research infrastructure or substantially enhance or transform an existing infrastructure with regional or national impact that goes substantially beyond the submitting institution or the location of the project. In case of questions regarding suitability of a project for the program, please email an Infrastructure Program Officer with a one-page description of the proposed project and a tentative budget. Full proposals must be submitted by the Full Proposal Deadline Date.
- (2) Training projects: Training proposals submitted to DMS Infrastructure must not fit into one of the areas covered by solicitations in the [Workforce Program in the Mathematical Sciences](#); they must be submitted by the Full Proposal Deadline Date; and they must:
 - A. Include a core research component for trainees in mathematical sciences;
 - B. Demonstrate promise for an impact at the regional or national scale that goes substantially beyond the submitting institution or the location of the project;
 - C. Satisfy at least one of the following criteria:
 - i. Serve as models to be replicated (an EHR review may be solicited),
 - ii. Promote partnerships with non-academic entities, minority-serving institutions, or community colleges, or
 - iii. Include a substantial broadening participation initiative. In addition, all proposals of this type must clearly identify:
 - Goals to be achieved;
 - Specific new activities to be conducted, the way in which these address the goals, and the way in which the activities significantly differ from or enhance common practice;
 - Measurable outcomes for the project;
 - Plans and methods for assessment of progress toward the goals to be achieved, and for evaluation of the success of the activity;
 - Recruitment, selection, and retention plans for participants, including members of underrepresented groups;
 - Sustainability plans to continue the pursuit of the project's goals when funding terminates; and
 - A budget commensurate with the proposed activity.
- (3) Conferences, Symposia, Working Research Sessions, Travel Support Requests: Principal Investigators should carefully read the program solicitation [Conferences and Workshops in the Mathematical Sciences](#) to obtain important information regarding the substance of proposals for conferences, workshops, summer/winter schools, international travel support, and similar activities.

Generally, proposals under this solicitation should first be considered for submission to the appropriate DMS disciplinary program subject to the lead-time requirements specified by that program; see the program web pages listed on the [DMS home page](#). Proposals under this solicitation submitted to DMS Infrastructure must show engagement in developing or enhancing the mathematical sciences research infrastructure in the U.S., including, but not limited to, broadening participation activities; professional development training; or involvement of students and early career researchers. Proposals must explain the regional or national scale impact of the activity that goes substantially beyond the submitting institution or the location of the event. Budgets and submission windows:

- A. Proposals of this type with budgets not exceeding \$50,000, which in accordance with NSF policy can be reviewed internally at NSF, should be submitted six to eight months in advance of the meeting date;
- B. Proposals with budgets higher than \$50,000 should be submitted by the Full Proposal Deadline Date that occurs at least six months prior to the event in order to allow time for external review.

Link to Additional Information: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12756

9. Innovations in Graduate Education (IGE) Program, National Science Foundation

Application Deadline: November 4, 2020

Science, technology, engineering, and mathematics (STEM) graduate education is poised to undergo a major transformation. There are multiple drivers for change including: (i) recent major national reports on the state of STEM graduate education¹, (ii) the accelerating pace of science and engineering discoveries and technological innovations, (iii) national STEM workforce trends, (iv) the growing globalization of science and engineering, (v) the potential to align graduate education practices and models with enhanced understanding of how people learn, and most recently (vi) the challenges faced by the graduate research and education enterprise associated with the COVID-19 pandemic in areas such as resilience, online and hybrid course delivery, and the accessibility, continuity, safety of lab and field research. In addition, there is increasing recognition that addressing the grand challenges in science and engineering requires interdisciplinary and broader professional training that is atypical for most graduate programs. There is also a growing body of evidence that diversity and inclusivity accelerate innovation across the STEM workforce. These realities and the increasing calls for new approaches to STEM graduate education represent an extraordinary opportunity to investigate the effectiveness of innovations. Accordingly, this solicitation encourages proposals in Innovations in Graduate Education (IGE) to test, develop, and implement innovative and effective STEM graduate education models and programming.

The Innovations in Graduate Education (IGE) program is designed to encourage the development and implementation of bold, new, and potentially transformative approaches to STEM graduate education training. The program seeks proposals that explore ways for graduate students in research-based master's and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers.

IGE focuses on projects aimed at piloting, testing, and validating innovative and potentially transformative approaches to graduate education. IGE projects are intended to generate the knowledge required for their customization, implementation, and broader adoption. The program supports testing of novel models or activities with high potential to enrich and extend the knowledge base on effective graduate education approaches.

The program addresses both workforce development, emphasizing broad participation, and institutional capacity building needs in graduate education. Strategic collaborations with the private sector, non-governmental organizations (NGOs), government agencies, national laboratories, field stations, teaching and learning centers, informal science centers, and academic partners are encouraged.

As a special emphasis under this solicitation, IGE seeks proposals that will result in a single cooperative agreement for the development and implementation of an IGE Innovation Acceleration Hub. The Hub will facilitate IGE awardee communications about research activities and outcomes and provide a platform for external stakeholder engagement. Only Hub proposals submitted to the November 2020 deadline will be considered for funding.

¹Graduate Education for the 21st Century, National Academies, 2018; The Path Forward: The Future of Graduate Education, Commission on the Future of Graduate Education in the United States, 2010; Advancing Graduate Education in the Chemical Sciences, American Chemical Society, 2012; Biomedical Research Workforce Working Group Report, National Institutes of Health, 2012; Understanding PhD Career Pathways for Program Improvement, Council of Graduate Schools, 2014; Revisiting the STEM Workforce: A Companion to Science and Engineering Indicators 2014, National Science Board, 2015; Professional Development: Shaping Effective Programs for STEM Graduate Students, Council of Graduate Schools, 2017.

Link to Additional Information: <https://www.nsf.gov/pubs/2020/nsf20595/nsf20595.pdf>

10. NICHD Program Project Grants for HIV Research, Department of Health and Human Services, National Institutes of Health

Application Deadline: March 31, 2021

The purpose of this Program Project (P01) grant initiative is to support integrated, multi-project research programs that have aspects of HIV as a well-defined, central research focus or objective. The P01 is a group of interrelated research projects, each able to stand on its own scientific merit but synergistic with each other.

NICHD is proposing this HIV/AIDS P01 FOA to strengthen existing and foster new collaborations in areas of HIV research which could benefit from enhanced multidisciplinary approaches. The work will include NICHD populations of interest including women (pregnant and non-pregnant) infants, children and adolescents.

The topics proposed should be in alignment with the new NICHD [Strategic Plan](https://www.oar.nih.gov/hiv-policy-and-research/research-priorities) and the NIH/OAR HIV/AIDS research priorities <https://www.oar.nih.gov/hiv-policy-and-research/research-priorities>.

The areas of interest include topics in the following themes:

- 1) The identification and prevention of adverse outcomes related to antiretrovirals and/or HIV and co-infections. While perinatal HIV transmission rates have declined, concerns that the use of different antiretroviral medications may increase adverse pregnancy and infant outcomes, (e.g., preterm birth) in the context of exposure to HIV or other pertinent co-infections needs further study.
- 2) Research on HIV and tuberculosis co-infection in pregnant women, infants, children, and adolescents that will expand knowledge on the unique clinical aspects of HIV/TB co-infection in these populations to generate improved preventive and therapeutic regimens and diagnostics.
- 3) The study of the infant immune system will inform the cure agenda and HIV vaccine development. HIV cure approaches may differ in infants/children/adolescents versus adults due to the status of their immune development. The different parameters involved in the establishment, type, quality, durability and vulnerability of the reservoirs could be explored. Work elucidating these aspects including vaccine- and other immune-based therapy research could be employed.
- 4) Research to understand changes in immune status and inflammation during pregnancy in pregnant women and their developing offspring, including on microbiome/virome establishment especially as it impacts neuroimmune development remain areas of interest. Understanding the role that different immune cells play in the evolving immune milieu early in life and in development of vaccines and immune based therapies would also be of interest.
- 5) The use of new technologies from diverse fields including advanced statistical modeling to better track vulnerable populations in the HIV epidemic and its evolution and co-occurrence in other epidemics/pandemics like SARS CoV2 is encouraged.

Link to Additional Information: <https://grants.nih.gov/grants/guide/rfa-files/RFA-HD-21-023.html>

11. Biology Integration Institutes, National Science Foundation

Application Deadline: January 13, 2021

Biology has transformed science over the last century through discoveries that cross subdisciplines from the molecular to the organismal to the ecosystem level. While making great progress, biology has also slowly fragmented into subdisciplines, creating a dynamic tension between unifying principles and increasingly reductionist pursuits. The aim of this solicitation is to bring researchers together around the common goal of understanding how the processes that sustain life and enable biological innovation operate and interact within and across different scales of organization, from molecules to cells, tissues to organisms, species, ecosystems, biomes and the entire Earth. The Biology Integration Institutes (BII) program supports collaborative teams of researchers investigating questions that span multiple disciplines within and beyond biology.

Integration across biological disciplines is essential if we hope to understand the diverse and ever-increasing data streams of modern biology and tackle emergent questions about living organisms and the environment. Of equal importance is the need for groundbreaking and sustainable training programs that prepare the next generations of scientists to navigate the breadth of biological sciences, training in multiple disciplines without sacrificing depth of learning or innovation. In addition, the biology community must continue to develop practices and adopt strategies that leverage rapid advances in cyberinfrastructure and other technologies to bridge and integrate across subdisciplines and make resources accessible, re-usable, and adaptable for unanticipated purposes. In these ways, Biology Integration Institutes will focus on biological themes that enable the discoveries of life's innovations. The outcomes from biological integration will inspire new biotechnologies and applications to drive our bioeconomy and provide solutions to societal challenges. While this solicitation focuses on the integration of biological subdisciplines, any field beyond biology may be included as needed to address the overarching biological theme.

The NSF Directorate for Biological Sciences program for Biology Integration Institutes (BII) supports diverse and collaborative teams of researchers investigating questions that span multiple disciplines within and beyond biology. The goal is to stimulate creative integration of disparate fields using innovative experimental, theoretical, and modeling approaches to discover underlying principles operating across multiple levels of life, from molecules to cells, organisms, species, ecosystems, biomes and the entire Earth. Funding will be at a higher level and for a longer time frame than is typical for standard NSF awards. The Institutes must enable an environment conducive to integration of research, infrastructure, resources, and training, explore new modes of collaboration, and prepare the next generation of biological scientists to be leaders who pursue multidisciplinary research throughout their careers. These next generation leaders should be able to help transform the scientific enterprise to become fully inclusive. Institutes may be localized at one organization or may span multiple organizations; they may comprise a single group of collaborators or incorporate additional researchers as the project evolves. While this solicitation focuses on the integration of biological subdisciplines, any field beyond biology may be included as needed to address the overarching biological theme. NSF invites proposals with organizational structures that are best suited to tackle integrative biological questions. New models for team interaction may be needed for productive discipline-spanning research within each Institute. Therefore, while particular activities are not prescribed, proposers must demonstrate thoughtful attention to elements that will make the institutes function cohesively. For example, sustaining communication

across disciplines over time requires creative community-building efforts and establishing "habitats" where language and cultural differences between disciplines and people can be addressed and harmonized. These new Institutes face additional challenges of logistics and project management, including: integration and interoperability of data, cyber, and other infrastructure among multiple disciplines, agreement on cross-organizational intellectual contribution and credit plans, development of co-mentorship and personnel exchange programs, and formalization of conflict resolution procedures. Solutions to these challenges will require thorough consideration and may necessitate innovative solutions tailored to the team and questions being addressed. In addition, it is expected that the institutes establish a climate of inclusion and equity through such practices as contemporary team science, open science, and other strategies that effectively include and engage scientists diverse in demography, disciplines, and geographies.

Each Institute must identify a **Research Theme**, centered around a compelling and broad biological question poised for breakthroughs by collaboration across biological subdisciplines. The Theme must be larger in scope than research projects typically submitted to core programs in the BIO Directorate. While it does not have to span all biological subdisciplines, it should span more than one subdiscipline and be compelling across the subdisciplines spanned.

Link to Additional Information: <https://www.nsf.gov/pubs/2020/nsf20601/nsf20601.pdf>

12. Toward Elucidating Mechanisms of HIV Pathogenesis within the Mission of the NIDDK (Pathogenesis TEAMS), Department of Health and Human Services, National Institutes of Health

Application Deadline: March 3, 2021 and November 17, 2021

The purpose of this Funding Opportunity Announcement (FOA) is to support multidisciplinary research teams with complementary expertise in HIV and pathobiology, pathophysiology, and/or metabolism in organs, tissues, and/or biological systems of specific interest to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). These teams will comprehensively interrogate fundamental mechanisms underlying HIV-associated comorbidities, coinfections, and complications relevant to the mission of the NIDDK and advance progress toward alleviating them.

The NIDDK supports medical research on diabetes and other endocrine and metabolic diseases; digestive diseases, nutritional disorders, and obesity; and kidney, urologic, and hematologic diseases, to improve people's health and quality of life. Systemic complications of HIV infection directly affect many of the organ systems and processes within the research mission of the NIDDK.

Objectives and Scope

Synergistic partnership between Multiple Program Directors/Principal Investigators (PDs/PIs) would benefit mechanistic interrogations of HIV-related CCCs within the mission of the NIDDK. CCCs within NIDDK's mission cause significant pathology and suffering in People with HIV (PWH). Areas of interest include enteropathy and loss of gastrointestinal homeostasis; noncommunicable liver diseases and viral hepatitis coinfections; kidney, urologic, and hematologic diseases; and obesity, diabetes, and associated complications. Moreover, NIDDK-relevant pathogenic processes may contribute to HIV pathogenesis in other tissues and organ systems. For example, loss of intestinal epithelial barrier function associated with HIV-associated enteropathy may result in systemic inflammation that contributes to cardiovascular disease as well as comorbidities within NIDDK's mission, including obesity, kidney or liver disease. Mechanistic interrogation of the processes whereby HIV infection or its treatment contributes to these CCCs is needed to identify and develop strategies for preventing and alleviating these pathologies.

Studies may utilize animal models or human subjects, specimens, or data. NIH defines a mechanistic study as a study "designed to understand a biological or behavioral process, the pathophysiology of a disease, or the mechanism of action of an intervention." NIH defines basic research consistent with the definition of basic research in the Code of Federal Regulations as a "systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind." (32 CFR 272.3)

Projects submitted to this FOA **must**:

- Be aligned with the guidelines outlined in [NOT-OD-20-018, UPDATE: NIH HIV/AIDS Research Priorities and Guidelines for Determining HIV/AIDS Funding](#).
- Use the Multiple PD/PI format and include at least one PD/PI whose primary expertise is in HIV science and at least one PD/PI whose primary expertise is in pathobiology, pathophysiology, and/or metabolism in organs, tissues, and/or biological systems of specific interest to NIDDK. One or more additional PD/PIs may also be included if their expertise is key for the success of the project.

Because this FOA is being issued to address the need to develop greater interdisciplinary communication between research communities, there is no expectation that teams necessarily have previous publications with each other or otherwise have a history of extensive previous collaboration. The development of the project itself; as reflected in the quality of the preliminary data, the rigor of

the approach, and the Multiple PD/PI leadership plan; can provide appropriate evidence of a strong and dedicated Multiple PD/PI team.

Topics of particular interest to this FOA include, but are not limited to:

- Elucidation of pathophysiological and metabolic pathways whereby HIV or its treatment contributes to comorbidities within NIDDK's mission.
- Interaction of HIV or its treatment with biological processes within NIDDK's mission, such as metabolism, endocrine function, erythrocyte biology and hematopoiesis, development or progression of kidney disease, or gastrointestinal mucosal immune homeostasis.
- The impact of HIV infection or its treatment on the gastrointestinal or penile microbiome, pathogenic enteric microbes, male genital tract infections, or co-infection with hepatitis viruses.
- Response of the numerous tissues within NIDDK's mission to HIV infection and HIV-associated inflammation.

Link to Additional Information: <https://grants.nih.gov/grants/guide/rfa-files/RFA-DK-20-022.html>

13. RESolution of Inflammation in EnviroNmentally Related disease (RESTORE) (R01 Clinical Trial Not Allowed), Department of Health and Human Services, National Institutes of Health

Application Deadline: February 11, 2021

The purpose of the RESTORE program is to advance understanding of the role of inflammation resolution pathways at the cellular and molecular level and how exposure to environmental pollutants interferes with these pathways resulting in exposure-induced chronic systemic inflammation and ultimately chronic disease conditions. The initial phase of this program is focused on understanding how chronic exposure to air pollution interferes with resolution of inflammation in pulmonary, cardiovascular, and metabolic systems and diseases. The goals of the program are as follows: 1) characterize air pollution-induced changes in inflammation resolution pathways; 2) determine whether these effects are conserved across pulmonary, cardiovascular, and metabolic systems; 3) understand how air pollution exacerbates or promotes chronic inflammatory diseases states such as asthma, allergy, atherosclerosis, COPD, diabetes, and obesity; and 4) identify potential intervention strategies to promote resolution of air pollution-induced inflammation.

Objectives:

This FOA is intended to encourage environmental health scientists to pursue studies using animal models to understand the impact of chronic exposure to air pollution on inflammation resolution pathways. For the purposes of this FOA, air pollution components of interest are limited to ambient PM 2.5, ultrafine particles, combustion generated particles/diesel exhaust particles, and ozone. Applications focused only on the onset of inflammation are not responsive to this FOA.

Specific topics of research interest include, but are not limited to, the following:

- Studies investigating pulmonary, cardiovascular, and metabolic effects of chronic exposure to air pollutants (environmentally relevant doses/ concentrations) using diverse animal models- neonate, adult, old/aged animals of both sexes, collaborative cross strains and disease models (asthma, COPD, fibrosis, atherosclerosis, hypertension, diabetic, obesity) to understand exposure-induced inflammation resolution kinetics and associated events
- Studies using both targeted and untargeted approaches (e.g., genomics, epigenomics, proteomics, lipidomics, and metabolomics) to identify chronic air pollutant-induced alterations in lung and/or cardiovascular tissues from normal and disease models to characterize molecular and biochemical phenotypes for inflammation resolution pathways and downstream mediators.
- Studies to characterize promotion of resolution of air pollution-induced inflammation using therapeutic or nutritional interventions.
- Studies to identify inflammation resolution biomarkers in tissues, biological fluids, exhaled breath condensate in chronic air pollution exposed animal models.
- Studies investigating air pollutant exposure-induced macrophage phenotypic alterations in cardiopulmonary tissues and their role in inflammation resolution including tissue resident macrophages.
- Studies to comprehensively characterize diverse mechanisms of phagocytosis in inflammation resolution and the impact of air pollutants.

Link to Additional Information: <https://grants.nih.gov/grants/guide/rfa-files/RFA-ES-20-013.html>

