

NJIT Research Newsletter

Issue: ORN-2018-47

NJIT Research Newsletter includes recent awards, and announcements of research related seminars, webinars, national and federal research news related to research funding, and **Grant Opportunity Alerts**. The Newsletter is posted on the NJIT Research Website <http://www.njit.edu/research/>.

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Grant Opportunity Alerts

Keywords and Areas Included in the Grant Opportunity Alert Section Below

NSF: Harnessing the Data Revolution (HDR); Institutes for Data-Intensive Research in Science and Engineering - Ideas Labs (I-DIRSE-IL); Mid-scale Research Infrastructure-2 (Mid-scale RI-2); Future of Work at the Human-Technology Frontier: Core Research (FW-HTF); NSF-CBMS Regional Research Conferences in the Mathematical Sciences; Macrosystems Biology and NEON-Enabled Science (MSB-NES); Research on Biological Systems; Mid-scale Research Infrastructure-1 (Mid-scale RI-1); National Robotics Initiative 2.0; Advanced Computing Systems & Services; Campus Cyberinfrastructure (CC*); Enabling Quantum Leap: Quantum Idea Incubator for Transformational Advances in Quantum Systems (QII - TAQS); Frontier Research in Earth Sciences (FRES); Ideas Lab: Cross-cutting Initiative in CubeSat Innovations; CNH2: Dynamics of Integrated Socio-Environmental Systems; Enabling Discovery through GENomic Tools (EDGE); Materials Innovation Platforms (MIP); Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining); EarthCube Office; NSF National Science Foundation Research Traineeship (NRT) Program; CyberCorps® Scholarship for Service (SFS); Methodology, Measurement, and Statistics (MMS)

NIH: Graduate Research Training Initiative for Student Enhancement (G-RISE) (T32); Limited Competition: Clinical and Translational Science Award (CTSA) Program: Exploratory Collaborative Innovation Awards (R21); NIH Research Project Grant (Parent R01); NIH Exploratory/Developmental Research Grant Program (Parent R21); NIH Pathway to Independence Award (Parent K99/R00); Research on Current Topics in Alzheimer's Disease and Its Related Dementias (R01); NIH Small Research Grant Program (R03); NIH Exploratory/Developmental Research Grant Program (Parent R21); NIH Research Project Grant (Parent R01); Computational Genomics and Data Science Opportunities for Small Business (R43/R44) NIH Small Research Grant Program (Parent R03)

Department of Defense/US Army/DARPA/ONR: Data-Driven Discovery of Optimized Multifunctional Material Systems Center of Excellence (D³OM²S CoE); FY19 Office of Naval Research (ONR) Navy and Marine Corps Science, Technology, Engineering & Mathematics (STEM), Education

and Workforce Program; Machine-Assisted Analytic Rapid-Repository System (MARS) Broad Agency Announcement; Electronic Warfare Technology; Microsystems Technology Office (MTO); AFRL/RXC Structural Materials Open BAA; BROAD AGENCY ANNOUNCEMENT (BAA) for Extramural Biomedical Research and Development; NRL Long Range Broad Agency Announcement (BAA) for Basic and Applied Research

Department of Education: Institute of Education Sciences (IES)

EPA: A National Student Design Competition Focusing on People, Prosperity and the Planet - Safe and Sustainable Water Resources

Department of Energy: Energy-Water Desalination Hub; Science Undergraduate Laboratory Internship (SULI); Transformational Sensing Capabilities for Monitoring the Subsurface; Advanced Systems Integration for Solar Technologies

NASA: ROSES 2018: Advanced Information Systems Technology; Appendix B: Solicitation of Proposals for Flight and Ground Space Biology Research; ROSES 2018 B.13 Heliophysics DRIVE Science Centers; Second Heliophysics Space Weather Operations to Research

National Endowment of Humanities: Digital Humanities Advancement Grants; Summer Seminars and Institutes

Environment Research and Education Foundation: Research on Research on Sustainable Solid Waste Management and Recycling

Recent Research Grant and Contract Awards

Congratulations to faculty and staff on receiving research grant and contract awards!

PI: Brooke Flammang (PI)

Department: Biological Sciences

Grant/Contract Project Title: RoL: FELS: RAISE: A Phylogenomically-Based Bioinspired Robotic Model Approach to Addressing the Evolution of Terrestrial Locomotion

Funding Agency: NSF

Duration: 01/01/19-12/31/22

PI: Qiang Tang (PI)

Department: Computer Science

Grant/Contract Project Title: Joint Research Labs on Blockchain Technology

Funding Agency: Beijing Wodong Tianjun Information Technology Co., Ltd.

Duration: 11/01/18-10/31/19

PI: James Lipuma (PI)

Department: Humanities

Grant/Contract Project Title: Collaboration with Long Branch School District iSTEAM

Funding Agency: NJ Dept of Education

Duration: 09/01/18-08/31/19

PI: Wen Zhang (PI)

Department: Civil and Environmental Engineering

Grant/Contract Project Title: Reactive Electrochemical Membrane (REM) Filtration

Funding Agency: EPA

Duration: 12/01/18-11/30/19

In the News...

(National and Federal News Related to Research Funding and Grant Opportunities)

Congressional Bill on QUANTUM R&D: Congress is close to final passage of legislation, sponsored by outgoing House Science Space and Technology Committee chair Lamar Smith (R-Tex.), to accelerate development of quantum information science and technology applications. It calls for a 10-year plan for R&D, a "workforce pipeline," and partnering with industry and universities. While the measure doesn't authorize new spending, the Congressional Budget Office says it directs research agencies to spend appropriated sums on quantum according to this breakdown: up to \$125 million annually for the Department of Energy to carry out basic research and establish and operate quantum information science research centers; \$80 million annually for NIST to expand quantum research and advance commercial development of quantum applications; and \$50 million annually for the NSF to carry out a quantum research and education program and to award grants to nonprofit organizations and institutions of higher education."

MULTIDISCIPLINARY CENTERS FOR QUANTUM RESEARCH AND EDUCATION.

(a) Multidisciplinary Centers for Quantum Research and Education.--

(1) In general.--The Director of the National Science Foundation, in consultation with other Federal agencies as appropriate, shall award grants to institutions of higher education or eligible nonprofit organizations (or consortia thereof) to establish up to 5 Multidisciplinary Centers for Quantum Research and Education.

(2) Collaborations.--A collaboration receiving an award under this subsection may include institutions of higher education, eligible nonprofit organizations, and private sector entities.

(3) Purpose.--The purpose of the Centers shall be to conduct basic research and education activities in support of the goals and priorities of the Program as determined in title I, to--

(A) continue to advance quantum information science and engineering;

(B) support curriculum and workforce development in quantum information science and engineering; and

(C) foster innovation by bringing industry perspectives to quantum research and workforce development, including by leveraging industry resources and research capacity.

(4) Requirements.--An institution of higher education or an eligible nonprofit organization (or a consortium thereof) seeking funding under this section shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require. The application shall include, at a minimum, a description of--

(A) how the Center will work with other research institutions and industry partners to leverage expertise in quantum science, education and curriculum development, and technology transfer;

(B) how the Center will promote active collaboration among researchers in multiple disciplines involved in quantum research including physics, engineering, mathematics, computer science, chemistry, and material science;

(C) how the Center will support long-term and short-term workforce development in the quantum field;

(D) how the Center can support an innovation ecosystem to work with industry to translate Center research into applications; and

(E) a long-term plan to become self-sustaining after the expiration of Foundation support.

(5) Selection and duration.--

(A) In general.--The Centers selected and established under this section are authorized to carry out activities for a period of 5 years.

(B) Reapplication.--An awardee may reapply for an additional, subsequent period of 5 years on a competitive, merit-reviewed basis.

(C) Termination.--Consistent with the existing authorities of the Foundation, the Director of the National Science Foundation may terminate an underperforming Center for cause during the performance period.

(6) Funding.--The Director of the National Science Foundation shall devote \$250,000,000 to carry out this section, which shall include \$50,000,000 for each of fiscal years 2019 through 2023, subject to the availability of appropriations, to come from amounts made available for Research and Related Activities and Education and Human Resources. This section shall be carried out using funds otherwise appropriated by law after the date of enactment of this Act.

See a [committee report](https://www.congress.gov/congressional-report/115th-congress/house-report/950/1?overview=closed) on <https://www.congress.gov/congressional-report/115th-congress/house-report/950/1?overview=closed>

\$1.7 MILLION TIME-AND-EFFORT PENALTY: Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance)⁸ provides audit requirements for state and local governments, colleges and universities, and non-profit organizations receiving Federal awards. Under the guidance, covered entities that expend \$750,000 or more a year in Federal awards must obtain an annual organization-wide audit that includes opinions on the entity's financial statements and compliance with Federal award requirements. Non-Federal auditors, such as public accounting firms and state auditors, conduct these single audits. We review the resulting audit reporting packages to ensure that they comply with the requirements of the Uniform Guidance and applicable Government and non-Government auditing standards.

The National Science Foundation got \$800,000 as its share of a settlement with an unnamed university that failed to maintain a system to ensure that salary costs were charged correctly and appropriately to various grants and submitted "numerous false certifications," [a report by the NSF inspector general](#) says. In other reported transgressions, a university research foundation "agreed to pay more than \$700,000 to resolve allegations of misuse of funds in awards from several federal agencies." Several abuses were reported by companies that obtained Small Business Innovation Research (SBIR) money. Full report is posted on the website https://www.nsf.gov/oig/pdf/NSF_OIG_SAR_59.pdf

White House Charting a Course for Success: America's Strategy for STEM Education: The Federal Government has a key role to play in furthering STEM education by working in partnership with stakeholders at all levels and seeking to remove barriers to participation in STEM careers, especially for women and other underrepresented groups. Accordingly, this report sets out a Federal strategy for the next five years based on a Vision for a future where all Americans will have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment. It represents an urgent call to action for a nationwide collaboration with learners, families, educators, communities, and employers—a "North Star" for the STEM community as it collectively charts a course for the Nation's success.

This vision will be achieved by pursuing three aspirational goals:

– **Build Strong Foundations for STEM Literacy** by ensuring that every American has the opportunity to master basic STEM concepts, including computational thinking, and to become digitally literate. A STEM-literate public will be better equipped to handle rapid technological change and will be better prepared to participate in civil society.

→ **Increase Diversity, Equity, and Inclusion in STEM** and provide all Americans with lifelong access to high-quality STEM education, especially those historically underserved and underrepresented in STEM fields and employment. The full benefits of the Nation’s STEM enterprise will not be realized until this goal is achieved.

→ **Prepare the STEM Workforce for the Future**—both college-educated STEM practitioners and those working in skilled trades that do not require a four-year degree—by creating authentic learning experiences that encourage and prepare learners to pursue STEM careers. A diverse talent pool of STEM-literate Americans prepared for the jobs of the future will be essential for maintaining the national innovation base that supports key sectors of the economy and for making the scientific discoveries and creating the technologies of the future.

The Federal strategy is built on four pathways representing a cross-cutting set of approaches, each with a specific set of objectives and priority Federal actions for achieving these goals.

Develop and Enrich Strategic Partnerships. This pathway focuses on strengthening existing relationships and developing new connections between educational institutions, employers, and their communities. That means bringing together schools, colleges and universities, libraries, museums, and other community resources to build STEM ecosystems that broaden and enrich each learner’s educational and career journey. It also means engaging learners in work-based learning experiences with local employers, internships, apprenticeships, and research experiences. Having strategic partnerships also means exploring opportunities within the education community to blend formal and informal learning, and to blend curricula to enable students to complete both core academic and applied technical curricula in preparation for higher education. Together the objectives under this pathway can help retain learners interested in STEM fields and develop high-quality talent for both public and private sector employers.

Engage Students where Disciplines Converge. This pathway seeks to make STEM learning more meaningful and inspiring to students by focusing on complex real-world problems and challenges that require initiative and creativity. It promotes innovation and entrepreneurship by engaging learners in transdisciplinary activities such as project-based learning, science fairs, robotics clubs, invention challenges, or gaming workshops that require participants to identify and solve problems using knowledge and methods from across disciplines. It seeks to help students challenged in mathematics— frequently a barrier to STEM careers—by using innovative, tailored instructional methods. Another objective is teaching learners to tackle problems using multiple disciplines; for example, learning data science by combining basic mathematics, statistics, and computer science to study a societal problem. Such activities help to create a STEM-literate population and prepare Americans for the rapidly evolving workplace.

Build Computational Literacy. This pathway recognizes how thoroughly digital devices and the internet have transformed society and adopts strategies that empower learners to take maximum advantage of this change. It recognizes that digital literacy empowers people with the tools to find information, answer questions, and share ideas, and that they need to understand how to use these tools responsibly and safely. This pathway seeks to advance computational thinking as a critical skill for today’s world. Computational thinking, including computer science, is not just about using computing devices effectively; more broadly, it means solving complex problems with data, a skill that can be learned at an early age. It seeks to expand the use of digital platforms for teaching and learning, because they enable anywhere/anytime learning; make possible individualized instruction customized to the way each person learns most effectively; and can offer more active and engaging learning through simulation-based activities or virtual reality experiences. These tools have the potential to decrease achievement gaps in formal educational settings and to offer rapid reskilling or upskilling opportunities in the workplace.

Operate with Transparency and Accountability. This pathway commits the Federal Government to open, evidence-based practices and decision-making in STEM programs, investments, and activities. Complementary practices by other STEM stakeholders will facilitate the entire ecosystem to collectively monitor progress towards achieving the shared national goals of this strategic plan. These four pathways have the potential to catalyze and empower educators, employers, and communities to the benefit of learners at all levels and to society as a whole and to ensure the realization of a shared vision for American leadership in STEM literacy, innovation, and employment.

NSF: From Research to Impact: The National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) says "research is transforming engineered systems and driving innovation in a wide variety of application domains, thereby enabling new levels of economic opportunity and growth, safety and security, health and wellness, and overall quality of life." So it intends to offer Transition to Practice (TTP) supplemental funding for active awards funded through its Cyber-Physical Systems (CPS) and Smart and Connected Communities (S&CC) programs. National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) wishes to notify the community of its intention to support **Transition to Practice (TTP) supplemental funding requests for active awards funded through its Cyber-Physical Systems (CPS) and Smart and Connected Communities (S&CC) programs.** Funded TTP supplements will provide support for periods of up to two years. Supplemental funding requests may not exceed more than one-third of the original award amount or \$400,000, whichever is less.

TTP activities relevant to each of the programs could include, but are not limited to, the following:

- In the case of active CPS awards that do not include a previously funded TTP option:
 - Accelerated maturation of the research technology readiness level, moving from laboratory and subscale deployment to integration in operational CPS in one or more application domains; and/or
 - Integration of research with one or more industrial or other transition partner(s), thereby demonstrating real-world utilization in an operational environment.
- In the case of active S&CC awards:
 - Expanding pilot activities to one or more communities—which could be in a new city, town, or region—considering the unique character(s) and challenge(s) of that (those) new community(ies);
 - Increasing the scale of the research beyond what was envisioned in the original project, which may create new technological and social challenges that would need to be overcome for successful integration within a community; and/or
 - Partnering with industry, as well as a community including a state or local government, to harden or commercialize the technology or approach emerging from the research project for performance in a larger, real-world context.

These TTP supplements are appropriate for CPS and S&CC projects that have demonstrated success or potential for success in their outcomes to date, and where one or more of the activities specified in the supplemental funding requests will significantly strengthen the outcomes beyond the already-funded projects. Any software developed as part of funded supplements is required to be released under an open source license listed by the Open Source Initiative (<http://www.opensource.org/>).

All supplemental funding requests will be subject to external review pursuant to the NSF merit review criteria of Intellectual Merit and Broader Impacts described in the NSF [Proposal and Award](#)

[Policies and Procedures Guide \(PAPPG\)](#). Each supplement funding request must follow the guidance specified in PAPPG Chapter VI.E.4 and must address the following items as part of the summary of the proposed work and the justification of the need for supplemental funds:

- Summary of the current CPS or S&CC award identifying key research activities and accomplishments including vision and goals spanning intellectual merit and broader impacts;
- Status of the current CPS or S&CC award, including its successes, limitations, and a compelling justification why there is a need for a TTP supplement in the context of a needed capability and potential impact;
- A work plan describing the proposed research activities, along with the goals, milestones, and predicted outcomes; how the activities will expand the current project's research and development activities; how these activities will address the needed capabilities and lead to potential impact; and the appropriateness of the supplemental funding request to the proposed scope and scale of the work;
- A description of the project team that articulates the readiness of the academic, community, and/or industry stakeholders, potentially including additional members from the original award, to carry out the proposed expanded effort as well as clear identification of transition partners; and
- An evaluation plan outlining tangible metrics to assess the outcomes of the proposed TTP activities, how these outcomes will inform the potential for transition including transferability and/or scalability beyond the original project, and the possible risk(s) and associated mitigation approach(es).

Principal Investigators (PIs) may find great relevance in TTP where the transition is international, including in the developing world. A supplemental funding request that includes an international component must also include a U.S.-based plan for TTP, and PIs are encouraged to explore externally-driven funding opportunities to support the international component, which may include an international collaborator. One opportunity to consider is the U.S. Agency for International Development's [Partnerships for Enhanced Engagement in Research \(PEER\) program](#), which supports researchers in developing countries to [partner with U.S.-based researchers with active federal research awards](#), including from NSF, to work together on research or capacity building.

The deadline for submission of supplemental funding requests for consideration is March 15, 2019, but earlier submissions are encouraged. More information is posted on the NSF website https://www.nsf.gov/pubs/2019/nsf19026/nsf19026.jsp?WT.mc_id=USNSF_25&WT.mc_ev=click

US Creating New Export Controls for 'Emerging Technologies': An advance notice cites 14 technology categories that could be subject to "effective controls . . . that avoid negatively impacting U.S. leadership in the science, technology, engineering, and manufacturing sectors." [AIP's FYI reports](#) that they include "a range of advanced computing, manufacturing, and sensing technologies. One category is dedicated to quantum information technology and references quantum computing, encryption, and sensing as examples of emerging technologies." The action responds to a [provision](#) in this year's [National Defense Authorization Act](#) (NDAA) directing the president to create an interagency process for establishing export controls on "*emerging and foundational technologies*." The department plans to issue a separate ANPRM for foundational technologies.

The notice identifies 14 technology categories that the Commerce Department regards as pertinent. The list includes a range of advanced computing, manufacturing, and sensing

technologies. One category is dedicated to quantum information technology and references quantum computing, encryption, and sensing as examples of emerging technologies. The notice states, “*These categories are a representative list of the technology categories from which Commerce, through an interagency process, seeks to determine whether there are specific emerging technologies that are important to the national security of the United States for which effective controls can be implemented that avoid negatively impacting U.S. leadership in the science, technology, engineering, and manufacturing sectors.*” Full report is posted on the website <https://www.aip.org/fyi/2018/us-creating-new-export-controls-emerging-technologies>

Webinar and Events

Event: Harnessing the Data Revolution (HDR): Data Science Corps (DSC) Program Webinar

Sponsor: NSF

When: December 17, 2018; 10.30 PM – 11.30 PM

Website: https://www.nsf.gov/events/event_summ.jsp?cntn_id=297443&org=NSF

Brief Description: In 2016, the National Science Foundation (NSF) unveiled a set of “Big Ideas,” 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research.

NSF’s Harnessing the Data Revolution (HDR) Big Idea is a visionary, national-scale activity to enable new modes of data-driven discovery, allowing fundamentally new questions to be asked and answered in science and engineering frontiers, generating new knowledge and understanding, and accelerating discovery and innovation. The HDR vision is realized via a coordinated set of program solicitations resulting in an ecosystem of interrelated activities enabling (i) research in the foundations of data science; frameworks, algorithms, and systems for data science; and data-driven research in science and engineering; (ii) advanced cyberinfrastructure; and (iii) education and workforce development—all of which are designed to amplify the intrinsically multidisciplinary nature of the data science challenge. The HDR Big Idea will establish theoretical, technical, and ethical data science frameworks, and apply them to practical problems in science and engineering, and in society more generally.

The Data Science Corps is one of the components of the HDR ecosystem, focusing on building capacity for harnessing the data revolution at the local, state, national, and international levels to help unleash the power of data in the service of science and society. The Data Science Corps will provide practical experiences, teach new skills, and offer teaching opportunities, in a variety of settings, to data scientists and data science students. It will also strive to promote data literacy and provide basic training in data science to the existing workforce across communities. As a first step in establishing the Data Science Corps, this solicitation focuses specifically on enabling participation by undergraduate students in the Data Science Corps, by supporting student stipends for participation in data science projects and supporting integration of real-world data science projects into classroom instruction.

To Register: Register for the webinar

at: <https://nsf2.webex.com/nsf2/onstage/g.php?MTID=ed589f9a5f837d2db033e6c8073af7efe>

Event: Engineering Education CAREER Webinar

Sponsor: NSF

When: December 17, 2018; 1.00 PM - 2.00 PM

Website: https://www.nsf.gov/events/event_summ.jsp?cntn_id=297218&org=NSF

Brief Description: Julie Martin, the program director for engineering education in the NSF Division of Engineering Education and Centers, will host a webinar for prospective [CAREER](#) Principal Investigators on Monday, December 17, at 1:00 p.m. Eastern. Participants are invited to [send questions to Dr. Martin](#) ahead of time to be answered during the webinar.

To join the webinar: Please join the webinar a few minutes early:

- [By WebEx](#)
 - Meeting number: 903 505 576
 - Meeting password: Career@2018
- By phone
 - Phone number: 1-510-210-8882
 - Access code: 903 505 576

Event: Partnerships for Innovation Webinar

Sponsor: NSF

When: January 10, 2019; 2.00 PM – 4.00 PM

Website: https://www.nsf.gov/events/event_summ.jsp?cntn_id=297442&org=NSF

Brief Description: Scientists and engineers increase the impact of their NSF-funded research discoveries by developing their technology into a prototype or proof-of-concept through the Partnerships for Innovation (PFI) program, one of the National Science Foundation's technology translation programs. The PFI program selects projects that will transition the technology out of the lab and into the market for societal benefit. Only NSF-funded research and researchers who either have received NSF funding in the last seven years or have participated in NSF Innovation Corps (I-Corps™) Teams program in the last four years are eligible. Join this webinar to learn more about the program and how to apply.

To Register: [Register for the January 10th PFI webinar on WebEx.](#)

Event: Modeling Light-Matter Interactions for Photonics Applications

Sponsor: IEEE

When: On Demand

Website:

https://event.on24.com/eventRegistration/EventLobbyServlet?target=reg20.jsp&partnerref=NOemail&et_mid=2035965180&et_mid=83774691&eventid=1878151&sessionid=1&key=DB32A11B5BB2D38949B94433E163AC2D®Tag=&sourcepage=register

Brief Description: In this webinar, an approach to accurately account for linear optical dispersion, nonlinear optics effects, and gain in light-matter interaction will be presented.

Alex Kildishev, a professor of electrical and computer engineering at Purdue University, will discuss the importance of generalizing the numerical description of light-matter interaction for more efficient time-domain multiphysics modeling in photonics. The need for generalization is illustrated by numerous physical effects, such as strong dispersion, saturation of absorption and reversed saturable absorption, as well as plasmon-enhanced stimulated and spontaneous emission in optical materials.

Time-domain multiphysics simulations in photonics are critical, as they provide information not attainable otherwise. Prof. Kildishev will show how to augment current mathematical models by including an additional set of custom equations, enabling highly accurate numerical simulations. Representative example cases will be shown. A live demo in COMSOL Multiphysics® will be an important part of this webinar. The demo will include the multiphysics modeling of representative optical effects in the time domain. The webinar will conclude with a Q&A session.

To join the webinar: Please register on the above URL.

Grant Opportunities

National Science Foundation

Grant Program: Harnessing the Data Revolution (HDR): Institutes for Data-Intensive Research in Science and Engineering - Ideas Labs (I-DIRSE-IL)

Agency: National Science Foundation NSF 19-543

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19543/nsf19543.htm>

Brief Description: NSF's *Harnessing the Data Revolution (HDR) Big Idea* is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering. Through this NSF-wide activity, HDR will generate new knowledge and understanding, and accelerate discovery and innovation. The HDR vision is realized through an interrelated set of efforts in:

- Foundations of data science;
- Algorithms and systems for data science;
- Data-intensive science and engineering;
- Data cyberinfrastructure; and
- Education and workforce development.

Each of these efforts is designed to amplify the intrinsically multidisciplinary nature of the emerging field of data science. The HDR Big Idea will establish theoretical, technical, and ethical frameworks that will be applied to tackle data-intensive problems in science and engineering, contributing to data-driven decision-making that impacts society.

This solicitation describes one or more Ideas Lab(s) on Data-Intensive Research in Science and Engineering (DIRSE) as part of the HDR Institutes activity. These Ideas Labs represent one path of a conceptualization phase aimed at developing Institutes as part of the NSF investment in the HDR Big Idea.

The HDR Institutes activity seeks to create an integrated fabric of interrelated institutes that can accelerate discovery and innovation in multiple areas of data-intensive science and engineering. The HDR Institutes will achieve this by harnessing diverse data sources and developing and applying new methodologies, technologies, and infrastructure for data management and analysis. The HDR Institutes will support convergence between science and engineering research communities as well as expertise in data science foundations, systems, applications, and cyberinfrastructure. In addition, the HDR Institutes will enable breakthroughs in science and engineering through collaborative, co-designed programs to formulate innovative data-intensive approaches to address critical national challenges.

Awards: Standard Grants. Anticipated Funding: \$20,000,000.

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter's local time):

January 28, 2019

Proposal Submission Deadline: June 19, 2019

Contacts: Nandini Kannan, MPS/DMS, telephone: (703) 292-8104, email: nakannan@nsf.gov

- Amy Walton, CISE/OAC, telephone: (703) 292-4538, email: awalton@nsf.gov
- Eva Zanzerkia, GEO/EAR, telephone: (703) 292-4734, email: ezanzerk@nsf.gov

Grant Program: Mid-scale Research Infrastructure-2 (Mid-scale RI-2)

Agency: National Science Foundation NSF 19-542

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19542/nsf19542.htm>

Brief Description: The need for a well-defined NSF mid-scale funding program has been recognized by stakeholders in the scientific community and by Congress in the American Innovation and Competitiveness Act (AICA) of 2017. As one of four "process ideas" in the NSF suite of 10 Big Ideas, the Mid-scale Research Infrastructure Program is aimed at transforming scientific and engineering research fields as well as science, technology, engineering and mathematics (STEM) education research

fields by making available new capabilities, while simultaneously training early-career researchers in the development, design, and construction of cutting-edge infrastructure.

The NSF Mid-scale Research Infrastructure-2 Program (Mid-scale RI-2) supports implementation of projects that comprise any combination of equipment, instrumentation, computational hardware and software, and the necessary commissioning and human capital in support of implementation of the same. The total cost for Mid-scale RI-2 projects ranges from \$20 million to below the minimum award funded by the Major Research Equipment and Facilities Construction (MREFC) Program, currently \$70 million. Mid-scale RI-2 projects will directly enable advances in any of the research domains supported by NSF, including STEM education. Projects may also include upgrades to existing research infrastructure.

The Mid-scale RI-2 Program emphasizes strong scientific merit and response to an identified need of the research community, technical and managerial readiness for implementation, and a well-developed plan for student training and involvement of a diverse workforce in mid-scale facility development, and/or associated data management.

Mid-scale RI-2 will consider only the implementation (typically construction or acquisition) stage of a project, including a limited degree of advanced development immediately preparatory to implementation. It is thus intended that Mid-scale RI-2 will support projects in high states of readiness for implementation, i.e., those that have already matured through previous developmental investments. Accordingly, Mid-scale RI-2 does not support pre-implementation (early-stage design or development). Mid-scale RI-2 also does not support post-implementation research, operations or maintenance, the anticipated source(s) of which are expected to be discussed in the proposal.

Awards: Cooperative Agreement. Anticipated Funding: \$150,000,000.

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

February 08, 2019

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter's local time):

March 11, 2019

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

August 02, 2019

Contacts: Brian Midson, GEO, telephone: (703) 292-8145, email: bmidson@nsf.gov

- Allena K. Opper, MPS, telephone: (703) 292-8958, email: aopper@nsf.gov
- Joy M. Pauschke, ENG, telephone: (703) 292-7024, email: jpauschk@nsf.gov

Grant Program: Future of Work at the Human-Technology Frontier: Core Research (FW-HTF)

Agency: National Science Foundation NSF 19-541

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19541/nsf19541.htm>

Brief Description: The Future of Work at the Human-Technology Frontier (FW-HTF), one of the Big Ideas, is one mechanism by which NSF is responding to the challenges and opportunities for the future of jobs and work. The overarching vision is to support convergent research to understand and develop the human-technology partnership, design new technologies to augment human performance, illuminate the emerging socio-technological landscape, understand the risks and benefits of new technologies, understand and influence the impact of artificial intelligence on workers and work, and foster lifelong and pervasive learning.

The landscape of jobs and work is changing at unprecedented speed, enabled by advances in computer and engineering technologies such as artificial intelligence and robotics, deeper understanding of societal and environmental change, advances in the learning sciences, pervasive, intelligent, and autonomous systems, and new conceptions of work and workplaces. This technological and scientific revolution presents a historical opportunity to the Nation and its people, in the creation of new industries and occupations, enhanced productivity and quality of work life, and the potential for more people to participate in the workforce, ultimately yielding sustained innovation and global leadership. But, as history teaches, such changes also come with risks. Some risks are immediate, such as jobs lost to automation or demand for skills not met by current educational pathways. Other equally important risks

include new security threats, algorithmic biases, unanticipated legal consequences including privacy implications, dependence on technology and erosion of human knowledge and skills, inadequate workplace policies and practices, or undesirable impact on the built environment.

The specific objectives of the Future of Work at the Human-Technology Frontier program are (1) to facilitate convergent research that employs the joint perspectives, methods, and knowledge of computer science, engineering, learning sciences, research on education and workforce training, and social, behavioral, and economic sciences; (2) to encourage the development of a research community dedicated to designing intelligent technologies and work organization and modes inspired by their positive impact on individual workers, the work at hand, the way people learn and adapt to technological change, creative and supportive workplaces (including remote locations, homes, classrooms, or virtual spaces), and benefits for social, economic, and environmental systems at different scales; (3) to promote deeper basic understanding of the interdependent human-technology partnership to advance societal needs by advancing design of intelligent work technologies that operate in harmony with human workers, including consideration of how adults learn the new skills needed to interact with these technologies in the workplace, and by enabling broad workforce participation, including improving accessibility for those challenged by physical or cognitive impairment; and (4) to understand, anticipate, and explore ways of mitigating potential risks arising from future work at the human-technology frontier. Ultimately, this research will advance our understanding of how technology and people interact, distribute tasks, cooperate, and complement each other in different specific work contexts of significant societal importance. It will advance the knowledge base related to worker education and training and formal and informal learning to enable all potential workers to adapt to changing work environments. It will advance our understanding of the links between the future of work at the human-technology frontier and the surrounding society, including the intended potential of new technologies and the unintended consequences for workers and the well-being of society.

For the purposes of this solicitation, work is defined as mental or physical activity to achieve tangible benefit such as income, profit, or community welfare. The Future of Work at the Human-Technology Frontier is, in turn, a conceptualization of work in the future that will be enabled or improved by advances in intelligent technology and their synergistic integration with human skill to achieve broad participation in the workforce and improve the social, economic, and environmental well-being of society. To reach this goal, research is sought that is anchored in work. Proposals must clearly define the work and work context addressed by the research. Technology should be integrated with learning sciences, research on education and workforce training, and social, behavioral, and economic science perspectives to advance the science of the human-technology team. Potential results should contribute to fundamental advances in the science and technology of future workforce development and education, work environments, and positive work outcomes for workers and society at large. Proposals are encouraged that are oriented toward the future of work at the human-technology frontier and that are not overly couched in current technology or work practices.

A proposal for a research grant in this program must focus on advancing fundamental understanding of future work, and potential improvements to work, workplaces, workforce preparation, or work outcomes for workers and society. It must be convergent research that addresses the technological as well as the human and societal dimensions and potential impact of future work, and in doing so, make significant contributions to both intellectual merit and broader impact. Achieving this goal requires integration and convergence of disciplines across computer science, engineering, learning sciences, research on education and workforce training, and social, behavioral, and economic sciences. A convergent perspective is essential to understand and shape long-term social and economic drivers, so that advanced intelligent technology will strengthen the social fabric. A convergent perspective also provides insights into education and re-skilling, so that the benefits of emerging technology can be conferred upon all citizens.

Awards: Standard Grants. Anticipated Funding: \$30,000,000

Two classes of proposals will be considered through this solicitation:

1. FW-HTF Planning Grants (FW-HTF-P) may be requested for a total budget not to exceed \$150,000 for a period of 1 year.
2. FW-HTF Research Grants (FW-HTF-R) may be requested at two levels:
 - a. Medium FW-HTF-R proposals may request support for a period of up to 3 years, with a total budget not to exceed \$1,500,000.
 - b. Large FW-HTF-R proposals may request support for a period of up to 4 years, with a total budget between \$1,500,001 and \$3,000,000.

Letter of Intent: Not required

Proposal Submission Deadline: March 06, 2019

Contacts: Stephanie E. August, EHR/DUE, telephone: (703) 292-5128, email: saugust@nsf.gov

- Amy L. Baylor, EHR/DRL, telephone: (703) 292-5126, email: abaylor@nsf.gov
 - Jordan Berg, ENG/CMMI, telephone: (703) 292-5365, email: jberg@nsf.gov
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Grant Program: NSF-CBMS Regional Research Conferences in the Mathematical Sciences

Agency: National Science Foundation NSF 19-539

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19539/nsf19539.htm>

Brief Description: The NSF-CBMS Regional Research Conferences in the Mathematical Sciences are a series of five-day conferences that usually feature a distinguished lecturer delivering ten lectures on a topic of important current research in one sharply focused area of the mathematical sciences. CBMS refers to the Conference Board of the Mathematical Sciences, which publicizes the conferences and disseminates the resulting conference materials. Support is provided for about 30 participants at each conference. Proposals should address the unique characteristics of the NSF-CBMS conferences, outlined in the Program Description.

Awards: Standard Grants. Anticipated Funding: \$350,000.

Letter of Intent: Not required

Proposal Submission Deadline: April 26, 2019

Contacts: J. Matthew Douglass, telephone: (703) 292-2467, email: mdouglas@nsf.gov

- Swatee Naik, telephone: (703) 292-4876, email: snaik@nsf.gov
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Grant Program: Macrosystems Biology and NEON-Enabled Science (MSB-NES) Research on Biological Systems at Regional to Continental Scales

Agency: National Science Foundation NSF 19-538

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19538/nsf19538.htm>

Brief Description: The Macrosystems Biology and NEON-Enabled Science (MSB-NES): Research on Biological Systems at Regional to Continental Scales program will support quantitative, interdisciplinary, systems-oriented research on biosphere processes and their complex interactions with climate, land use, and invasive species at regional to continental scales as well as training activities to enable groups to conduct Macrosystems Biology and NEON-Enabled Science research.

Proposers are encouraged to use NEON resources, and proposals for substantive and innovative NEON-enabled research will be prioritized for funding. Substantive NEON-enabled projects rely on data and/or samples collected by NEON, co-locate research activities at NEON sites, and/or develop tools that will explicitly enhance the processing, use, and/or analysis of NEON data or collections within the context of Macrosystems Biology research questions.

Awards: Standard Grants. Anticipated Funding: \$9,000,000

Macrosystems Research Awards (MRA). Awards to advance Macrosystems Biology research broadly, including substantively NEON-enabled research, and innovative training to conduct this research. These awards may be up to 5 years in duration; 3 to 5 awards are anticipated. These awards will average \$1,000,000.

Macrosystems Small Awards (MSA). Awards employing targeted approaches to advance understanding of regional to continental-scale processes, or addressing a theoretical challenge such as scaling or teleconnections, and prioritizing the use or development of NEON data and/or infrastructure. Proposals from early career investigators remain a priority. These awards will be limited to \$300,000 and up to 3 years in duration; 13 to 18 awards are anticipated.

Budget and duration should reflect the scope and complexity of the work proposed. Proposal budgets should be generated with attention to the amount of funding available and the expected number of awards.

Letter of Intent: Not required

Proposal Submission Deadline: February 25, 2019

Contacts: Michael W. Binford, telephone: (703) 292-7346, email: mbinford@nsf.gov

- Daniel S. Gruner, telephone: (703) 292-7946, email: dgruner@nsf.gov

Grant Program: Mid-scale Research Infrastructure-1 (Mid-scale RI-1)

Agency: National Science Foundation NSF 19-537

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19537/nsf19537.htm>

Brief Description: In 2016, the National Science Foundation (NSF) unveiled a set of “Big Ideas,” 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to the Office of Integrative Activities, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

Please consult NSF's [Large Facilities Manual](#) (LFM) and its successor to be published as the Major Facilities Guide (MFG) for definitions of terms used in this solicitation, such as the Project Execution Plan. Note that Project Execution Plans should be appropriate for the complexity of the project, and may not require all of the elements described in the LFM/MFG.

NSF-supported science and engineering research increasingly relies on cutting-edge infrastructure. With its Major Research Instrumentation (MRI) program and Major Research Equipment and Facilities Construction (MREFC) projects, NSF supports infrastructure projects at the lower and higher ends of infrastructure scales across science and engineering research disciplines. The Mid-scale Research Infrastructure Big Idea is intended to provide NSF with an agile, Foundation-wide process to fund experimental research capabilities in the mid-scale range between the MRI and MREFC thresholds. Within Mid-scale RI-1, proposers may submit two types of projects, “Implementation” and “Design”. Design and Implementation projects may comprise any combination of equipment, infrastructure, computational hardware and software, and necessary commissioning. Design includes planning (preliminary and final design) of research infrastructure with an anticipated total project cost that is appropriate for future Mid-scale RI-1, Mid-scale RI-2 or MREFC-class investments. Mid-scale RI-1 uses an inclusive definition of implementation, which can include traditional stand-alone construction or acquisition and can include a degree of advanced development leading immediately to final system acquisition and/or construction.

Mid-scale RI-1 "Implementation" projects may have a total project cost ranging from \$6 million up to below \$20 million. Projects must directly enable advances in fundamental science, engineering or science, technology, engineering and mathematics (STEM) education research in one or more of the research domains supported by NSF. Implementation projects may support new or upgraded research infrastructure. Only Mid-scale RI-1 "Design" projects may request less than \$6 million, with a minimum request of \$600,000 and a maximum request below \$20 million as needed to prepare for a future mid-scale or larger infrastructure implementation project. (Successful award of a Mid-scale RI-1 design project does not imply NSF commitment to future implementation of that project.)

Awards: Standard Grants or Cooperative Agreements. Anticipated Funding: \$60,000,000

Letter of Intent: See Below

Proposal Submission Deadline:

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter's local time):

February 19, 2019

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

May 20, 2019 (by invitation only)

Contacts: Randy L. Phelps, OIA, telephone: (703) 292-8040, email: rphelps@nsf.gov

- Robert D. Fleischmann, BIO, telephone: (703) 292-7191, email: rfleisch@nsf.gov
 - Deepankar (Deep) Medhi, CISE, telephone: (703) 292-8950, email: dmedhi@nsf.gov
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Grant Program: National Robotics Initiative 2.0: Ubiquitous Collaborative Robots (NRI-2.0)

Agency: National Science Foundation NSF 19-536

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19536/nsf19536.htm>

Brief Description: The NRI-2.0 program builds upon the original National Robotics Initiative (NRI) program to support fundamental research in the United States that will accelerate the development and use of collaborative robots (co-robots) that work beside or cooperatively with people. The focus of the NRI-2.0 program is on **ubiquity**, which in this context means seamless integration of co-robots to assist humans in every aspect of life.

The program supports four main research thrusts that are envisioned to advance the goal of ubiquitous co-robots: **scalability**, **customizability**, **lowering barriers to entry**, and **societal impact**. Topics addressing **scalability** include how robots can collaborate effectively with multiple humans or other robots; how robots can perceive, plan, act, and learn in uncertain, real-world environments, especially in a distributed fashion; and how to facilitate large-scale, safe, robust and reliable operation of robots in complex environments. **Customizability** includes how to enable co-robots to adapt to specific tasks, environments, or people, with minimal modification to hardware and software; how robots can personalize their interactions with people; and how robots can communicate naturally with humans, both verbally and non-verbally. Topics in **lowering barriers to entry** should focus on lowering the barriers for conducting fundamental robotics research and research on integrated robotics application. This may include development of open-source co-robot hardware and software, as well as widely-accessible testbeds. Outreach or using robots in educational programs do not, by themselves, lower the barriers to entry for robotics research. Topics in **societal impact** include fundamental research to establish and infuse robotics into educational curricula, advance the robotics workforce through education pathways, and explore the social, economic, ethical, and legal implications of our future with ubiquitous collaborative robots.

Collaboration between academic, industry, non-profit, and other organizations is encouraged to establish better linkages between fundamental science and engineering and technology development, deployment, and use.

The NRI-2.0 program is supported by multiple agencies of the federal government including the National Science Foundation (NSF), the U.S. Department of Agriculture (USDA), the U.S. Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), and the U.S. Department of Defense (DOD). Questions concerning a particular project's focus, direction and relevance to a participating funding organization should be addressed to that agency's point of contact, listed in section VIII of this solicitation.

Awards: Standard Grants or Cooperative Agreements. Anticipated Funding: \$35,000,000

Letter of Intent: Not required

Proposal Submission Deadline: February 19, 2019

Contacts: David Miller, CISE/IIS, telephone: (703) 292-4914, email: damiller@nsf.gov

- Radhakisan Baheti, ENG/ECCS, telephone: (703) 292-8339, email: rbaheti@nsf.gov
 - Jordan Berg, telephone: (703) 292-5365, email: jberg@nsf.gov
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Grant Program: Advanced Computing Systems & Services: Adapting to the Rapid Evolution of Science and Engineering Research

Agency: National Science Foundation NSF 19-534

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19534/nsf19534.htm>

Brief Description: The intent of this solicitation is to request proposals from organizations willing to serve as service providers (SPs) within the NSF Innovative High-Performance Computing (HPC) program to provide advanced cyberinfrastructure (CI) capabilities and/or services in production operations to support the full range of computational- and data-intensive research across all of science and engineering (S&E). The current solicitation is intended to complement previous NSF investments in advanced computational infrastructure by provisioning resources, broadly defined in this solicitation to include systems and/or services, in two categories:

- Category I, Capacity Systems: production computational resources maximizing the capacity provided to support the broad range of computation and data analytics needs in S&E research; and
- Category II, Innovative Prototypes/Testbeds: innovative forward-looking capabilities deploying novel technologies, architectures, usage modes, etc., and exploring new target applications, methods, and paradigms for S&E discoveries.

Resources supported through awards from this solicitation will be incorporated into and allocated as part of NSF's Innovative HPC program. This program complements investments in [leadership-class computing](#) and funds a federation of nationally-available HPC resources that are technically diverse and intended to enable discoveries at a computational scale beyond the research of individual or regional academic institutions. NSF anticipates that at least 90% of the provisioned system or services will be available to the S&E community through an open peer-reviewed national allocation process and be supported by community and other support services [such as those currently supported through eXtreme Science and Engineering Discovery Environment (XSEDE) 2.0 project-managed allocations recommended by the XSEDE Resource Allocation Committee (XRAC), and other activities intended to foster efficient coordination across resources], or an NSF-approved alternative that may emerge. If this is not feasible for the proposed system/services, proposers must clearly explain in detail why this is the case and how they intend to make the proposed system/services available to the national S&E community.

Awards: Cooperative Agreements. Anticipated Funding: \$10,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: March 04, 2019

Contacts: Robert Chadduck, Program Director, CISE/OAC, telephone: (703) 292-8970, email: rchadduc@nsf.gov

- Edward Walker, Program Director, CISE/OAC, telephone: (703) 292-4863, email: edwalker@nsf.gov
- Alejandro M. Suarez, Assistant Program Director, CISE/OAC, telephone: (703) 292-7092, email: alsuarez@nsf.gov

Grant Program: Campus Cyberinfrastructure (CC*)

Agency: National Science Foundation NSF 19-533

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19533/nsf19533.htm>

Brief Description: The Campus Cyberinfrastructure (CC*) program invests in coordinated campus-level networking and cyberinfrastructure improvements, innovation, integration, and engineering for science applications and distributed research projects. Learning and workforce development (LWD) in cyberinfrastructure is explicitly addressed in the program. Science-driven requirements are the primary motivation for any proposed activity.

Awards: Standard Grant. Anticipated Funding: \$17,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 20, 2019

Contacts: Kevin Thompson, Program Director, CISE/OAC, telephone: (703) 292-4220, email: kthompso@nsf.gov

- Deepankar (Deep) Medhi, Program Director, CISE/CNS, telephone: (703) 292-8950, email: dmedhi@nsf.gov
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Grant Program: Enabling Quantum Leap: Quantum Idea Incubator for Transformational Advances in Quantum Systems (QII - TAQS)

Agency: National Science Foundation NSF 19-532

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19532/nsf19532.htm>

Brief Description: The Quantum Idea Incubator for Transformational Advances in Quantum Systems (QII - TAQS) program is designed to support interdisciplinary teams that will explore highly innovative, original, and potentially transformative ideas for developing and applying quantum science, quantum computing, and quantum engineering. Proposals with the potential to deliver new concepts, new platforms, and/or new approaches that will accelerate the science, computing, and engineering of quantum technologies are encouraged. Breakthroughs in quantum sensing, quantum communications, quantum simulations, or quantum computing systems are anticipated. This Quantum Idea Incubator solicitation aims to support the process of translating such ideas into reality.

This solicitation calls for proposals focused on interdisciplinary research that includes elements from the following thrust areas: (i) fundamental science such as, but not limited to, physics, chemistry, materials science, mathematics, biology, or geoscience, as well as foundational concepts and techniques in quantum information science and engineering; (ii) communication, computation, and modeling; and (iii) devices and engineered systems. Proposals must articulate how the project leverages and/or promotes advances in knowledge in the selected thrust areas. Proposals should be innovative and must focus on quantum functionality and must result in experimental demonstrations and/or transformative advances towards quantum systems and/or proof-of-concept validations. Competitive proposals will come from an interdisciplinary research team led by at least three investigators who collectively contribute synergistic expertise from one or more engineering domains, from mathematics, computational and/or computer and information science, and from one or more physical, chemical, biological, or materials science domains. Proposals will be judged on how likely the integrated effort is to lead to transformative advances in quantum systems. Both fundamental and applied topics are encouraged.

Awards: Standard Grants. Anticipated Funding: \$26,000,000

Letter of Intent: Required: January 07, 2019

Proposal Submission Deadline:

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):
February 21, 2019

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):
May 24, 2019

Contacts: Tania M. Paskova, telephone: (703) 292-2264, email: tpaskova@nsf.gov

- Dominique Dagenais, telephone: (703) 292-2980, email: ddagenai@nsf.gov
 - Alexander Cronin, telephone: (703) 292-5302, email: acronin@nsf.gov
-

Grant Program: Frontier Research in Earth Sciences (FRES)

Agency: National Science Foundation NSF 19-531

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19531/nsf19531.htm>

Brief Description: The FRES program will support research in Earth systems from its core through the critical zone. The project may focus on all or part of the surface, continental lithospheric, and deeper Earth systems over the entire range of temporal and spatial scales. FRES projects will typically have a larger scientific scope and budget than those considered for funding by core programs in the Division of Earth Sciences (EAR). FRES projects may be interdisciplinary studies that do not fit well within the

core programs or cannot be routinely managed by sharing between core programs. Innovative proposals within a single area with results that will have broad relevance to Earth Science research are also encouraged. Investigations may employ any combination of field, laboratory, and computational studies with observational, theoretical, or experimental approaches. Projects should be focused on topics that meet the guidelines for research funded by the Division of Earth Sciences.

Awards: Standard Grants. Anticipated Funding: \$12,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 20, 2019

Contacts: Dennis Geist, telephone: (703) 292-4361, email: dgeist@nsf.gov

- Margaret Benoit, telephone: (703) 292-7233, email: mboenit@nsf.gov
 - Richard F. Yuretich, telephone: (703) 292-4744, email: ryuretic@nsf.gov
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Grant Program: Ideas Lab: Cross-cutting Initiative in CubeSat Innovations

Agency: National Science Foundation NSF 19-530

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19530/nsf19530.htm>

Brief Description: CubeSat constellations and swarms have been identified as a new paradigm for space-based measurements to address high-priority science questions in multiple disciplines. However, the full potential of CubeSat constellations and swarms for scientific studies has not yet been realized because of: i) the limitations of some of the existing key CubeSat technology, ii) knowledge gaps in the design and optimization of CubeSat technology for swarms and constellations, and iii) the increasing cost of more sophisticated CubeSat technology. The technology challenges include high bandwidth communications in CubeSat-to-CubeSat and CubeSat-to-ground scenarios, circuits and sensors miniaturization, on-board signal processing, and power generation. The vision of a satellite mission consisting of 10-100 CubeSats will require focused investment and development in a myriad of CubeSat-related technologies to build a cost-effective constellation or swarm of CubeSats. This will require transformative approaches for designing and building CubeSat subsystems and sensors, and innovative production approaches that will reduce the cost of implementing large-scale constellation missions. Spectrum allocations for data transmission and possible electromagnetic interference between or within constellations of CubeSats are issues that also will need to be considered.

This solicitation describes an Ideas Lab focused on CubeSat Innovations to push the envelope of space-based research capabilities by simultaneously developing enabling technologies in several domains, including propulsion systems, sensor design, electronic circuits, antennas, satellite-to-ground and satellite-to-satellite communications and wireless networking, and power management. The vision of this Ideas Lab is to support research and engineering technology development efforts that will lead to new science missions in geospace and atmospheric sciences using self-organizing CubeSat constellations/swarms. The resulting new crosscutting concepts in CubeSat technology are expected to transform and stimulate CubeSat-enabled science and engineering research supported by NSF. The realization of self-organizing CubeSats will also require innovative approaches in educating, training, and developing a cross-disciplinary workforce with the relevant expertise spanning propulsion systems, sensors, circuits, antennas, wireless communications and networking, radio-frequency interference issues, and power management. It is anticipated that these innovations in CubeSat technology and education will enable new mission concepts for Cube-Sat based science investigations.

Awards: Continuing Grants. Anticipated Funding: \$8,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 08, 2019

Contacts: S. Irfan Azeem, telephone: (703) 292-8529, email: sazeem@nsf.gov

- Monisha Ghosh, telephone: (703) 292-8746, email: mghosh@nsf.gov
 - Jenshan Lin, telephone: (703) 292-8339, email: jenlin@nsf.gov
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Grant Program: CNH2: Dynamics of Integrated Socio-Environmental Systems**Agency: National Science Foundation NSF 19-528****RFP Website:** <https://www.nsf.gov/pubs/2019/nsf19528/nsf19528.htm>

Brief Description: The CNH2 Program supports research projects that advance basic scientific understanding of integrated socio-environmental systems and the complex interactions (dynamics, processes, and feedbacks) within and among the environmental (biological, physical and chemical) and human ("socio") (economic, social, political, or behavioral) components of such a system. The program seeks proposals that emphasize the truly integrated nature of a socio-environmental system versus two discrete systems (a natural one and a human one) that are coupled. CNH2 projects must explore a connected and integrated socio-environmental system that includes explicit analysis of the processes and dynamics between the environmental and human components of the system.

PIs are encouraged to develop proposals that push conceptual boundaries and build new theoretical framings of the understanding of socio-environmental systems. Additionally, we encourage the exploration of multi-scalar dynamics, processes and feedbacks between and within the socio-environmental system.

Awards: Standard Grants. Anticipated Funding: \$18,000,000**Letter of Intent:** Required December 17, 2018**Proposal Submission Deadline:** February 14, 2019**Contacts:** Elizabeth R. Blood - Lead PO, telephone: (703) 292-4349, email: CNH2@nsf.gov

- Antoinette M. WinklerPrins - Lead PO, telephone: (703) 292-7266, email: CNH2@nsf.gov
- Richard F. Yuretich - Lead PO, telephone: (703) 292-4744, email: CNH2@nsf.gov

Grant Program: Enabling Discovery through GENomic Tools (EDGE)**Agency: National Science Foundation NSF 19-527****RFP Website:** <https://www.nsf.gov/pubs/2019/nsf19527/nsf19527.htm>

Brief Description: The Division of Integrative Organismal Systems (IOS) recognizes that a lack of methods for analysis of gene function represents an obstacle to progress in a range of diverse non-model organisms. These organisms are important for understanding numerous basic science questions in organismal biology as funded through the Division's core programs. Enabling Discovery through Genomic Tools (EDGE) is designed to provide support for development of tools, approaches and infrastructure necessary for direct tests of cause and effect hypotheses between gene function and phenotypes in diverse plants, animals, microbes, viruses and fungi for which these methods are presently unavailable. Such approaches are essential to advance understanding of the genomes-to-phenomes relationship, an area relevant to [Understanding the Rules of Life: Predicting Phenotype](#), one of the [10 Big Ideas](#) for future NSF investment.

To meet the goal of catalyzing communities to enable direct tests of cause-and-effect hypotheses about genes and phenotypes in organisms for which such tools and infrastructure are presently lacking, EDGE proposals **must** include training and rapid dissemination plans enabling larger communities of investigators to utilize the newly-developed tools quickly, thereby catalyzing an increase in the capacity of research communities to test cause-and-effect hypotheses about genes and phenotypes in organisms for which such tools and infrastructure are presently lacking.

Awards: Standard Grants. Anticipated Funding: \$8,000,000**Letter of Intent:** Not Required**Proposal Submission Deadline:** February 12, 2019**Contacts:** Michelle Elekonich, telephone: (703) 292-7202, email: melekoni@nsf.gov

- Diane Jofuku Okamuro, telephone: (703) 292-4508, email: dokamuro@nsf.gov
- Edda (Floh) Thiels, telephone: (703) 292-8421, email: ethiels@nsf.gov

Grant Program: Materials Innovation Platforms (MIP)**Agency: National Science Foundation NSF 19-526****RFP Website:** <https://www.nsf.gov/pubs/2019/nsf19526/nsf19526.htm>

Brief Description: Materials Innovation Platforms (MIP) is a mid-scale infrastructure program in the Division of Materials Research (DMR) designed to accelerate advances in materials research. MIPs respond to the increasing complexity of materials research that requires close collaboration of interdisciplinary and transdisciplinary teams and access to cutting edge tools. These tools in a user facility benefit both a user program and in-house research, which focus on addressing grand challenges of fundamental science and meet national needs. MIPs embrace the paradigm set forth by the Materials Genome Initiative (MGI), which strives to "discover, manufacture, and deploy advanced materials twice as fast, at a fraction of the cost," and conduct research through iterative "closed-loop" efforts among the areas of materials synthesis/processing, materials characterization, and theory/modeling/simulation. In addition, they are expected to engage the emerging field of data science in materials research. Each MIP is a scientific ecosystem, which includes in-house research scientists, external users and other contributors who, collectively, form a community of practitioners and share tools, codes, samples, data and know-how. The knowledge sharing is designed to strengthen collaborations among scientists and enable them to work in new ways, fostering new modalities of research and education/training, for the purpose of accelerating discovery and development of new materials and novel materials phenomena/properties, as well as fostering their eventual deployment.

The scientific focus of the MIP program is subject to change from competition to competition. The first MIP competition in 2015 focused on developing new bulk and thin-film crystalline hard materials. **The second MIP competition, in 2019, focuses on the convergence of materials research with biological sciences for developing new materials.**

Limit on Number of Proposals per Organization: 1

One (1) per organization as lead institution. Potential PIs are advised to contact their Sponsored Projects Office regarding processes used to select proposals for submission.

The institutions that were awarded a MIP in the 2015 competition as the lead institution are not eligible to submit a MIP proposal as a lead institution in the 2019 competition.

If you are interested in submitting a proposal, please submit a pre-proposal with list of all key investigators, extended summary, intellectual merit, broader impact, PI's NSF format biosketch and budget to Atam Dhawan at dhawan@njit.edu with a copy of dean of the respective college(s) by **December 1, 2018**. In case of multiple pre-proposal, the institutional response on the selection of the proposal will be provided by December 7, 2018.

Awards: Cooperative Agreement. Anticipated Funding: \$12,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 04, 2019

Contacts: Z Charles Ying, Lead MIP Program Director, telephone: (703) 292-8428, email: cying@nsf.gov

- Guebre X. Tessema, Program Director, telephone: (703) 292-4935, email: gtessema@nsf.gov
- Leonard Spinu, Program Director, telephone: (703) 292-2665, email: lspinu@nsf.gov

Grant Program: Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining)**Agency: National Science Foundation NSF 19-524****RFP Website:** <https://www.nsf.gov/pubs/2019/nsf19524/nsf19524.htm>

Brief Description: This program seeks to prepare, nurture, and grow the national scientific *research* workforce for *creating, utilizing, and supporting* advanced cyberinfrastructure (CI) to enable and potentially transform fundamental science and engineering research and contribute to the Nation's overall economic competitiveness and security. The goals of this solicitation are to **(i) ensure broad adoption of CI tools, methods, and resources by the research community in order to catalyze**

major research advances and to enhance researchers' abilities to lead the development of new CI; and (ii) integrate core literacy and discipline-appropriate advanced skills in advanced CI as well as computational and data-driven science and engineering into the Nation's educational curriculum/instructional material fabric spanning undergraduate and graduate courses for advancing fundamental research. *Pilot and Implementation* projects may target one or both of the solicitation goals, while *Large-scale Project Conceptualization* projects must address both goals. For the purpose of this solicitation, advanced CI is broadly defined as the set of resources, tools, methods, and services for advanced computation, large-scale data handling and analytics, and networking and security for large-scale systems that collectively enable potentially transformative fundamental research.

This solicitation calls for innovative, scalable training, education, and curriculum/instructional materials—targeting one or both of the solicitation goals—to address the emerging needs and unresolved bottlenecks in scientific and engineering research workforce development, from the postsecondary level to active researchers. The funded activities, spanning targeted, multidisciplinary communities, will lead to transformative changes in the state of research workforce preparedness for advanced CI-enabled research in the short- and long-terms. As part of this investment, this solicitation also seeks to broaden CI access and adoption by (i) increasing or deepening accessibility of methods and resources of advanced CI and of computational and data-driven science and engineering by a wide range of *scientific disciplines* and *institutions* with lower levels of CI adoption to date; and (ii) harnessing the capabilities of larger segments of diverse underrepresented groups. Proposals from, and in partnership with, the aforementioned communities are especially encouraged.

Awards: Standard Grants. Anticipated Funding: \$6,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 06, 2019

Contacts: Sushil K. Prasad, CISE/OAC, telephone: (703) 292-5059, email: spasad@nsf.gov

• Almadena Y. Chtchelkanova, CISE/CCF, telephone: (703) 292-8910, email: achtchel@nsf.gov

• Victor P. Piotrowski, EHR/DGE, telephone: (703) 292-8670, email: vp Piotrow@nsf.g

Grant Program: EarthCube Office

Science Office for a Community-Driven Data and Knowledge Environment for the Geosciences)

Agency: National Science Foundation NSF 19-523

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19523/nsf19523.htm>

Brief Description: EarthCube is a community-driven activity to transform the conduct of geosciences research and education, sponsored through a partnership between the NSF Directorate of Geosciences and the Office of Advanced Cyberinfrastructure in the Directorate for Computer and Information Science and Engineering.

EarthCube aims to accelerate the ability of the geosciences community to understand and predict the Earth system by enabling access to geosciences data. EarthCube will require a long-term dialog between NSF and the interested scientific communities to develop new modes for sharing data that is thoughtfully and systematically built to meet the current and future needs of geoscientists.

This solicitation seeks the services of a qualified organization to act as the EarthCube Office. This organization will provide the services required to maintain and manage the community governance structures and to carry out activities consistent with EarthCube priorities as guided by community governance. The award, to be administered as a Cooperative Agreement, is intended to cover an initial 3-year period.

Awards: Cooperative Agreements. Anticipated Funding: \$2,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 11, 2019

Contacts: Eva Zanzerkia, Directorate for Geosciences, telephone: (703) 292-4734, email: ezanzerk@nsf.gov

Grant Program: NSF National Science Foundation Research Traineeship (NRT) Program

Agency: National Science Foundation NSF 19-522

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19522/nsf19522.htm>

Brief Description: The NSF Research Traineeship (NRT) program is designed to encourage the development and implementation of bold, new, and potentially transformative models for science, technology, engineering and mathematics (STEM) graduate education training. The NRT 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.

The program is dedicated to effective training of STEM graduate students in high priority interdisciplinary or convergent research areas, through the use of a comprehensive traineeship model that is innovative, evidence-based, and aligned with changing workforce and research needs. Proposals are requested in any interdisciplinary or [convergent](#) research theme of national priority, with special emphasis on the research areas in [NSF's 10 Big Ideas](#). The NSF research Big Ideas are Harnessing the Data Revolution (HDR), The Future of Work at the Human-Technology Frontier (FW-HTF), Navigating the New Arctic (NNA), Windows on the Universe: The Era of Multi-Messenger Astrophysics (WoU), The Quantum Leap: Leading the Next Quantum Revolution (QL), and Understanding the Rules of Life: Predicting Phenotype (URoL).

The NRT program addresses 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. NRT especially welcomes proposals that will pair well with the efforts of NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) to develop STEM talent from all sectors and groups in our society (https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp). Collaborations are encouraged between NRT proposals and existing NSF INCLUDES projects, provided the collaboration strengthens both projects.

Limited Number of Submission: 2: An eligible organization may participate in two proposals per competition. **Participation includes serving as a lead organization, non-lead organization, or subawardee on any proposal.** Organizations participating solely as evaluators on projects are excluded from this limitation. Proposals that exceed the organizational eligibility limit (beyond the first two submissions based on timestamp) will be returned without review regardless of the organization's role (lead organization, non-lead collaborative, or subawardee) in the returned proposal. Only US IHEs are eligible to submit as a lead or non-lead organization.

Limit on Number of Proposals per PI or Co-PI: 1: An individual may serve as Lead Principal Investigator (PI) or Co-PI on only one proposal submitted to the NRT program per annual competition. Proposals that exceed the PI/Co-PI eligibility limit (beyond the first submission based on timestamp), will be returned without review regardless of the individual's role (PI or co-PI) in the returned proposal.

Awards Range: Standard Grant; **Anticipated Funding Amount:** \$45,000,000

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

Submission Deadline: Letter of Intent Due Date(s) (required) (due by 5 p.m. submitter's local time): November 25, 2018 - December 06, 2018

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time): February 06, 2019

Contact: Laura B. Regassa, telephone: (703) 292-2343, email: lregassa@nsf.gov

- Tara L. Smith, telephone: (703) 292-7239, email: tsmith@nsf.gov

Internal Competition Deadline to College Dean's Office: November 15, 2018: Please submit a pre-proposal for internal competition in the following format to your Dean. Deans are requested to forward the pre-proposals with their recommendations to the Office of Research for institutional review by November 22, 2018. The pre-proposal should include:

Section 1. Letter of Intent (NSF Format): Submit a one-page LOI through FastLane during the open submission window with the following information:

- The name and departmental affiliation of the Principal Investigator (PI).
- The name(s) and departmental affiliation(s) of the Co-PI(s) and others composing the Core Participants (maximum 10).
- The names(s) of any other (non-lead) participating institutions or organizations. If the sole contribution of the partner is evaluation, then designate as “*Evaluation: institutional or organizational name*”; evaluators are exempt from institutional eligibility limits (see section IV). If there are partnering institutions, then the LOI MUST include the appropriate mandatory statement at the end of the project synopsis (see Project Synopsis below).
- Project Title: The title must begin with “NRT-HDR:” or “NRT-INFIEWS:” for projects targeting the Harnessing the Data Revolution or Nexus of Food, Energy, and Water Systems research areas, respectively. Titles for projects addressing another interdisciplinary theme of national importance must begin with “NRT:”. Any collaborative project with proposals from multiple institutions should begin with “Collaborative Research:”. For example, a collaborative proposal in INFIEWS would have a title beginning “Collaborative Research: NRT-INFIEWS:”
- Project Synopsis (up to 2500 text characters including required organizational statement): Provide a brief summary of the vision and goals of the proposed training program, including a brief description of the interdisciplinary research theme, the main training elements, the integration of the research and training, and the need for the program. Add the appropriate **required partner organization statement** at the end of the project synopsis. If the project has a partner institution that is not solely an evaluator, then the following text must appear at the end of the project synopsis: *"The participating institutions and organizations have agreed to partner on this NRT project. The NRT-eligible institutions have been informed by the lead organization that serving as a non-lead organization or subawardee on a proposal where the institution appears in the budget will count toward their institutional eligibility limit of two NRT proposals per annual competition."* NRT-eligible institutions are universities and colleges accredited in and having a campus located in the U.S. that award a research-based master’s degree and/or a doctoral degree in a STEM discipline supported by the National Science Foundation. If the project has no NRT-eligible partner institutions or if the only NRT-eligible institution solely has an evaluation role (and has been designated as such, see participating institution instructions above), then the following text is required at the end of the project synopsis: *"There are no NRT-eligible institutions partnering on this project outside of an evaluation role."*
- Target Disciplines: List up to 5 primary disciplinary areas contributing to the research focus.

Section 2. Tentative Budget Summary: Please provide itemized budget for the entire duration

Section 3. Biographical Sketch of the PI (NSF Format)

Grant Program: CyberCorps® Scholarship for Service (SFS)

Agency: National Science Foundation NSF 19-521

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19521/nsf19521.htm>

Brief Description: Cyberspace has transformed the daily lives of people. Society's overwhelming reliance on cyberspace, however, has exposed its fragility and vulnerabilities: corporations, agencies, national infrastructure and individuals continue to suffer cyber-attacks. Achieving a truly secure cyberspace requires addressing both challenging scientific and engineering problems involving many components of a system, and vulnerabilities that stem from human behaviors and choices. Examining the fundamentals of security and privacy as a multidisciplinary subject can lead to fundamentally new ways to design, build and operate cyber systems, protect existing infrastructure, and motivate and educate individuals about cybersecurity. The Cybersecurity Enhancement Act of 2014, as amended by the National Defense Authorization Act for FY 2018, authorizes the National Science Foundation, in coordination with the Office of Personnel Management and the Department of Homeland Security, to

offer a scholarship program to recruit and train the next generation of information technology professionals, industry control system security professionals and security managers to meet the needs of the cybersecurity mission for federal, state, local, and tribal governments.

The goals of the CyberCorps®: Scholarship for Service (SFS) program are aligned with the [U.S. National Cyber Strategy](#) to develop a superior cybersecurity workforce. The SFS program welcomes proposals to establish or to continue scholarship programs in cybersecurity. All scholarship recipients must work after graduation for a federal, state, local, or tribal Government organization in a position related to cybersecurity for a period equal to the length of the scholarship. A proposing institution must provide clearly documented evidence of a strong existing academic program in cybersecurity. Such evidence can include designation by the National Security Agency and the Department of Homeland Security as a Center of Academic Excellence in Cyber Defense (CAE-CD), in Cyber Operations (CAE-CO) or in Research (CAE-R); or equivalent evidence documenting a strong program in cybersecurity. The SFS program also supports efforts leading to an increase in the ability of the United States higher education enterprise to produce cybersecurity professionals. Funding opportunities in this area are provided via the [Secure and Trustworthy Cyberspace - Education Designation \(SaTC-EDU\)](#) and other programs (see the section "Increasing National Capacity in Cybersecurity Education" for more details.).

Awards: Standard Grants. Anticipated Funding: \$15,000,000

Letter of Intent: Not Required

Proposal Submission Deadline: February 04, 2019

Contacts: Victor P. Piotrowski, Lead Program Director, telephone: (703) 292-5141, email: vpotrow@nsf.gov

- Chun-Hsi (Vincent) Huang, Program Director, telephone: (703) 292-7877, email: chuang@nsf.gov

Grant Program: Methodology, Measurement, and Statistics (MMS)

Agency: National Science Foundation NSF 19-520

RFP Website: <https://www.nsf.gov/pubs/2019/nsf19520/nsf19520.htm>

Brief Description: The Methodology, Measurement, and Statistics (MMS) Program is an interdisciplinary program in the Directorate for Social, Behavioral, and Economic Sciences that supports the development of innovative analytical and statistical methods and models for those sciences. MMS seeks proposals that are methodologically innovative, grounded in theory, and have potential utility for multiple fields within the social, behavioral, and economic sciences. As part of its larger portfolio, the MMS Program partners with a consortium of federal statistical agencies to support research proposals that further the production and use of official statistics.

The MMS Program provides support through a number of different funding mechanisms. The following mechanisms are addressed in this solicitation:

- Regular Research Awards
- Awards for conferences and community-development activities
- Doctoral Dissertation Research Improvement (DDRI) Grants
- Research Experience for Undergraduates (REU) Supplements

MMS also supports Faculty Early Career Development (CAREER) awards. Please see the [CAREER Program Web Site](#) for more information about this activity.

Awards: Standard Grants. Anticipated Funding: \$3,760,000

Letter of Intent: Not Required

Proposal Submission Deadline: January 31, 2019; August 29, 2019

Contacts: Cheryl L. Eavey - Program Director, telephone: (703) 292-7269, email: ceavey@nsf.gov

- Liana A. Denola - Social Scientist, telephone: (703) 292-2675, email: ldenola@nsf.gov
- Robbie W. Brown - Program Specialist, telephone: (703) 292-7264, email: rbrown@nsf.gov

National Institutes of Health

Grant Program: Graduate Research Training Initiative for Student Enhancement (G-RISE) (T32)

Agency: National Institutes of Health PA-19-102

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-102.html>

Brief Description: The **Overarching Objective** of this Graduate Research Training Initiative for Student Enhancement program is to develop a diverse pool of well-trained Ph.D. biomedical scientists, who have the following technical, operational, and professional skills:

- A broad understanding across biomedical disciplines and the skills to independently acquire the knowledge needed to advance their chosen fields;
- The ability to think critically and independently, and to identify important biomedical research questions and approaches that push forward the boundaries of their areas of study;
- A strong foundation in scientific reasoning, rigorous research design, experimental methods, quantitative and computational approaches, and data analysis and interpretation;
- A commitment to approaching and conducting biomedical research responsibly, ethically, and with integrity;
- Experience initiating, conducting, interpreting, and presenting rigorous and reproducible biomedical research with increasing self-direction;
- The ability to work effectively in teams with colleagues from a variety of cultural and scientific backgrounds, and to promote inclusive and supportive scientific research environments;
- The skills to teach and communicate scientific research methodologies and findings to a wide variety of audiences (e.g., discipline-specific, across disciplines, and the public); and
- The knowledge, professional skills and experiences required to identify and transition into careers in the biomedical research workforce (i.e., the breadth of careers that sustain biomedical research in areas that are relevant to the NIH mission).

Diversity at all levels—from the kinds of science to the regions in which it is conducted to the backgrounds of the people conducting it—contributes to excellence in research training environments and strengthens the research enterprise. This FOA is intended to support outstanding research training programs that will enhance diversity at all levels. As part of a larger initiative to enhance diversity, the G-RISE program will support trainees earning a Ph.D. at research-active institutions.

Program Considerations

NIGMS intends to fund applications that propose feasible academic and research focused training programs that will enhance diversity in the biomedical workforce. Applicants are expected to identify training objectives (i.e., specific, measurable, and obtainable outcomes the program intends to achieve) and to develop plans to implement evidence-based training and mentoring activities that are grounded in the literature and from evaluations of existing relevant programs. Program objectives must align with the overarching goal of the G-RISE diversity enhancing program. Funded programs are expected to provide evidence of accomplishing the training objectives in progress reports and upon renewal, to make training and career outcomes publicly available, and are strongly encouraged to disseminate successful training practices to the broader community.

Institutional commitment and support for the proposed training program are important elements of the application. The G-RISE program may complement and synergize with other ongoing federally-supported predoctoral research training programs at the applicant institution (e.g., in the development of skills needed for careers in the biomedical research workforce); however, the G-RISE program goals and activities to achieve those goals must be distinct from related programs currently receiving federal support at the same institution. In cases where an institution has multiple NIGMS training grants, it is expected that these programs will seek to create administrative efficiencies to reduce costs and improve trainee services and outcomes. The training grant should be well integrated within one or more department(s)/program(s) and should exert a strong, positive influence on the development and execution

of the curriculum, training opportunities, and mentoring. Training grant funds may not be used solely as a vehicle to provide stipends for trainees to conduct research.

NIGMS does not accept applications for predoctoral T32 programs proposing only short-term research training (T35). Programs proposing short-term research training should apply to the Kirschstein-NRSA Short-Term Institutional Research Training Grant Program (T35) exclusively reserved for predoctoral, short-term research training (see [PA-18-404](#) and subsequent reissuances but note that NIGMS does not participate in that FOA). NIGMS will not accept applications proposing combined predoctoral and postdoctoral training under this FOA.

Award: Application budgets are not limited but need to reflect the actual needs of the proposed project. NIGMS expects to fund programs at or below 20 trainees, as appropriate to the institutional capabilities. The maximum project period is 5 years.

Letter of Intent: Not Required

Deadline: May 21, 2019; May 21, 2020; May 21, 2021, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates. Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

**Grant Program: Limited Competition: Clinical and Translational Science Award (CTSA)
Program: Exploratory Collaborative Innovation Awards (R21 Clinical Trial Optional)**

Agency: National Institutes of Health PAR-19-100

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-100.html>

Brief Description: Translating biomedical discoveries into clinical applications is essential to improving human health. It is also a complex process with high costs and substantial failure rates. These failures can result in delays of years or decades before improved patient outcomes result from discoveries in biomedical research. Under NCATS' leadership, the CTSA Program supports a national consortium of medical research institutions — called hubs ? that work together to improve the translational research process to get more treatments to more patients more quickly. The hubs collaborate locally, regionally, and nationally to catalyze innovation in training, research tools and processes.

The overall purpose of the CTSA program is to deliver scientific and systems change that solve the many outstanding problems limiting the efficiency, effectiveness, and reach of clinical translational research, and thus get more treatments to more patients more quickly across the country. To do that, the program focuses on widely appreciated systematic barriers including (exemplary only; not intended to be exhaustive or exclusive):

- Data interoperability
- Biomarker qualification process
- Regulatory science
- Clinical trial networks
- Patient recruitment
- Electronic Health Records for research
- Harmonized IRBs
- Clinical diagnostic criteria
- Clinical outcome criteria (e.g., PROs)
- Adaptive clinical trial designs
- Shortening time of intervention adoption
- Methods to better measure impact on health (or lack thereof)
- Data transparency/release
- Integration of project management
- Incentives/credit for team science
- Incentives/credit for health improvements
- Education/Training (scientific and cultural)

- Collaborative structures

Award: Application budgets need to reflect the actual needs of the proposed project. The combined budget for direct costs for the two-year project period may not exceed \$275,000. No more than \$200,000 may be requested in any single year.

Letter of Intent: 30 days prior to the application due date

Deadline: March 8, 2019, July 11, 2019, November 9, 2019, March 8, 2020, July 11, 2020, November 9, 2020, March 8, 2021, July 11, 2021, November 9, 2021, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates. Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Research Project Grant (Parent R01 Basic Experimental Studies with Humans Required)

Agency: National Institutes of Health PA-19-091

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-091.html>

Brief Description: The NIH Research Project Grant (R01) supports a discrete, specified, circumscribed project in scientific areas that represent the investigators' specific interests and competencies and that fall within the mission of the participating NIH Institutes and Centers (ICs). The R01 is the original, and historically the oldest, grant mechanism used by the NIH to support health-related research and development.

Research grant applications are assigned to participating ICs based on receipt and referral guidelines, and many applications are assigned to multiple participating ICs with related research interests. Applicants are strongly encouraged to identify a participating IC that supports their area of research and contact Scientific/Research staff from relevant ICs to inquire about their interest in supporting the proposed research project. For specific information about the mission of each NIH IC, visit the [List of NIH Institutes, Centers, and Offices](#) website. All applications submitted to this Parent Funding Opportunity Announcement must propose basic science experimental studies involving humans, otherwise referred to in [NOT-OD-18-212](#) as “prospective basic science studies involving human participants,” that fall within the NIH definition of a clinical trial and also meet the definition of basic research.

NIH defines basic research consistent with the definition of basic research in federal code, “the 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](#)).

NIH defines a clinical trial as "A research study in which one or more human subjects are prospectively assigned to one or more interventions (which may include placebo or other control) to evaluate the effects of those interventions on health-related biomedical or behavioral outcomes." ([NOT-OD-15-015](#)). Types of studies that should submit under this FOA include studies that prospectively assign human participants to conditions (i.e., experimentally manipulate independent variables) and that assess biomedical or behavioral outcomes in humans for the purpose of understanding the fundamental aspects of phenomena without specific application towards processes or products in mind.

Award: Application budgets are not limited but need to reflect the actual needs of the proposed project.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply), by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Exploratory/Developmental Research Grant Program (Parent R21 Basic Experimental Studies with Humans Required)

Agency: National Institutes of Health PA-19-092

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-092.html>

Brief Description: The evolution and vitality of the biomedical, behavioral, and clinical sciences require a constant infusion of new ideas, techniques, and points of view. These may differ substantially from current thinking or practice and may not yet be supported by substantial preliminary data. Through the NIH Exploratory/Developmental Research Grant Program, the NIH seeks to foster the introduction of novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to substantially advance biomedical, behavioral, and clinical research.

This program is intended to encourage new exploratory and developmental research projects. For example, such projects could assess the feasibility of a novel area of investigation or a new experimental system that has the potential to enhance health-related research. Another example could include the unique and innovative use of an existing methodology to explore a new scientific area. These studies may involve considerable risk but may lead to a breakthrough in a particular area, or to the development of novel techniques, agents, methodologies, models, or applications that could have a major impact on a field of biomedical, behavioral, or clinical research.

Applications for Exploratory/Developmental Research Grant awards should include projects distinct from those supported through the traditional R01 activity code. For example, long-term projects, or projects designed to increase knowledge in a well-established area, are not appropriate for this FOA. Applications submitted to this FOA should be exploratory and novel. These studies should break new ground or extend previous discoveries toward new directions or applications. Projects of limited cost or scope that use widely accepted approaches and methods within well-established fields are better suited for the [NIH Small Research Grant Program](#).

Applications are assigned to participating Institutes and Centers (ICs) based on receipt and referral guidelines and many applications are assigned to multiple participating ICs with related research interests. Applicants are encouraged to identify a participating IC that supports their area of research via the [R21 Basic Experimental Studies with Humans Required IC-Specific Scientific Interests and Contact website](#).

Award: The combined budget for direct costs for the two-year project period may not exceed \$275,000. No more than \$200,000 may be requested in any single year.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply), by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Pathway to Independence Award (Parent K99/R00 Independent Basic Experimental Studies with Humans Required)

Agency: National Institutes of Health PA-19-090

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-090.html>

Brief Description: The overall goal of the NIH Research Career Development program is to help ensure that a diverse pool of highly trained scientists is available in appropriate scientific disciplines to address the Nation's biomedical, behavioral, and clinical research needs. NIH Institutes and Centers (ICs) support a variety of mentored and non-mentored career development award programs designed to foster the transition of new investigators to research independence and to support established investigators in achieving specific objectives. Candidates should review the different career development (K) award programs to determine the best program to support their goals. More information about Career programs may be found at the [NIH Extramural Training Mechanisms](#) website.

The objective of the NIH Pathway to Independence Award (K99/R00) is to help outstanding postdoctoral researchers complete needed, mentored training and transition in a timely manner to

independent, tenure-track or equivalent faculty positions. The K99/R00 award is intended to foster the development of a creative, independent research program that will be competitive for subsequent independent funding and that will help advance the mission of the NIH. Applicants must have no more than 4 years of postdoctoral research experience at the time of the initial (new) or the subsequent resubmission application. The K99/R00 award is intended for individuals who require at least 12 months of mentored research training and career development (K99 phase) before transitioning to the R00 award phase of the program. Consequently, the strongest applicants will require, and will propose, a well-conceived plan for 1–2 years of substantive mentored research training and career development that will help them become competitive candidates for tenure-track faculty positions and prepare them to launch robust, independent research programs. An individual who cannot provide a compelling rationale for at least one year of additional mentored research training at the time of award is not a strong candidate for this award.

Individuals must be in mentored, postdoctoral training positions to be eligible to apply to the K99/R00 program. If an applicant achieves independence (any faculty or non-mentored research position) before a K99 award is made, neither the K99, nor the R00 award, will be made.

Award: Salary and research costs may be requested to the level provided by the awarding Institute or Center. Candidates should consult the following table for IC-specific, programmatic and budgetary information (see [Table of IC-Specific Information, Requirements and Staff Contacts](#)).

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: Research on Current Topics in Alzheimer's Disease and Its Related Dementias (R01 Clinical Trial Optional)

Agency: National Institutes of Health PAR-19-070

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PAR-19-070.html>

Brief Description: This Funding Opportunity Announcement (FOA) is inviting applications proposing research on current topics in Alzheimer's disease and its related dementias. Further information on the high-priority topics of interest will be announced through a series of Notices published subsequent to this FOA.

Applications proposing research on topics beyond those specified in the notices will not be prioritized for funding under this FOA. Investigators proposing applications on topics that are not high priority are encouraged to apply to the [parent R01 grant](#) or to explore whether their topic would be appropriate for [NIA's other AD-focused FOAs](#).

Award: Application budgets are not limited but need to reflect the actual needs of the proposed project.

Letter of Intent: Not Required

Deadline: March 11, 2019; July 9, 2019; November 12, 2019; March 11, 2020; July 9, 2020; November 12, 2020; March 11, 2021; July 9, 2021; and November 12, 2021, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Small Research Grant Program (Parent R03 Clinical Trial Not Allowed)

Agency: National Institutes of Health PA-19-052

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-052.html>

Brief Description: The NIH Small Research Grant Program supports discrete, well-defined projects that realistically can be completed in two years and that require limited levels of funding. This program supports different types of projects including, but not limited to, the following:

- Pilot or feasibility studies;
- Secondary analysis of existing data;
- Small, self-contained research projects;
- Development of research methodology; and
- Development of new research technology.

Applications are assigned to participating Institutes and Centers (ICs) based on receipt and referral guidelines and applications may be assigned to multiple participating ICs with related research interests. Applicants are encouraged to identify a participating IC that supports their area of research via the [R03 IC-Specific Scientific Interests and Contact](#) website and contact Scientific/Research staff from relevant ICs to inquire about their interest in supporting the proposed research project.

Award: Application budgets are limited to \$50,000 in direct costs per year.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

The first standard application due date for this FOA is February 16, 2019.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Exploratory/Developmental Research Grant Program (Parent R21 Clinical Trial Not Allowed)

Agency: National Institutes of Health PA-19-053

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-053.html>

Brief Description: The evolution and vitality of the biomedical, behavioral, and clinical sciences require a constant infusion of new ideas, techniques, and points of view. These may differ substantially from current thinking or practice and may not yet be supported by substantial preliminary data. Through the NIH Exploratory/Developmental Research Grant Program, the NIH seeks to foster the introduction of novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to substantially advance biomedical, behavioral, and clinical research.

This program is intended to encourage new exploratory and developmental research projects. For example, such projects could assess the feasibility of a novel area of investigation or a new experimental system that has the potential to enhance health-related research. Another example could include the unique and innovative use of an existing methodology to explore a new scientific area. These studies may involve considerable risk but may lead to a breakthrough in a particular area, or to the development of novel techniques, agents, methodologies, models, or applications that could have a major impact on a field of biomedical, behavioral, or clinical research.

Applications for Exploratory/Developmental Research Grant awards should include projects distinct from those supported through the traditional R01 activity code. For example, long-term projects, or projects designed to increase knowledge in a well-established area, are not appropriate for this FOA. Applications submitted to this FOA should be exploratory and novel. These studies should break new ground or extend previous discoveries toward new directions or applications. Projects of limited cost or scope that use widely accepted approaches and methods within well-established fields are better suited for the [NIH Small Research Grant Program](#).

Award: The combined budget for direct costs for the two-year project period may not exceed \$275,000. No more than \$200,000 may be requested in any single year.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

The first standard application due date for this FOA is February 16, 2019.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Research Project Grant (Parent R01 Clinical Trial Not Allowed)

Agency: National Institutes of Health PA-19-056

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-056.html>

Brief Description: The NIH Research Project Grant supports a discrete, specified, circumscribed project in scientific areas that represent the investigators' specific interests and competencies and that fall within the mission of the participating NIH Institutes and Centers (ICs). The R01 is the original, and historically the oldest, grant mechanism used by the NIH to support health-related research and development.

Research grant applications are assigned to participating ICs based on receipt and referral guidelines and applications may be assigned to multiple participating ICs with related research interests. Applicants are encouraged to identify a participating IC that supports their area of research via the [R01 IC-Specific Scientific Interests and Contact](#) website and contact Scientific/Research staff from relevant ICs to inquire about their interest in supporting the proposed research project.

This Funding Opportunity Announcement does not accept applications proposing clinical trial(s). For specific information about the mission of each NIH IC, visit the [List of NIH Institutes, Centers, and Offices](#) website.

Award: Application budgets are not limited but need to reflect the actual needs of the proposed project.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

The first standard application due date for this FOA is February 5, 2019.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: Computational Genomics and Data Science Opportunities for Small Business (R43/R44 Clinical Trial Not Allowed)

Agency: National Institutes of Health PAR-19-061

[PAR-18-843](#), [R21](#) Exploratory/Developmental Research Grant

[PAR-18-844](#), [R01](#) Research Project Grant

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PAR-19-061.html>

Brief Description: Through this FOA, NHGRI seeks to fund innovative commercial product development in computational genomics, data science, statistics, and bioinformatics for basic or clinical genomic sciences and broadly applicable to human health and disease, as well as commercial product development stemming from improvement of existing software or approaches demonstrated to be in broad use by the genomics community.

Research topics appropriate for this FOA include, but are not limited to, development of commercial computational, bioinformatics, statistical, or analytical approaches, tools, or software for:

- Interactive analysis and visualization of large genomic data sets.
- Identification or prioritization of disease-causal genetic variants.
- Causal statistical modeling related to genomic research.
- Analysis of single-cell or sub-cellular genomic data both in situ and in dissociated cells.
- Integrating model organism data with human data to derive biomedical insight.
- Integrating and interpreting various genomic data types, including sequence data, functional data, phenotypic data, and clinical data.
- Processing and integrating genome sequence data to enhance representation of population variation.

- Processing sequence data for sequence assembly, variant detection (SNPs and SVs), imputation, and resolution of haplotypes.
- Development of efficient and scalable algorithms for compute-intensive genomic applications, or otherwise achieving major cost reductions in genomic data processing and analysis.
- Enabling scalable and cost-effective curation of FAIR metadata for genomic and phenotypic data.
- Enhancing secure sharing and use of genomic data in combination with clinical data.
- Processing or analyzing new genomic data types, or major improvement in processing or analyzing existing genomic data types.
- Hardening an existing widely-used genomic data processing pipeline to enable its reproducible implementation by the biomedical research community.
- Improved and novel methods for integrating prior biological knowledge into machine learning models.

This FOA does not support:

- Development, maintenance, or curation of genomic databases and other genomic data resources. Applicants considering developing such resources are directed to the Genomic Community Resources (U24) program: <https://grants.nih.gov/grants/guide/pa-files/PAR-17-273.html>.
- Research not generalizable beyond one or a small number of diseases or biological systems. Research utilizing a small number of disease models or biological systems for proof-of-concept studies may be acceptable when the resulting methods, tools, approaches, or software are generalizable.
- Development and application of ontologies or controlled vocabularies, or manual curation efforts.
- Basic data science research that is not developed for genomics.
- Significant experimental work. Applicants may propose limited experimental work to test predictions generated as a result of computational approaches and/or inform modeling efforts, but this should not be a major focus of the application.
- Approaches not clearly pertaining to computational genomics and data science and/or lacking relevance to human health and disease.
- Work focused on microbial genomics or the microbiome.

Award: According to statutory guidelines, total funding support (direct costs, indirect costs, fee) normally may not exceed \$150,000 for Phase I awards and \$1,000,000 for Phase II awards. With appropriate justification from the applicant, Congress will allow awards to exceed these amounts by up to 50% as a hard cap (\$225,000 for Phase I and \$1,500,000 for Phase II). However, NIH has received a waiver from SBA, as authorized by statute, to exceed the hard cap of \$225,000 for Phase I or \$1,500,000 for Phase II for specific topics.

Letter of Intent: 30 days prior to the application due dates

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization.

*** Note new SBIR/STTR Standard Due Dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: NIH Small Research Grant Program (Parent R03 Clinical Trial Not Allowed)

Agency: National Institutes of Health PA-19-052

RFP Website: <https://grants.nih.gov/grants/guide/pa-files/PA-19-052.html>

Brief Description: The NIH Small Research Grant Program supports discrete, well-defined projects that realistically can be completed in two years and that require limited levels of funding. This program supports different types of projects including, but not limited to, the following:

- Pilot or feasibility studies;
- Secondary analysis of existing data;
- Small, self-contained research projects;
- Development of research methodology; and
- Development of new research technology.

Applications are assigned to participating Institutes and Centers (ICs) based on receipt and referral guidelines and applications may be assigned to multiple participating ICs with related research interests. Applicants are encouraged to identify a participating IC that supports their area of research via the [R03 IC-Specific Scientific Interests and Contact](#) website and contact Scientific/Research staff from relevant ICs to inquire about their interest in supporting the proposed research project.

This Funding Opportunity Announcement does not accept applications proposing clinical trial(s)

Award: Application budgets are limited to \$50,000 in direct costs per year.

Letter of Intent: Not Required

Deadline: [Standard dates](#) apply, by 5:00 PM local time of applicant organization. All [types of non-AIDS applications](#) allowed for this funding opportunity announcement are due on these dates.

The first standard application due date for this FOA is February 16, 2019.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Department of Defense/US Army/DARPA/ONR

Grant Program: Data-Driven Discovery of Optimized Multifunctional Material Systems Center of Excellence (D³OM²S CoE)

Agency: Department of Defense Air Force Research Lab FOA-AFRL-RQKM-2019-5011

Website:

https://www.fbo.gov/index?s=opportunity&mode=form&id=09325ea5dafef5deb797ec7e032135cc&tab=core&_cview=1

Brief Description: The objective of this effort is the development and application of artificial intelligence, data analytics, and decision science to advance materials problems of interest to the USAF through strong, organic collaborations between the Recipient and USAF researchers. The program will seek to grow these collaborations by funding graduate students at the Recipient institution(s) performing basic research in materials problem spaces via application and adaptation of approaches in data analytics. Research under this program should produce actionable, quantifiable information that furthers fundamental knowledge of materials systems.

Awards: \$5,000,000

Proposal Deadline: January 03, 2019

Contact Information: Melissa Gross,
Contract/Grants Negotiator

melissa.gross.1@us.af.mil

Phone: 937-713-9980

Grant Program: FY19 Office of Naval Research (ONR) Navy and Marine Corps Science, Technology, Engineering & Mathematics (STEM), Education and Workforce Program

Agency: Department of Defense Office of Naval Research N00014-19-S-F003

Website: <https://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>

Brief Description: The ONR seeks a broad range of applications for augmenting existing or developing innovative solutions that directly maintain, or cultivate a diverse, world-class STEM workforce in order

to maintain the U.S. Navy and Marine Corps' technological superiority. The goal of any proposed effort must provide solutions that will establish and maintain pathways of diverse U.S. citizens who are interested in uniformed or civilian DoN (or Navy and Marine Corps) STEM workforce opportunities. As the capacity of the DoN Science and Technology (S&T) workforce is interconnected with the basic research enterprise and STEM education system, ONR recognizes the need to support efforts that can jointly improve STEM student outcomes and align educational efforts with Naval S&T current and future workforce needs. This announcement explicitly encourages projects that improve the capacity of education systems and communities to create impactful STEM educational experiences for students and workers. Submissions are encouraged to consider including active learning approaches and incorporating 21st century skill development. Projects must aim to increase student and worker engagement in STEM and enhance people with needed Naval STEM capabilities. ONR encourages applications to utilize current STEM educational research for informing project design and advancing our understanding of how and why people choose STEM careers and opportunities of naval relevance.

Awards: ONR's total STEM funding effort is \$6,250,000 per year, subject to the availability of funds. Under this FOA competition, ONR intends to award approximately twenty-five (25) awards for a maximum of \$250,000 per year for each award, with one-year (1) option periods for up to three (3) years.

Proposal Deadline:

White Paper Inquiries and Questions 17 June 2019 (Monday) White Papers must be received between 1 April 2019 (Monday) with a deadline of 28 June 2019 (Friday) at 5:00 PM Eastern Time Application Inquiries and Questions 16 September 2019 (Monday) Applications must be received no later than 27 September 2019 (Friday) at 11:59 PM Eastern Time

Contact Information: David Broadwell Grant Management Specialist Phone 703-588-2866

Grant Program: Machine-Assisted Analytic Rapid-Repository System (MARS) Broad Agency Announcement

Agency: Department of Defense Defense Intelligence Agency HHM402-18-S-MARS

Website: <http://www.federalgrants.com/MARS-Broad-Agency-Announcement-74264.html>

Brief Description: A key DIA mission is providing foundational intelligence to the military and decision makers. Foundational intelligence is the essential advantage we provide for a comprehensive understanding of foreign military capabilities, infrastructure and materiel in all operational domains - land, air, sea, space and cyber. Since the mid-1990s, this global foundational intelligence dataset has been housed in the Modernized Integrated Database (MIDB). MIDB contains the military and civilian infrastructure supporting those capabilities; characteristics and performance of foreign weapons, platforms, and sensors; and the military operating environment. This intelligence supports every aspect of military planning and operations, as well as the long-term planning and shaping of the joint force.

MARS will transform the existing MIDB into a data-centric knowledge repository at a significantly larger scale and with a transactional throughput capability. MARS will:

Allow analysts and operators to absorb and process large amounts of data to find new relationships, ensuring DIA provides the level of detail necessary to conduct agile, precise and more sophisticated analysis in support of military operations.

Capture new sources of data that provide deeper understanding of global technological developments, allowing us to better inform the acquisition community (support intelligence mission data development) as they develop, test, operate and sustain systems to ensure continued U.S. military dominance.

Provide the ability to track both static and mobile military forces, ensuring a holistic understanding of foreign military operational readiness and disposition, and enhancing indications and warning of potential threats to joint force operations.

Enable an exponential increase of data ingested on military and civilian infrastructure in the operating environment.

Leverage commercial best practices and industry technological advances to scale, respond and adapt MARS at pace with future mission-driven data demands for the military.

Awards: Various

Proposal Deadline: Proposal Due Date for Initial Round of Selections for Technical Capability Areas 1-4: December 10, 2018

Contact Information: Mishelle Miller Grants and Contracting Officer
diacfo4mars@dodis.mil

Grant Program: Accelerated Molecular Discovery (AMD)

Agency: Department of Defense DARPA HR001119S0003

Website:

https://www.fbo.gov/index?s=opportunity&mode=form&id=dce9a69eca4f0f4d0c789ed6dcc2475c&tab=core&_cview=1

Brief Description: The Defense Sciences Office (DSO) at the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals in the area of autonomous molecular design to accelerate the discovery, validation and optimization of new, high-performance molecules for Department of Defense (DoD) needs. Specifically, DARPA seeks to develop new, systematic approaches that increase the pace of discovery and optimization of high-performance molecules through development of closed-loop systems that exploit, build and integrate tools for: 1) extracting existing data from databases and text; 2) executing autonomous experimental measurement and optimization; and 3) incorporating computational approaches to develop physics-based representations and predictive tools. Such methods will ultimately enable AI-based design and discovery of completely new molecules that are optimized across multiple molecular properties for specific DoD applications. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, and systems related to small organic molecules. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

Awards: Multiple

Proposal Deadline:

Abstract Due Date: November 1, 2018, 4:00 p.m. o FAQ Submission Deadline: January 3, 2019, 4:00 p.m. See Section VIII.A. o Full Proposal Due Date: January 14, 2019, 4:00 p.m.

Contact Information: Anne Fischer, Program Manager, DARPA/DSO; BAA Email: AMD@darpa.mil

Grant Program: Electronic Warfare Technology

Agency: Department of Defense ONR N00014-19-R-S002

Website: <https://www.onr.navy.mil/en/Contracts-Grants/Funding-Opportunities/Special-Notices>

Brief Description: The proposed topic will explore and exploit the technical opportunities for discovery and invention in the area of Electronic Warfare (EW). The goal of EW is to control the Electromagnetic Spectrum (EMS) by exploiting, deceiving, or denying enemy use of the spectrum while ensuring its use by friendly forces. To that end, the Office of Naval Research (ONR) EW Discovery and Invention (D&I) program invests in Science and Technology (S&T) initiatives that will provide naval forces (including Navy and Marine Corps) with improved threat warning systems; Electronic warfare Support (ES); decoys and countermeasures against weapon tracking and guidance systems; Electronic Attack (EA) against adversary Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); and Electronic Protection (EP) of our own weapons and C4ISR from intentional and unintentional interference.

ONR Code 312 Electronic Warfare (312EW) seeks proposals to develop and demonstrate technologies for the next generation systems in electronic warfare. White papers and subsequent proposals should address technology developments in one or more of the following Research Opportunity Technical Areas (TA) 1-4.

Awards: Multiple

Proposal Deadline:

White Paper Submission Date 12/07/2018 4:00pm Eastern Local Time Notification of White Paper Evaluation* 01/10/2019 Oral Presentation - Invitation Only 01/23/2019 – 01/24/2019 Notification of Oral Presentation Evaluation 01/29/2019 Full Proposal Submission Date 02/28/2019 4:00pm

Contact Information: Stephen Hughes Contracting Officer

Grant Program: Microsystems Technology Office (MTO)

Agency: Department of Defense DARPA HR001118S0060

Website:

https://www.fbo.gov/index?s=opportunity&mode=form&id=68dfd959363ffdeb96f61c065e212ef7&tab=core&_cview=1

Brief Description: Since its inception in 1991, MTO has helped create and prevent strategic surprise through investments in compact microelectronic components such as microprocessors, microelectromechanical systems (MEMS), and photonic devices. MTO’s revolutionary work applying advanced capabilities in areas such as wide-band gap materials, phased array radars, high-energy lasers, and infrared imaging have helped the United States establish and maintain technological superiority for more than two decades. MTO seeks to develop high-risk, high-reward technologies that continue DARPA’s mission of creating and preventing strategic surprise, help to secure the Department of Defense’s (DoD) technological superiority, and address the complex threats facing U.S. national security. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice. As MTO evolves to address future microsystems-related challenges, the office has identified three target thrust areas: (1) Electronics: Managing Moore’s Inflection, (2) Spectrum: Enhancing Our Advantage with Agility and Autonomy, and (3) Sensors: Decentralized Sensors for the DoD.

Awards: Multiple

Proposal Deadline:

Abstract Due Date: Abstracts may be submitted on a rolling basis until 1:00PM on May 26, 2020. o

Proposal Due Date: Proposals may be submitted on a rolling basis until 1:00PM on June 26, 2020.

Contact Information: Dr. William Chappell Director, Microsystems Technology Office BAA Coordinator: HR001118S0060@darpa.mil

Grant Program: AFRL/RXC Structural Materials Open BAA

Agency: Department of Defense Air Force -- Research Lab FA8650-18-S-5010

Website: <http://cdmrp.army.mil/funding/dmrdp>

Brief Description: Air Force Research Laboratory, Materials & Manufacturing Directorate, Structural Materials Division, AFRL/RXC, is soliciting white papers and potentially technical and cost proposals under this announcement that support the needs of its Structural Materials and Applications mission. Structural Materials technologies that range from materials and scientific discovery through technology development and transition are of interest. Descriptors of Materials and Manufacturing Directorate technology interests are presented in two contexts in the Statement of Objectives (BAA Attachment 1); that of structural materials science and engineering academic “competencies,” and that of Air Force application area needs.

Awards: Up to \$5,000,000; Available program funding: \$99,500,000

Proposal Deadline: White Paper Submission: 20 September 2023

Proposal Submission: Due followed by white paper submission and review

Contact Information: Adrianna Menker Contracting/Grants Officer Phone 937-713-9924

Grant Program: NRL Long Range Broad Agency Announcement (BAA) for Basic and Applied Research

Agency: Department of Defense Naval Research Laboratory N00173-18-S-BA01

Website: <https://www.nrl.navy.mil/doing-business/Current-NRL-BAA>

Brief Description: The Naval Research Laboratory (NRL) The Naval Research Laboratory (NRL) is the Navy's corporate laboratory. NRL conducts basic and applied research for the Navy in a variety of scientific and technical disciplines. The basic research program is driven by perceptions about future requirements of the Navy. NRL conducts most of its research program at its own facilities but also funds some related research such as anticipated by this announcement. More extensive research support opportunities are available from the Naval Research Laboratory (NRL). NRL announcements may be accessed via the Internet at <https://www.nrl.navy.mil/doingbusiness/contracting-division/baa>. NRL is interested in receiving proposals for Long-Range Science and Technology (S&T) Projects which offer potential for advancement and improvement of Navy and Marine Corps operations. Readers should note that this is an announcement to declare NRL's broad role in competitive funding of meritorious research across a spectrum of science and engineering disciplines. A brief description of the NRL Program Codes and the science and technology thrusts that NRL is pursuing is provided below. Additional information can be found at the NRL website at <https://www.nrl.navy.mil/research/directorates-divisions/>. This announcement is an expression of interest only and does not commit the Government to make any award or to pay for any proposal preparation costs. The cost of proposal preparation for response to a BAA is not considered an allowable direct charge to any resultant contract or any other contract; however, it may be an allowable expense to the normal bid and proposal indirect cost specified in FAR 31.205-18.

Awards: Various

Proposal Deadline: May 9, 2019

Contact Information: Mary Johnson Contract Specialist Phone 202-767-2021

Department of Education

Grant Program: Institute of Education Sciences (IES): Education Research CFDA Number 84.305A

Agency: Department of Education ED-GRANTS-052118-001

Website: <https://www.gpo.gov/fdsys/pkg/FR-2018-05-21/pdf/2018-10802.pdf>

Brief Description: Each funding opportunity description is a synopsis of information in the Federal Register application notice. For specific information about eligibility, please see the official application notice. The official version of this document is the document published in the Federal Register. Free Internet access to the official edition of the Federal Register and the Code of Federal Regulations is available on GPO Access at: <http://www.access.gpo.gov/nara/index.html>. Please review the official application notice for pre-application and application requirements, application submission information, performance measures, priorities and program contact information.

For the addresses for obtaining and submitting an application, please refer to our Common Instructions for Applicants to Department of Education Discretionary Grant Programs, published in the Federal Register on February 12, 2018 (83 FR 6003) and available at www.gpo.gov/fdsys/pkg/FR-2018-02-12/pdf/2018-02558.pdf.

The dates when applications are available and the deadlines for transmittal of applications invited under this notice are indicated in the chart at the end of this notice and in the Requests for Applications (RFAs) that are posted at the following websites: <https://ies.ed.gov/funding>, <https://www.ed.gov/programs/edresearch/index.html>, and <https://www.ed.gov/programs/specialedresearch/index.html>.

Purpose of Program: In awarding these grants, the Institute of Education Sciences (Institute) intends to provide national leadership in expanding fundamental knowledge and understanding of (1)

developmental and school readiness outcomes for infants and toddlers with or at risk for a disability, (2) education outcomes for all students from early childhood education through postsecondary and adult education, and (3) employment and wage outcomes when relevant (such as for students who engaged in career and technical, postsecondary, or adult education). The Institute's research grant programs are designed to provide interested individuals and the general public with reliable and valid information about education practices that support learning and improve academic achievement and access to education opportunities for all students. These interested individuals include parents, educators, students, researchers, and policymakers. In carrying out its grant programs, the Institute provides support for programs of research in areas of demonstrated national need.

Competitions in This Notice: The Institute will conduct nine research competitions in FY 2019 through two of its centers: The Institute's National Center for Education Research (NCER) will hold a total of five competitions--one competition in each of the following areas: Education research; education research and development centers; statistical and research methodology in education; partnerships and collaborations focused on problems of practice or policy; and low-cost, short-duration evaluation of education interventions.

Catalog of Federal Domestic Assistance (CFDA) numbers 84.305A, 84.305C, 84.305D, 84.305H, 84.305L, 84.324A, 84.324B, 84.324L, and 84.324N.

Awards: Up to \$4,000,000. Estimated total funding: \$115,000,000

Proposal Deadline: Aug 23, 2018 Application Package Available: June 21, 2018. Deadline for Transmittal of Applications: August 23, 2018

Contact Information: Julius Cotton ED Grants.gov FIND Systems Admin. Phone 202-245-6288 EducationGrantInquiries@ed.gov

Program Manager: Molly Faulkner-Bond e-Mail: Molly.Faulkner-Bond@ed.gov .

EPA

Grant Program: 16th Annual P3 Awards: A National Student Design Competition Focusing on People, Prosperity and the Planet - Safe and Sustainable Water Resources

EPA-G2019-P3-Q1 – Air Quality

EPA-G2019-P3-Q2 – Safe and Sustainable Water Resources

EPA-G2019-P3-Q3 – Sustainable and Healthy Communities

EPA-G2019-P3-Q4 – Chemical Safety

Agency: Environmental Protection Agency

Website: <https://www.epa.gov/research-grants/16th-annual-p3-awards-national-student-design-competition-focusing-people-prosperity>

Brief Description: The U.S. Environmental Protection Agency (EPA) – as part of its People, Prosperity and the Planet (P3) Award Program – is seeking applications proposing to research, develop, design, and demonstrate solutions to real world challenges. The P3 competition highlights the use of scientific principles in creating innovative technology-based projects that achieve the mutual goals of improved quality of life, economic prosperity, and protection of the planet – people, prosperity, and the planet. The EPA offers the P3 competition to respond to the needs of people in the United States (U.S.)—e.g., those in small, rural, tribal, and disadvantaged communities. Please see the People, Prosperity and the Planet (P3) Student Design Competition website for more details about this program. Proposed projects must embody the P3 approach, which is that they have the intention and capability to simultaneously improve the quality of people’s lives, provide economic benefits, and protect the environment.

This solicitation provides the opportunity for the submission of applications for projects that may involve human subjects research. Human subjects research supported by the EPA is governed by EPA Regulation 40 CFR Part 26 (Protection of Human Subjects). This includes the Common Rule at subpart A and prohibitions and additional protections for pregnant women and fetuses, nursing women, and children at subparts B, C, and D. Research meeting the regulatory definition of intentional exposure

research found in subpart B is prohibited by that subpart in pregnant women, nursing women, and children. Research meeting the regulatory definition of observational research found in subparts C and D is subject to the additional protections found in those subparts for pregnant women and fetuses (subpart C) and children (subpart D). All applications must include a Human Subjects Research Statement (HSRS, as described in Section IV.C.5.b of this solicitation), and if the project involves human subjects research, it will be subject to an additional level of review prior to funding decisions being made as described in Sections V.C and V.D of this solicitation.

Awards; The first phase is a competition for one-year grants of up to \$25,000 to test, research, and develop innovative scientific projects or engineering designs that use the P3 approach. In the spring of 2020, the Phase I grantees awarded from this solicitation are required to present their projects/designs at the National Student Design Expo. EPA will provide teams with information about the Expo during the award year. At the end of Phase I, teams will submit a *Project Report* that will serve as an application for a Phase II grant award of up to \$100,000. The Phase II grant awards are intended to support the further development and demonstration of the projects/designs created in Phase I. The competitors for 2020 P3 Phase II grants are limited to recipients of Phase I grant awards from this solicitation.

Submission Deadline: December 11, 2018, 11:59:59 pm Eastern Time

Contact Information: Technical Contact: Angela Page (page.angelad@epa.gov), Phone: 202-564-7957; Eligibility Contact: Ron Josephson (josephson.ron@epa.gov), Phone: 202-564-7823; Electronic Submissions: Debra M. Jones (jones.debram@epa.gov), Phone: 202-564-7839

Department of Energy

Grant Program: Energy-Water Desalination Hub

Agency: Department of Energy

Website: <https://eere-exchange.energy.gov/#FoaId4f2ad83a-6f54-4458-97d8-94e748cb2f14>

Brief Description: The Office of Energy Efficiency and Renewable Energy (EERE), within the U.S. Department of Energy (DOE), invests in cutting-edge research, development, and demonstration activities focused on sustainable transportation, renewable power, and energy efficiency. Through EERE's Advanced Manufacturing Office (AMO) public-private R&D consortia, manufacturers, small businesses, universities, national laboratories, and state and local governments are brought together to pursue coordinated early-stage R&D in high-priority areas essential to energy in manufacturing. Federal funding is the catalyst to bring stakeholders into shared spaces and to address process and technological challenges that present a significant degree of scientific or technical uncertainty.

The purpose of this funding opportunity announcement (FOA) is to establish an Energy Innovation Hub (referred to hereafter as the Energy-Water Desalination Hub, or the Hub) to address water security issues in the U.S. For the purpose of this FOA, "desalination" more broadly includes technologies that primarily remove salts. The Hub is a critical component of the Department of Energy's (DOE) broader Water Security Grand Challenge which will use a coordinated suite of prizes, competitions, early stage research and development (R&D), and other programs to help address the nation's water security needs. The Energy-Water Desalination Hub will be organized around four topic areas: 1) Materials Research and Development, 2) New Process Research and Development, 3) Modeling and Simulation Tools, and 4) Integrated Data and Analysis. DOE intends to select and fund one application with the greatest likelihood of achieving the goals of all four topics of this FOA.

Informational Webinar: The Informational Webinar mentioned in the FOA will be held on January 7, 2019 at 3:00 PM Eastern Standard Time. Attendance is not mandatory and will not positively or negatively impact the overall review of any Applicant submissions. Standard application questions regarding the EERE Office and FOA procedures will be discussed. No new information will be presented during the webinar and EERE will not answer any attendee questions during the webinar. Please click [here](#) to register for the webinar.

Awards: Up to \$45,000,000; Anticipated Program Funding: \$100,000,000
Submission Deadline: May 07, 2019 A mandatory Concept Paper is due February 7, 2019.
Contact: FOA Mailbox: AMOWaterHub@ee.doe.gov

Grant Program: Science Undergraduate Laboratory Internship (SULI)

Agency: Department of Energy

Website: <https://science.energy.gov/wdts/suli/>

Brief Description: The Science Undergraduate Laboratory Internship (SULI) program encourages undergraduate students and recent graduates to pursue science, technology, engineering, and mathematics (STEM) careers by providing research experiences at the Department of Energy (DOE) laboratories. Selected students participate as interns appointed at one of [17 participating DOE laboratories/facilities](#). They perform research, under the guidance of laboratory staff scientists or engineers, on projects supporting the DOE mission. The SULI program is sponsored and managed by the DOE Office of Science's, Office of Workforce Development for Teachers and Scientists (WDTS) in collaboration with the DOE laboratories/facilities.

Applications for the SULI program are solicited annually for three separate internship terms. Internship appointments are 10 weeks in duration for the Summer Term (May through August) or 16 weeks in duration for the Fall (August through December) and Spring (January through May) Terms. Each DOE laboratory/facility offers different research opportunities; not all DOE laboratories/facilities offer internships during the Fall and Spring Terms.

Awards: Various

Submission Deadline: January 10, 2019 at 5:00 PM ET.

Grant Program: Transformational Sensing Capabilities for Monitoring the Subsurface

Agency: Department of Energy DE-FOA-0001998

Website: <https://www.fedconnect.net/FedConnect/default.htm>

Brief Description: The purpose of this Request for Information (RFI) is to seek information from stakeholders such as industry, academia, nonprofits, and research institutions about Research and Development (R&D) activities that could lead to development of transformational sensing capabilities for monitoring parameters associated with CO₂ injection throughout the storage complex, including: overburden, reservoir, and underburden. This includes fluid flow throughout the reservoirs into the far field through critical but difficult-to-detect features such as faults and integrated fracture networks. Of particular interest are transformational sensors or sensing systems that will improve the ability to monitor movement of fluids in the subsurface and the ability to measure critical subsurface properties throughout a commercial-scale (greater than 50 million metric tons CO₂ stored) storage complex. A storage complex consists of: (1) one or more storage reservoirs, with permeability and porosity that allow injection and storage of CO₂; and (2) one or more low-permeability seals, which enclose the reservoir(s) and serve as barriers to migration of CO₂ out of the reservoir.

Awards: Various

Submission Deadline: Responses to this RFI must be submitted electronically to: DE-FOA0001998@netl.doe.gov with the subject line "DE-FOA0001998 - RFI" no later than 8:00 PM (ET) on December 3, 2018.

Contact Information: John R. Hatfield John.Hatfield@netl.doe.gov

Grant Program: Advanced Systems Integration for Solar Technologies

Agency: Department of Energy DE-FOA-0001987

Website: <https://eere-exchange.energy.gov/#FoaId3c598467-b778-45b1-b2a0-7fc4a14e1456>

Brief Description: The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Solar Energy Technology Office, a Funding Opportunity Announcement (FOA) entitled “Advanced Systems Integration for Solar Technologies”.

This FOA supports the mission of the Solar Energy Technologies Office (SETO) which is to support early-stage research and development to improve the performance and flexibility of solar technologies that contribute to a reliable and resilient U.S. electric grid. The office invests in innovative research efforts that securely integrate more solar energy into the grid, enhance the use, storage and dispatch of solar energy, and lower solar electricity costs.

DOE is committed to improving the affordability of energy technologies and strengthening the Energy Sector’s capability to withstand cyber and physical threats, including natural disasters. Improving the strategic location and situational awareness of solar systems can help ensure continuity of service in the face of widespread and coordinated threats. Developing innovative approaches to accelerate the transfer of solar system solutions that will improve Energy Sector resilience is also a priority.

Awards: Various

Submission Deadline: Letter of Intent Deadline: 11/14/2018 5:00 PM ET

- Full Application Submission Deadline: 12/7/2018 5:00 PM ET

Contact Information: Maureen.Davison@NETL.DOE.GOV

NASA

Grant Program: ROSES 2018: Heliophysics Living With a Star

Agency: NASA NNH18ZDA001N-LWS

Website: <https://nspires.nasaprs.com/external/solicitations/summary!init.do?solId={8DB28CFB-8DD8-8A61-F6FF-7418AACBBE0B}&path=open>

Brief Description: The Living With a Star (LWS) Program emphasizes the science necessary to understand those aspects of the Sun and Earth’s space environment that affect life and society. A primary goal of the LWS program is to provide scientific understanding, with the potential for prediction, of the Heliosphere as a system. This includes an understanding of the space weather conditions from the Sun to the Earth and throughout the interplanetary medium, as well as the Sun-climate connection. The LWS program objectives are as follows: 1. Understand how the Sun varies and what drives solar variability. 2. Understand how the Earth and planetary systems respond to dynamic external and internal drivers. 3. Understand how and in what ways dynamic space environments affect human and robotic exploration activities.

Awards: It is expected that there will be approximately \$4.8 M available in Fiscal Year (FY) 2019

Notice of Intent: Not Required

Proposal Deadline: Step-1 Proposal Due February 14, 2019

Contact: Jeff Morrill Heliophysics Division, jeff.s.morrill@nasa.gov

Grant Program: ROSES 2018: Advanced Information Systems Technology

Agency: NASA NNH18ZDA001N-AIST

Website: <https://nspires.nasaprs.com/external/solicitations/summary.do?solId=%7BC0D379E0-B4A8-6B97-7B0C-7F5409CD2442%7D&path=open&method=init>

Brief Description: NASA’s Advanced Information Systems Technology (AIST) Program identifies, develops, and supports adoption of information technology expected to be needed by the Earth Science Division in the 5-20-year timeframe, as described in ROSES-18 Appendix A.1. Currently, the AIST Program is organized around two primary thrusts, the Analytic Center Framework (ACF) and the New Observing Strategy (NOS). The ACF harmonizes tools, data, and computing environments to meet the

needs of Earth science investigations of physical processes and natural phenomena. The aim of these investigations is to improve human understanding and prediction of Earth processes and natural phenomena. The ACF integrates new or previously unlinked datasets, tools, models, and a variety of computing resources together into a common platform to address previously intractable scientific questions. Additionally, this activity seeks to generalize custom or unique tools that are used by a limited community, in order to make them accessible and useful to a broader community. The ACF concept is intended to be instantiated for a specific investigation quickly and to be configured to help answer the specific science questions being investigated. Some ACF instantiations might become permanent, based on the needs of the user community. An ACF instantiation may support a scientific investigation using data from both NASA and nonNASA sources. The ACF is described in more detail at the AIST website (https://esto.nasa.gov/info_technologies_aist.html).

Awards: It is expected that there will be approximately \$11.4 M available in Fiscal Year (FY) 2019

Notice of Intent: Not Required

Proposal Deadline: AIST18 NOIs Due Jan 10, 2019

Contact: Michael Little Earth Science Technology Office Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Email: Michael.M.Little@NASA.gov

Grant Program: Appendix B: Solicitation of Proposals for Flight and Ground Space Biology Research

Agency: NASA NNH18ZTT001N-FG

Website: <https://nspires.nasaprs.com/external/solicitations/summary.do?solId=%7BB5D22D51-66F6-AE61-66F2-4D1059F5B7CB%7D&path=&method=init>

Brief Description: This Appendix to the Research Opportunities in Space Biology (ROSBio) - 2018 NASA Omnibus Research Announcement solicits proposals that will increase NASA's understanding of how living systems acclimate to spaceflight to support human space exploration. The solicited research will fall into the following four research emphases: 1. Microbiology studies that will produce new understanding to augment and expand our knowledge of the Microbiology of the Built Environment (MoBE) in Space and suggest how to manipulate and control it in the closed environment of exploration spacecraft. 2. Plant Biology studies in support of Human Space Exploration making maximal use of the capabilities of the VEGGIE and Advanced Plant Habitat) on ISS to study environmental effects on plant growth and interactions with microbes and fungi. Proposed studies should answer fundamental questions about how plants adapt to spaceflight and provide new understanding of how to grow plants in space that will enable human space exploration. 3. Animal Biology (vertebrate and invertebrate) in support of Human Space Exploration. 4. Studies designed to compare results and validity of microgravity "simulators" in parallel with flight and ground-based studies. The types of experiments solicited by this Appendix include the following, based on the award type (please see the solicitation for descriptions of specific award types): Flight experiments using the ISS, or suborbital and parabolic flight platforms to test, develop, or refine flight hypotheses; Ground-based experiments conducted in non-NASA or NASA laboratories, including drop tower facilities, and/or specialized centrifuge facilities to study gravity as a continuum; Individual PI- led or team-based studies.

Awards: Up to \$1,200,000

Notice of Intent: Not Required

Proposal Deadline: Step-1 Proposals Due Jan 07, 2019

Contact: Dr. David L. Tomko, Program Scientist for Space Biology Space Life and Physical Sciences Research and Applications Division, NASA Headquarters Phone: 202-358-2211 Email: dtomko@nasa.gov

Grant Program: ROSES 2018 B.13 Heliophysics DRIVE Science Centers**Agency:** NASA NNH18ZDA001N-DRIVE**Website:** <https://nspires.nasaprs.com/external/solicitations/summary!init.do?solId={2AF0A877-0C3F-8E34-5954-223EAAD4CBB4}&path=open>

Brief Description: DRIVE Science Centers (DSCs) are part of an integrated multi-agency initiative, DRIVE (Diversify, Realize, Integrate, Venture, Educate), put forward as a high priority recommendation of the 2013 Solar and Space Physics Decadal Survey. DSCs, which fall under the "Venture" aspect of the DRIVE initiative, address grand challenge goals that are both ambitious and focused enough to be achievable within the lifetime of the center - in other words, problems poised and ready for major advances. This program is intended to support science that cannot be effectively done by individual investigators or small teams, but requires the synergistic, coordinated efforts of a research center. In order to maximize the potential for these science centers to deliver on innovative and breakthrough science, they are expected to include aspects in their design that support collaboration and deep knowledge integration across the full range of expertise (scientific, computational, educational) within them, as recommended in a recent report by the National Academy of Sciences, Enhancing the Effectiveness of Team Science. With this motivation, NASA and NSF joined forces to design a DSC program implemented in this ROSES-18 program element by NASA, that takes advantage of lessons learned from ongoing and past science centers and the growing body of information on team science.

Awards: It is expected that there will be approximately \$4.0 M available in Fiscal Year (FY) 2019 to support ~6 Phase I DSCs selected through this solicitation. Annual funding is unlikely to exceed \$650K per investigation. This is subject to receipt of meritorious proposals and the availability of funds. The actual number of awards will depend on the quality of the proposals received; NASA reserves the right to make no awards, or more than 6 awards.

Notice of Intent: Not Required**Proposal Deadline:** DRIVE18 Step-1 Proposals Due Jan 15, 2019**Contact:** Janet Kozyra and James Spann Heliophysics Division Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Kozyra Telephone: (202) 875-3278 Kozyra Email: janet.kozyra@nasa.gov Spann Telephone: (202) 358-0574 Spann Email: jim.spann@nasa.gov**Grant Program: Second Heliophysics Space Weather Operations to Research****Agency:** NASA NNH18ZDA001N-2HSWO2R**Website:** <https://nspires.nasaprs.com/external/solicitations/summary.do?solId=%7B42510C5A-BC75-3943-5FD4-C4C2C63B540E%7D&path=open&method=init>

Brief Description: NSF's primary role in developing space weather readiness for the nation is in the support of basic research that advances fundamental understanding of space weather and related processes, specifically, the generation of solar storms, their propagation through the interplanetary medium, and the generation of disturbances in the near-Earth space environment and atmosphere. NSF-supported community members use that fundamental understanding in the development of models for these space weather processes, which draw on observations from NSF's persistent ground-based observational platforms, among others, to test and further refine our community's understanding. The goals of these NSF funded research activities are to benefit society and contribute to the achievement of specific, desired societal outcomes, such as improving space weather predictive capability.

For this opportunity, NASA, NOAA, and NSF have identified the following focus area for research and development to advance forecast models of energetic particles in the heliosphere: • Improve forecasts of the energetic proton and/or heavy ion conditions in the heliosphere due to solar eruptions. The primary goal of this funding is to support research by the grant recipient to improve numerical models and/or data utilization techniques that could advance forecasting capabilities and which could also lead to improved scientific understanding. Effective utilization of available data is encouraged. Employing data assimilation, ensemble, and/or machine-learning techniques is also encouraged. Improved forecast capabilities could include, for example, forecasts of solar event probabilities and enhanced energetic

particle levels one or more days prior to a solar eruption, as well as probabilities of event duration, peak flux levels, and integrated event fluence following the initiation of a solar eruption. Improved forecasts of solar energetic particles can support numerous applications, including human and robotic exploration beyond low-Earth orbit, satellite launch and on-orbit operations, aviation operations, and radio communication.

Awards: Various

Proposal Deadline: Step-1 Proposal due on February 1, 2019

Contact: James Spann Heliophysics Division Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Telephone: (202) 358-0574 Email: jim.spann@nasa.gov

National Endowment of Humanities

Grant Program: Digital Humanities Advancement Grants

Agency: National Endowment for the Humanities

Website: <https://www.neh.gov/grants/listing>

Brief Description: Digital Humanities Advancement Grants (DHAG) support digital projects at different stages throughout their lifecycles, from early start-up phases through implementation and sustainability. Experimentation, reuse, and extensibility are hallmarks of this program, leading to innovative work that can scale to enhance scholarly research, teaching, and public programming in the humanities. You can find a discussion of the forms that experimentation can take in the Frequently Asked Questions document. This program is offered twice per year. Proposals are welcome for digital initiatives in any area of the humanities.

Through a special partnership with NEH and pending the availability of appropriated funds, the Institute of Museum and Library Services (IMLS) anticipates providing additional funding to this program to encourage innovative collaborations between museum or library professionals and humanities professionals to advance preservation of, access to, use of, and engagement with digital collections and services. IMLS and NEH may jointly fund some DHAG projects that involve collaborations with museums and/or libraries.

Digital Humanities Advancement Grants may involve

- 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 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.

Awards: Maximum award amount \$325,000 in outright, \$50,000 in match

Deadline: January 15, 2019

Contact: Contact the Office of Digital Humanities Team odh@neh.gov

Grant Program: Summer Seminars and Institutes

Agency: National Endowment for the Humanities

Website: <https://www.neh.gov/grants/education/summer-seminars-and-institutes>

Brief Description: NEH Summer Seminars and Institutes grants broaden and deepen understanding of the humanities in supporting professional development programs, specifically designed for a national audience of K-12 educators or college and university faculty. The programs provide one- to four-week opportunities for participants (NEH Summer Scholars) to explore a variety of topics relevant to K-12 or undergraduate education in the humanities.

NEH Summer Seminars and Institutes

- focus on the study and teaching of significant texts and other resources;

- provide models of excellent scholarship and teaching;
- contribute to the intellectual growth of the of participants; and
- build lasting communities of inquiry.

An NEH Summer Seminar or Institute may be hosted by a college, university, learned society, center for advanced study, library or other repository, cultural or professional organization, or school or school system. The host site must provide facilities for collegial interaction and scholarship. The program must be held only in the United States and its territories.

Seminars and Institutes are designed either for K-12 educators or for college and university faculty. Programs for K-12 educators must involve someone with significant K-12 experience in both project planning and implementation and must respond to K-12 curricular needs.

Awards: Maximum award amount

Seminars: \$125,000

Institutes: \$200,000

Deadline: February 14, 2019

Contact: Contact the Division of Education Programs Team 202-606-2324 sem-inst@neh.gov

Environment Research and Education Foundation

Grant Program: Research on Research on Sustainable Solid Waste Management and Recycling

Agency: Environment Research and Education Foundation

Website: <https://erefdn.org/research-grants-projects/how-to-apply-for-grant/>

Brief Description: The sustainability movement has reached the business models of nearly every industry in the United States, and many companies, municipalities and states have set aggressive sustainability goals that include how waste streams are being managed. The EREF Board of Directors has set an initiative to ensure research funded reflects EREF's long-term strategic plan to address all areas of integrated solid waste management, with a strong focus towards research that increased sustainable solid waste management practices.

Pre-proposal topics must relate to sustainable solid waste management practices and pertain to the following topic areas:

1. Waste minimization
2. Recycling
3. Waste conversion to energy, biofuels, chemicals or other useful products. This includes, but is not limited to, the following technologies:
 - Waste-to-energy
 - Anaerobic digestion
 - Composting
 - Other thermal or biological conversion technologies
4. Strategies to promote diversion to higher and better uses (e.g. organics diversion, market analysis, optimized material management, logistics, etc.)
5. Landfilling

Upon submission, pre-proposals will be examined by a selection committee and successful pre-proposals will be invited to submit a full proposal for consideration. Full proposals will then be subjected to EREF's review process, as described later in this document.

Proposal Deadline: EREF has two deadlines per year for pre-proposals:

December 1

May 1

Contact: If interested, please send an email to Eric Blitz (eric.blitz@njit.edu) and Atam Dhawan (dhawan@njit.edu).

Streamlyne Question of the Week

Question: Can I generate budgets for multiple years from the Year-1 budget in Streamlyne?
Answer: Yes! You only need to input the Year-1 budget and then click on the “generate all periods” button. Streamlyne will create budget sheets for the remaining periods. You can then go to “summary” under the budget tab to review budget sheets for all periods. You can also change specific budget items that you allocated in Year-1 but you do not want to continue them in the following periods.

More FAQs on Streamlyne: Please visit <http://www.njit.edu/research/streamlyne/>

Streamlyne Information

Streamlyne User Manuals: <http://www.njit.edu/research/streamlyne/>

Streamlyne_NewUserManual_CommonElements.docx : This manual provides a reference to all the common elements of Streamlyne Research. This user manual is a good document to review each module’s functionality.

Streamlyne_NewUserManual_PD&PDBudget.docx: This is a user manual on proposal and budget development in Streamlyne. The content herein explain the use and functionality of this module. This is the most useful Streamlyne document for PIs and users new to Streamlyne.

How-to-do-Videos

New “How to Do” videos have been posted on the research website <http://www5.njit.edu/research/streamlyne/>. The videos show step-by-step process on the following tasks:

- ◆ [How to Begin Proposal Submission in Streamlyne](#)
- ◆ [How to Input Proposal Budget](#)
- ◆ [How to Process Approvals](#)
- ◆ [How to Upload Proposal Attachments](#)
- ◆ [How to Search for a Proposal that is in Route](#)
- ◆ [Difference Between "Prime Sponsor Code" and "Sponsor Code"](#)
- ◆ [How to Select an RR Budget, RR Sub-award or Modular Budget](#)
- ◆ [How to Add a Student/Summary](#)
- ◆ [Participant Support Categories](#)
- ◆ [Supplies Specific Category Materials](#)
- ◆ [How to Create a Modular Budget](#)

Faculty and staff having any questions on proposal submission, may contact their college representatives, and also follow up with **Justin Samolewicz, Associate Director (Pre Award)** 973-596-3145; justin.m.samolewicz@njit.edu; and **Eric Hetherington, Director, Sponsored Research Programs Administration** 973-596-3631; eric.d.hetherington@njit.edu. The college representatives to help PIs on proposal submissions are

John McCarthy, NCE Director of Research; (973) 596-3247; john.p.mccarthy@njit.edu
Cristo Leon, CSLA Director of Research; (973) 596-6426; cristo.e.yanezleon@njit.edu
Sean Andrews, YWCC Director of Research; (973) 596-5352; sean.t.andrews@njit.edu
Iris Pantoja, NCE, CoAD and MTSM Project Manager; 973-596-4483; irp3@njit.edu

Need Information about Funding?

Finding Research Opportunities and Collaborations (FROC) **Walk-In Open-Hour Discussion with SVPR Over Tea**

Every Thursday: 3.00 PM-4.00 PM; 340 Fenster Hall

The Office of Research has started a new service to help all faculty and staff explore collaborative research opportunities and currently active RFPs (Request for Proposals) for potential proposal development and submission. Faculty and research staff members are welcome to meet with Senior Vice Provost for Research Atam Dhawan at the open-hour every Thursday from 3.00 PM to 4.00 PM to discuss research opportunities related issues including the following but not limited to:

- Research opportunities and potential collaborations
- Currently active RFPs and developing collaborative teams for proposal submission
- Proposal review criterion for specific RFP/program/agency
- Proposal concept and draft review in the context of review criterion
- Future plans for proposal development and submission
- Invention disclosures, patent applications and processing of intellectual property
- External faculty research awards including fellowships

Though *walk-ins* are welcome during the open-hour, faculty members are encouraged to email SVPR Atam Dhawan (dhawan@njit.edu) about specific questions on research opportunities and needs to be discussed in advance for more detailed discussion.

The open-hour session with individuals or small groups of faculty and research staff members is expected to focus on finding research opportunities, developing collaborative teams, exploring the review criterion and reviewing program requirements. Specific proposal submission and grant management issues can be discussed with Office of Research staff separately.

Enjoy coffee/tea and cookies with SVPR over the discussion.

For any questions and additional information, please send an email to SVPR at dhawan@njit.edu.
