



**TUFTS UPDATE – MARCH 19, 2020**  
**PREPARED BY LEWIS-BURKE ASSOCIATES LLC**

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## **Introduction**

This edition of the Tufts Washington Update for mid-March includes Administration and agency updates, funding opportunities, and congressional updates. Faculty, staff, and researchers are welcome to schedule calls with the Lewis-Burke Tufts team or meet with the team when they visit Washington, DC. Contact Amanda Bruno, Lewis-Burke Associates LLC, at [amanda@lewis-burke.com](mailto:amanda@lewis-burke.com) with any questions or comments related to the Update's content, for more information on updates and opportunities, or to add a new recipient to the distribution list.

## **Administration and Agency Updates**

### **Lewis-Burke Analysis of COVID-19 Guidance and Opportunities**

Lewis-Burke has compiled a list of Congressional updates, federal guidance, research opportunities, and Administration updates related to the novel coronavirus COVID-19, updated as of March 18. Newest items are highlighted in yellow. The document is linked below. Lewis-Burke will continue to track the constantly evolving situation regarding COVID-19 and related federal guidance and opportunities.

#### *Sources and Additional Information:*

- Lewis-Burke's analysis of COVID-19 guidance and opportunities is available at [https://www.lewis-burke.com/sites/default/files/client\\_update\\_-\\_covid\\_guidance\\_and\\_opportunities\\_-\\_march\\_18\\_2020.pdf](https://www.lewis-burke.com/sites/default/files/client_update_-_covid_guidance_and_opportunities_-_march_18_2020.pdf).

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### **Cyberspace Solarium Commission Releases Their Public Report**

The Cyberspace Solarium Commission (CSC) held a launch event for their public report March 11, 2020. Releasing both the executive summary and full report online as well, the CSC report proposes a “layered cyber deterrence” strategy to shape behavior, deny benefits, and impose costs to malign actors. In achieving the goal of “defending forward”, the CSC report addresses six key pillars and provides helpful recommendations on how to strengthen deterrence, and create a cyber-resilient economy and government. The Commission delivers innovative suggestions on how to reform the cyber ecosystem and culture, and promote cyber hygiene to support national resilience in the event of cyber attacks. Other elements also include cybersecurity education and literacy, workforce development, legislation proposals, how to strengthen public-private partnerships, and plans to bolster cyber accountability. The full report contains over 80 recommendations, with key recommendations such as:

- Having the executive branch issue an updated National Cyber Strategy;
- Creating an Assistant Secretary of State in the Department of State, with a new Bureau of Cyberspace Security and Emerging Technologies;
- Improving international tools for law enforcement (i.e. increase the number of FBI Cyber Assistant Legal Attachés;
- Establishing a Congress-approved Bureau of Cyber Statistics;
- Establishing House Permanent Select and Senate Select Committees on Cybersecurity;
- Elevating the **Cybersecurity and Infrastructure Security Agency (CISA)** to be a focal point for coordinating national cybersecurity;
- Creating a Senate-confirmed **National Cyber Director** position within the Executive Office of the White House; and
- Promoting digital literacy, civics education, and public awareness.

The Senate Armed Services Subcommittee on Cybersecurity will hold a hearing **March 25, 2020 at 2:30 PM EST** to discuss the findings of the Cyberspace Solarium Commission.

*Sources and Additional Information:*

- The Cyberspace Solarium Commission executive summary, full report, and livestreamed launch event can be found at <https://www.solarium.gov/>.

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**DOE Highlights Upcoming Opportunities and Future Research Directions for Advanced Scientific Computing Research**

The Department of Energy (DOE) has issued its final report on *AI for Science*. As noted below, the report summarizes the findings of four separate townhall meetings held by the DOE Office of Advanced Scientific Research (ASCR) which were aimed at identifying future research directions at the intersection of artificial intelligence (AI) and the agency's science and technology needs.

AI is one of the top research and development priorities for DOE and specifically the Office of Science. DOE investments in AI and scientific machine learning are expected to grow by \$136 million or 83 percent in less than two years. The FY 2021 request includes \$258 million for AI and machine learning (see table below), but Congress is likely to appropriate closer to \$300 million because it will reject cuts to renewable energy applications and continue to expand those efforts. This opens up new research and funding opportunities. Of the \$300 million, approximately one third or \$100 million, will be through competitive, extramural grants available to research universities.

**Artificial Intelligence and Machine Learning**  
(dollars in thousands)

<b>Artificial Intelligence and Machine Learning</b>	<b>FY 2019 Enacted</b>	<b>FY 2020 Enacted</b>	<b>FY 2020 Request</b>
Artificial Intelligence and Technology Office	0	2,500	4,912
Advanced Research Projects Agency - Energy	30,000	0	0
Cybersecurity, Energy Security and Emergency	5,200	7,000	12,000
Response Energy Efficiency and Renewable Energy	24,752	48,915	10,355
Environmental Management	4,000	4,000	4,000
Fossil Energy Research and Development	24,400	18,000	23,100
National Nuclear Security Administration	47,110	75,118	76,600
Chief Information Officer	0	1,800	2,510
Electricity	6,760	750	0
Science	21,964	71,000	124,500
<b>Total, Artificial Intelligence and Machine Learning</b>	<b>164,186</b>	<b>229,083</b>	<b>257,977</b>

*Source: DOE. Please note, the column "FY 2020 Request" should read FY 2021 request.*

The report outlines how AI will enable advances across a broad array of topic areas relevant to DOE's mission. These not only include foundational areas such as applied mathematics and computational science, or domain sciences such as chemistry, biology, and physics, but also engineering and technology-focused areas such as advanced manufacturing and energy infrastructure. In addition, several chapters are devoted to crosscutting fields including data life cycle and infrastructure, hardware architectures, AI for experimental facilities, and edge computing. The broad topic areas include:



The diversity of topics included in the report indicates that DOE does not intend to confine its AI-related activities to the Office of Science. Rather, it reflects the fact that the agency views AI as an enabling capability across the breadth of its science and technology portfolio, including in more applied areas. We expect that the report will influence future AI-focused funding calls across DOE's basic and applied research programs, and so encourage faculty with relevant expertise and interest in DOE to explore its contents.

*Sources and Additional Information:*

- The full report can be found at <https://anl.app.box.com/s/f7m53y8beml6hs270h4yzh9l6cnmukph>.

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## **Funding Opportunities**

### **DOE Releases Fifth Scientific Discovery Through Advanced Computing (SciDAC-5) Institutes**

#### **Competition**

the U.S. Department of Energy (DOE) Office of Advanced Scientific Computing Research (ASCR) has released a Funding Opportunity Announcement (FOA) for its fifth Scientific Discovery through Advanced Computing (SciDAC-5) Institutes competition. ASCR expects to award between \$14 million and \$30 million for roughly two collaborations. Given their wide scope and associated management demands, SciDAC Institutes are typically National Laboratory-led endeavors with significant university participation.

SciDAC Institutes consist of teams of applied mathematicians, computer scientists, and researchers from other fields to advance the multidisciplinary application of high performance computing. The transfer of foundational research outcomes into discipline-specific solutions is enabled by the pipeline between the SciDAC Institutes and the SciDAC Partnerships, which are focused projects jointly funded by ASCR and other Office of Science (SC) program offices as well as the Office of Nuclear Energy. DOE intends for the SciDAC-5 Institutes to produce the following:

- “Mechanisms for engaging computational grand challenges across application areas within DOE’s and SC’s Congressionally-authorized mission-space”, including through close collaboration with the SciDAC Partnership projects;
- “Tools and resources for lowering the barriers to effectively use state-of-the-art computational systems” such as the currently operating supercomputers located at Argonne, Oak Ridge, and Lawrence Berkeley National Laboratories and the exascale systems that will soon be deployed;
- “Mechanisms for incorporating and demonstrating the value of basic research results from ASCR investments”, with the expectation that SciDAC-5 Institutes will each center on the primary topics of Applied Mathematics and Computer Science; and
- “Plans for building up and engaging our Nation’s computational science research communities.”

As noted in our summary of the January meeting of the Advanced Scientific Computing Advisory Committee, the SciDAC-5 Institute competition will include an emphasis on artificial intelligence and scientific machine learning. The FOA mentions these areas specifically within the context of SciDAC-5 Institute support for Basic Energy Sciences (prediction and control of materials and chemical systems), Fusion Energy Sciences (extreme scale simulations), High Energy Physics (computational physics), and Nuclear Physics (processing of large-scale nuclear data sets).

#### *Sources and Additional Information:*

- The full FOA is available at [https://science.osti.gov/-/media/grants/pdf/foas/2020/SC\\_FOA\\_0002223.pdf](https://science.osti.gov/-/media/grants/pdf/foas/2020/SC_FOA_0002223.pdf).
- Additional information on existing SciDAC Institutes is available at <https://www.scidac.gov/institutes.html>.

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## **DOE Releases BOTTLE Opportunity to Support Plastics Innovation Challenge and Announces National Lab-Led BOTTLE Consortium**

On March 16, the Department of Energy (DOE) Office of Energy Efficiency & Renewable Energy (EERE) released a \$25 million funding solicitation for plastics recycling research jointly funded by EERE's Bioenergy Technologies Office and the Advanced Manufacturing Office. The Bio-Optimized Technologies to Keep Thermoplastics out of Landfills and the Environment (BOTTLE) opportunity is one of several planned funding calls that support the DOE Plastics Innovation Challenge. Consistent with Lewis-Burke's December 2019 advance intelligence on BOTTLE and the plastics innovation challenge, this initiative seeks to address plastic waste and leverage DOE's fundamental and applied research capabilities to develop energy efficient plastics recycling technologies.

BOTTLE seeks proposals that address plastic waste challenges. Specifically, BOTTLE would “develop novel polymers, create innovative deconstruction pathways, and establish a framework for evaluating carbon and energy efficiency” for reclamation and upcycling of plastic waste and creation of new plastics technology. To accomplish this, BOTTLE seeks proposals within the following topic areas:

- **“Highly Recyclable or Biodegradable Plastics:** Develop new plastics that have improved performance attributes over a comparable existing plastic and can be cost-effectively recycled or biodegrade completely in the environment or in compost facilities. (\$8 million)
- **Novel Methods for Deconstructing and Upcycling Existing Plastics:** Generate energy-efficient recycling technologies (mechanical, chemical, or biological) that are capable of breaking plastic streams into intermediates which can be upgraded into higher value products. (\$8 million)
- **BOTTLE Consortium Collaborations to Tackle Challenges in Plastic Waste:** Create collaborations with the BOTTLE Laboratory Consortium to further the long-term goals of the Consortium and the Plastics Innovation Challenge. (\$9 million)”

In addition to the funding call, DOE also announced the launch of the national –lab-led BOTTLE consortium. The consortium will focus on the design of new plastics and recycling strategies and is led by the National Renewable Energy Laboratory in partnership with Oak Ridge and Los Alamos National Laboratories.

EERE expects between 13 and 16 awards under the BOTTLE program that will run up to 36 months in duration. EERE requires that each application propose a research partnership with three or more entities (which include research universities, DOE national laboratories, and non-profits.). The submission deadline for concept papers is **April 22, 2020 at 5:00 PM ET**. If invited, full applications are due by **June 18, 2020 at 5:00 PM ET**.

### *Sources and Additional Information:*

- More information about the plastics innovation challenge can be found at <https://www.energy.gov/articles/department-energy-launches-plastics-innovation-challenge>.
- The BOTTLE funding opportunity can be found at <https://eere-exchange.energy.gov/FileContent.aspx?FileID=9365680f-656d-4e74-ba72-c9f5a7fdd290>.

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## **NEH Releases Infrastructure and Capacity Building Challenge Grant Program**

The National Endowment for the Humanities (NEH) has released the solicitations for the Infrastructure and Capacity Building Challenge Grants program, which provides matching funds to organizations in order to increase humanities capacity through capital expenditures or endowments. The program offers two solicitations which each fund different project types:

- The Capital Projects solicitation supports “design, purchase, construction, restoration, or renovation of facilities for humanities activities,” including purchase and installation of equipment and building systems (ventilation, lighting, security, etc.) necessary for exhibiting, maintaining, and protecting humanities collections.
- The Digital Infrastructure solicitation supports “maintenance, modernization, and sustainability of existing digital scholarly projects and platforms,” which should serve multiple communities or organizations over the long-term. Temporary digital projects or those with limited audiences may not be considered “digital infrastructure” under this solicitation.

Of note, the program requires *significant* matching funds from nonfederal, third-party donors. While minority-serving institutions and two-year community colleges are required to provide a one-to-one match, other institutions are required to provide either a three-to-one match on grants up to \$500,000 or a four-to-one match on grants above \$500,000.

Similar to last year’s competition, this year’s solicitation includes special encouragement for projects that align with the “A More Perfect Union” special initiative to “promote a deeper understanding of American history and culture and that advance civic education and knowledge of our core principles of government.” The solicitation also encourages proposals from minority-serving institutions and community colleges.

**Due Date:** Proposals are due by **May 15, 2020 at 11:59 PM EDT**. Program officers will provide feedback on draft proposals submitted by April 3, 2020.

**Total Funding and Award Size:** NEH anticipates making up to 30 awards of up to a maximum of \$750,000 each.

**Eligibility and Limitations:** Eligible applicants include U.S. colleges and universities, state and local agencies, and other non-profit organizations with 501(c)(3) tax-exempt status. Entities are limited to one application per year across both solicitations.

### *Sources and Additional Information:*

- The Capital Projects solicitation is available at <https://www.neh.gov/sites/default/files/inline-files/Infrastructure%20and%20Capacity%20Building%20Challenge%20Grants%20Capital%20Projects%202020.pdf>.
- The Digital Infrastructure solicitation is available at <https://www.neh.gov/sites/default/files/inline-files/Infrastructure%20and%20Capacity%20Building%20Challenge%20Grants%20Digital%20Infrastructure%20NOFO%202020.pdf>.
- Additional information on the Infrastructure and Capacity Building Challenge Grants program is available at <https://www.neh.gov/grants/preservation/infrastructure-and-capacity-building-challenge-grants>.



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### **DARPA Releases BAA on Microsystems Technologies**

The Defense Advanced Research Projects Agency (DARPA) released its Microsystems Technology Office (MTO) Office-wide broad agency announcement (BAA) March 13 for research abstracts and proposals investigating revolutionary advances in microsystems and innovative strategies and solutions to address future microsystems-related challenges. To achieve these objectives, MTO highlights four thrust areas:

- Embedded Microsystem Intelligence and Localized Processing;
- Next Generation Front-End Component Technologies for Electromagnetic (EM) Spectrum Dominance;
- Microsystem Integration for Increased Functional Density and Security; and
- Disruptive Defense Microsystem Applications.

“This BAA is primarily, but not solely, intended for early stage research that may lead to larger, focused, MTO programs in the future.” Federally Funded Research and Development Centers (FFRDCs) and government entities are eligible to apply, but are “subject to applicable direct competition limitations.” Multiple awards are anticipated, and specific award amount will depend on quality of proposals as well as fund availability. Single-phase and multi-phase efforts will both be considered. Single phase efforts with short duration (less than 12 months) may receive up to \$1 million, and multi-phase efforts (exceeding 12 months) “covering clearly identifiable research topics with quantitative technical metrics ” may receive larger awards. Proposers are strongly encouraged to submit abstracts in advance to proposals to streamline proposal preparation and evaluation. Abstracts and full proposals will be accepted and reviewed on a rolling basis and must be electronically submitted to DARPA/MTO. Abstracts are due **January 3, 2022 at 1:00 PM ET** and proposals are due **March 13, 2022 at 1:00 PM ET**. Questions regarding this BAA may be submitted before **February 15, 2022 at 1:00 PM ET**.

#### *Sources and Additional Information:*

- Additional BAA details, specifics on the four thrust areas, and an additional list of topic areas of interest can be found at <https://www.grants.gov/web/grants/view-opportunity.html?oppld=325388>, or at [www.grants.gov](http://www.grants.gov) under solicitation number “HR001120S0018.”

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### **DTRA Releases Open BAA for Strategic Trends Research Initiative**

The Defense Threat Reduction Agency (DTRA) Strategic Integration Directorate, Strategic Trends and Effects Department, Strategic Trends Division (SI-STT) released an open broad agency announcement (BAA) to solicit white papers for research studies, strategic dialogues, and tabletop exercises through its Strategic Trends Research Initiative (STRI). Through this BAA, DTRA seeks to partner with experts in academia and industry to “deliver a continuous stream of operationally relevant research and analysis” for the future battlespace and threat environment. White papers should address DTRA SI-STT’s five focus areas (included in the solicitation) and align with the seven thrust areas listed below:

- Competition With Revisionist Powers

- Emerging Threats
- Counter Threat Networks (CTN)
- Strategic Security and Risk Reduction
- Allies, partners, and non-traditional partners
- Key strategic competitors
- Competition with revisionist powers (with a focus on Weapons of Mass Destruction-related issues)

Academia, think tanks, and industry are eligible to apply. Total funding for the BAA will be approximately \$1.95 million per year, with individual awards ranging from \$25,000 to \$350,000. White papers are required and proposals are by invite only. DTRA will accept white papers on a rolling basis until March 2, 2025 or until the BAA is replaced.

*Sources and Additional Information:*

- Additional information can be found in the full BAA at <https://www.grants.gov/web/grants/view-opportunity.html?oppld=325076>.

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### **DOD Releases FY 2021 Innovation Corps (I-Corps) Program**

The Department of Defense (DOD) released a broad agency announcement (BAA) on March 4 for the fiscal year (FY) 2020 Innovation Corps @ Department of Defense Program (I-Corps @ DOD Program). Modeled after the National Science Foundation's (NSF) I-Corps program, I-Corps @ DOD aims to "spur the transition of fundamental research with potential defense relevance to the marketplace, to encourage collaboration between academia and industry, and to train students, faculty, and other researchers to understand innovation and entrepreneurship."

Interested applicants must create an I-Corps Team, made up of a technical lead (or principal investigator), entrepreneurial lead, and an I-Corps @ DOD mentor. The entrepreneurial lead is intended to be a postdoctoral researcher, graduate student, or other student focused on commercializing the innovation. The mentor should be from a third party and have entrepreneurial experience.

The I-Corps @ DOD program, administered by the Army Research Office, is focused on three outcomes:

- A go/no go decision on the viability of products and services
- Development of a transition plan if a product or service is selected to move forward
- Execution of a minimum viable product demonstration

DOD plans to award a total of \$700,000 for up to 10 awards. The maximum individual award is \$70,000 and will have a performance period of 12 months. Informal white papers, which are due by **May 15, 2020**, are not mandatory but offer an opportunity to receive comments from program officials. The final deadline to submit final applications is **June 15, 2020 at 4:00 PM ET**.

*Sources and Additional Information:*

- The full announcement can be found at [www.grants.gov](http://www.grants.gov) under solicitation number "W911NF-20-S-0007."

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### **DOD CDMRP Releases FY 2020 Peer Reviewed Medical Research Program Solicitations**

The Department of Defense (DOD) Congressionally Directed Medical Research Program (CDMRP) released its fiscal year (FY) 2020 Peer Reviewed Medical Research Program (PRMRP) solicitations. For FY 2020, Congress has allocated \$360 million for PRMRP in 44 topic areas.

Information on each of the funding mechanisms and a list of the FY 2020 topic areas is listed below. Those interested should carefully review the submission requirements for each funding mechanism. Additionally, interested applicants should review the “Areas of Encouragement,” in the appendix of each solicitation, for details on DOD interests in the listed topic areas. Lewis-Burke Associates LLC (Lewis-Burke) is available to speak with those interested to provide details on best practices for successful submissions, especially as they pertain to addressing military relevancy and the review processes.

#### **Funding Mechanisms:**

- The **Discovery Award** supports the exploration of a highly innovative new concept or untested theory in the topic area(s) of interest. Postdoctoral or clinical fellow and above are eligible.
  - **Pre-Application Deadline:** April 16, 2020; 5:00 PM Eastern Time (ET)
  - Solicitation details are available at [www.grants.gov](http://www.grants.gov) under solicitation number “W81XWH-20-PRMRP-DA.”
- The **Focused Program Award** supports multidisciplinary research with multiple investigators, addressing an overarching goal in the topic area(s) of interest. Projects may range from exploratory/hypothesis development through small-scale clinical trials.
  - **Pre-Application Deadline:** April 23, 2020; 5:00 PM ET
  - Solicitation details are available at [www.grants.gov](http://www.grants.gov) under solicitation number “W81XWH-20-PRMRP-FPA.”
- The **Investigator-Initiated Research Award** supports novel research and allows for partnering of primary investigators.
  - **Pre-Application Deadline:** April 23, 2020; 5:00 PM ET
  - Solicitation details are available at [www.grants.gov](http://www.grants.gov) under solicitation number “W81XWH-20-PRMRP-IIRA.”
- The **Technology/Therapeutic Development Award** supports the translation of preclinical findings into clinical applications for prevention, detection, diagnosis, treatment, or quality of life in the topics area(s) of interest. This is a product-oriented award.
  - **Pre-Application Deadline:** April 23, 2020; 5:00 PM ET
  - Solicitation details are available at [www.grants.gov](http://www.grants.gov) under solicitation number “W81XWH-20-PRMRP-TTDA.”
- The **Clinical Trial Award** (included in preannouncement) supports the implementation of clinical trials to evaluate products, pharmacologic agents, devices, clinical guidance and emerging approaches and technologies that may significantly impact one of the diseases listed under the FY 2020 PRMRP topic areas. The FY 2020 Clinical Trial Award has not yet been released.

- Preannouncement details are available at <https://cdmrp.army.mil/pubs/press/2020/20prmrppreann>.
- Note: Lewis-Burke will update this announcement upon release of the full FOA.

**Topic Areas:** (\* denotes new topics for FY 2020):

Arthritis	Inflammatory Bowel Diseases
Burn Pit Exposure	Interstitial Cystitis
Chronic Migraine and Post-Traumatic Headache	Metals Toxicology
Congenital Heart Disease	Mitochondrial Disease
Constrictive Bronchiolitis	Musculoskeletal Health
Diabetes	Myalgic Encephalomyelitis/Chronic Fatigue Syndrome*
Dystonia	Myotonic Dystrophy
Eating Disorders	Nutrition Optimization
Emerging Viral Diseases*	Pancreatitis
Endometriosis*	Pathogen-Inactivated Blood Products
Epidermolysis Bullosa	Plant-Based Vaccines*
Familial Hypercholesterolemia*	Polycystic Kidney Disease
Fibrous Dysplasia*	Pressure Ulcers
Focal Segmental Glomerulosclerosis	Pulmonary Fibrosis
Food Allergies	Resilience Training
Fragile X	Respiratory Health
Frontotemporal Degeneration	Rheumatoid Arthritis
Guillain-Barré Syndrome	Sleep Disorders and Restriction*
Hemorrhage Control	Spinal Muscular Atrophy
Hepatitis B	Sustained Release Drug Delivery*
Hydrocephalus	Vascular Malformations
Immunomonitoring of Intestinal Transplants	Women's Heart Disease

**Review Process:**

Although Congress decides which topic areas are funded, DOD program managers and Joint Program Committees (JPCs) retain authority in program directions and are influential in shaping the direction of CDMRP programs. CDMRP employs a rigorous two-tier review process: scientific, peer review and programmatic review. The programmatic review is intended to address the relevance of the proposed research to DOD's needs; therefore, it is important for both the pre-application and the full proposal to consider the topic area in relation to the mission of DOD and the "Areas of Encouragement" described in the appendix of each solicitation. Additional information about the two-tier review process is available at: <http://cdmrp.army.mil/about/2tierRevProcess>. Additionally, the members of the Programmatic Review Panel are available at <https://cdmrp.army.mil/prmrp/panels/panels20>.

*Sources and Additional Information:*

- The FY 2020 PRMRP funding opportunities can be found at <https://cdmrp.army.mil/funding/prmrp>.
- A reference table for the award mechanisms and submission requirements can be found at <https://cdmrp.army.mil/funding/pdf/20prmrpreftable.pdf>.
- Additional information on PRMRP is available at <https://cdmrp.army.mil/prmrp/default>.

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### **NSF Announces New Engineering Research Centers Solicitation**

The National Science Foundation's (NSF) Directorate for Engineering (ENG) has released a new solicitation to support ***Gen-4 Engineering Research Centers (ERC) – Convergent Research and Innovation through Inclusive Partnerships and Workforce Development***. This is the second Gen-4 ERC solicitation and includes enhanced emphasis on: convergence; societal impact; demonstrable integration of ERC foundational components (convergence, workforce, diversity and inclusion, and value creation); societal value creation; and opportunities for effective leadership, management, and infrastructure approaches. These areas of emphasis were also included in the previous ERC solicitation as recommended in the 2017 National Academies of Sciences, Engineering, and Medicine (NASEM) report, "A New Vision for Center-Based Engineering Research".<sup>[1]</sup>

The full ERC solicitation builds on the program's tradition of integrating engineering research and education with technological innovation to advance "national prosperity, health, and security." As for the previous Gen-4 ERC solicitation, this competition support ERCs with the potential for high **societal impact**. The solicitation highlights four foundational components of the ERC program: **Convergent Research, Engineering Workforce Development, Diversity and Culture of Inclusion, and the Innovation Ecosystem**.

ERCs aim to advance engineered systems that can only be achieved through a center-based approach. ERCs should be focused on outcomes that positively impact engineering communities and can impact engineering challenges more broadly as well as advancing state of the art research, science, engineering fundamentals, and research communities. "ERCs should build knowledge, prepare students and researchers that respect and flourish in an environment with diverse perspectives, impact how engineering research is conducted and provide value for society." NSF expects the ERCs will produce significant outcomes within the 10-year timeframe of the award and beyond.

To support the successful development of new Gen-4 ERC proposals, NSF has supported a number of ERC planning grants to assist in team formation and development of future ERC proposals. NSF has stated repeatedly that the ERC planning grants are separate from this solicitation; planning grants are not required to submit a proposal to the full ERC solicitation.

**Key elements of the ERC**, as stated in the solicitation and consistent with the previous Gen-4 ERC solicitation, are outlined below:

- **Strategic Plan** – should include the following:
  - **Convergence** – Research thrusts, testbeds, team formation, and other major aspects of the research plan should support a convergent approach.
  - **Stakeholder Engagement** – Plans should include all parties that contribute or may be affected by the ERC.
  - **Team Formation** – Teams should be interdependent, multidisciplinary, and diverse.

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<sup>[1]</sup> NASEM report "A New Vision for Center-Based Engineering Research:" <https://www.nap.edu/catalog/24767/a-new-vision-for-center-based-engineering-research>.

- **ERC Infrastructure:**
  - **Effective Leadership** – Leadership must have intellectual vision, demonstrable leadership, successful entrepreneurial experience, a track record of delivering results and ability to communicate. The center director should also be supported by an Executive Leadership Team.
  - **Organization and Management** – Requires understanding of ERC goals and structure/foundational components (Research, Engineering Workforce Development, Diversity and Culture of Inclusion, and Innovation Ecosystem) to support those goals.
  - **Administrative Director** – This role must be filled by an experienced staff member.
- **Partners:**
  - **Lead Institution** – The Lead Institution guides the ERC award.
  - **Core Partners** – To qualify as a core partner, institutions must have a minimum of three faculty and three students participate in the ERC; this institution must also be involved in the cost sharing requirement and the Council of Deans.
  - **Other Partners** – Partners may include affiliated faculty members, national laboratories, private-sector or non-profit organizations, educational partners, and/or foreign universities/institutions.
  - **Industrial/Practitioner Member** – Non-academic members may include federal/state/local governments, industry, industry associations, medical facilities, foundations, nonprofits, venture capitalists, and others.
  - **Affiliated Faculty Member** – Faculty at institutions outside the lead and core partner universities and are included in the budget.
  - **Institutional Commitment** – NSF states that “lead and all core partner institutions must augment support for the ERC through cost-sharing and other allowed means and sustain the ERC once NSF's support ceases.”
  - **Community Feedback** – Community input will help to continually monitor the health of the ERC.
  - **Advisory Boards** – Advisory Boards support and reinforce the ERC foundational components and must include the Council of Deans and Student Leadership Council.
  - **Student Leadership Council (SLC)** – The SLC will include graduate and undergraduate students from all partner institutions.
  - **Council of Deans** – This council will be led by the Dean of Engineering from the lead university along with Deans from the lead and core institutions.

**Due Dates:** Letters of Intent (LOI) are required and are due **September 2, 2020**. Preliminary proposals are required and are due **October 2, 2020**. Full proposals will be submitted by invitation only and are due **May 7, 2021**.

**Letters of Intent:** LOIs should include between one and five principal investigators (PI) and should list all anticipated core partners. The LOI should also list, in order of decreasing emphasis, “four keywords that represent the scientific interdisciplinary content in the proposal.”

**Preliminary Proposals:** Proposals must explicitly address the following questions:

1. “What are the compelling new ideas and the potential high societal impacts? Are they high-risk but high-payoff?”

2. How do the proposed centers research benchmarks against the state of the art?
3. Why is an ERC necessary to tackle the idea?
4. How will the ERC's infrastructure integrate and implement CR, EWD, DCI, and an IE to achieve its vision and create societal impact, impact on the scientific enterprise, and impact on the engineering community?
5. What is the proposed management structure for the ERC and how will it foster team-formation and convergent research, as well as an integrated approach for items 1-3 above?
6. What are the proposed strategies for engaging and developing the appropriate stakeholder community?
7. How will all ERC participants engage in a unique experience that would otherwise not be available?"

**Total Funding and Award Size:** NSF anticipates awarding up to five new ERCs with up to \$17.5 million in fiscal year (FY) 2022, pending funding availability, to support the first year of the new centers. The breakout of funding in subsequent years for each center is as follows:

- Year one: up to \$3.5 million
- Year two: up to \$4.5 million
- Year three through five: up to \$6.0 million
- Years six through eight (pending performance and renewal reviews): up to \$6.0 million
- Years nine and ten: would be phased down, with \$4 million in year nine and \$2.6 million in year 10.

**Eligibility and Limitations:** Only U.S. universities with undergraduate, masters, and doctoral engineering programs can submit proposals as the lead university. There is no limit specified for the number of preliminary proposals from one institution.

**PI Eligibility and Limitations:** The Lead PI must be a tenured faculty member at the lead university. There are no restrictions on the number of proposals per PI or Co-PI. The Lead PI and ERC Director can be different people but must be from the same institution.

**Organizational Requirements:** Full proposals (by invitation only), must include:

- Multiple institutions, including a lead university and additional U.S. university core partners.
- The core partner must include at least three faculty and three students participating in the ERC.
- At least one of the universities in the ERC team must be a university "that serves populations of traditionally underrepresented students interested in STEM (defined as minority serving institutions, women's colleges, or institutions where the majority of the students are students with disabilities)."
- Commitments from lead and core partner universities for cost sharing must be in place.

*Sources and Additional Information:*

- The full ERC solicitation is available at <https://www.nsf.gov/pubs/2020/nsf20553/nsf20553.htm>.
- The NSF ERC web page is available at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505599](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505599).
- Information on previously supported ERCs is available at <http://erc-assoc.org/>.

- The NASEM report “A New Vision for Center-Based Engineering Research” is available at <https://www.nap.edu/catalog/24767/a-new-vision-for-center-based-engineering-research>.
- Information on the NSF Growing Convergence Research Big Idea is available at [https://www.nsf.gov/news/special\\_reports/big\\_ideas/convergent.jsp](https://www.nsf.gov/news/special_reports/big_ideas/convergent.jsp).
- Information on the ERC Planning Grants is available at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505530](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505530).

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### **NSF Releases Future Manufacturing Solicitation**

The National Science Foundation (NSF) has released a new cross-agency solicitation titled, Future Manufacturing (FM). Advanced Manufacturing is a priority under the Trump Administration’s *Industries of the Future*<sup>[1]</sup> thrust and one of the top focus areas included in the NSF budget request for fiscal year (FY) 2021. The goal of this solicitation is to support research and education to enable future manufacturing opportunities and technologies that do not currently exist or that are not possible at scale.

The FM solicitation states that advances in manufacturing will be based on new “materials, chemicals, devices, systems, processes, machines, design and work methods, social structures and business practices.” The solicitation also highlights the need for fundamental research in robotics, artificial intelligence, biotechnology, materials science, sustainability, education and public policy, and workforce development. Proposals should lead to transformational developments in manufacturing; incremental improvements in current manufacturing will not be supported through this solicitation.

Led by the Engineering Directorate, the new opportunity includes the Directorates for Computer and Information Science and Engineering; Biological Sciences; Mathematical and Physical Sciences; Education and Human Resources; Social, Behavioral and Economic Sciences and the Offices for International Science and Engineering; and Integrative Activities. The initial FM solicitation will include three thrust areas; proposals must support fundamental research in at least one of these areas:

- Future Cyber Manufacturing Research
- Future Eco Manufacturing Research
- Future Biomanufacturing Research

FM will support interdisciplinary teams that demonstrate a convergence approach. Proposals must include an Education and Workforce Development Plan and are encouraged to build on other NSF funding opportunities for workforce development. Teams that include minority serving institutions are especially encouraged.

FM will support a range of award mechanisms:

- **Future Manufacturing Research Grants (FMRG):** To support fundamental, multidisciplinary, and integrative research and education projects.
  - Type I: \$500,000 to \$750,000 per year for up to five years
  - Type II: \$750,000 to \$2 million per year for up to five years

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<sup>[1]</sup> <https://www.whitehouse.gov/briefings-statements/president-trumps-fy-2021-budget-commits-double-investments-key-industries-future/>



- **Future Manufacturing Seed Grants (FMSG):** To support teambuilding, the development of fundamental research concepts, and the initiation of research and educational activities that could provide the basis for future FMRG proposals. Awards will be funded up to \$250,000 per year for up to two years. Partnership with industry and two-year institutions are encouraged.
- **Future Manufacturing Networks (FMNet):** To support the establishment of a network of interdisciplinary researchers, educators and stakeholders in one or more of the three thrust areas. FMNet will be funded up to \$500,000 per year for up to five years.

**Due Date:** Letters of intent are due by **April 10, 2020**. Full proposals are due by **June 5, 2020**.

**Eligibility:** There is no limit on the number of proposals per organization. However, individuals may only be designated as PI or Co-PI, on one proposal in each track.

**Total Funding and Award Size:** NSF anticipates between \$40 million total funding for FM in FY 2020 to support around 20 awards. This includes (approximately):

- Five Type I FMRGs
- Two Type II FMRGs
- Ten FMSGs
- Three FMNet

*Sources and Additional Information:*

- The full solicitation is available at <https://www.nsf.gov/pubs/2020/nsf20552/nsf20552.htm>.
- The program page for Future Manufacturing is available at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505737](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737).
- Information on Convergence Research at NSF available at <https://www.nsf.gov/od/oia/convergence/index.jsp>.
- The National Science Board report on The Skilled Technical Workforce is available at <https://www.nsf.gov/nsb/publications/2019/nsb201923.pdf>.

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### **Future Funding Opportunity: NASA STEM Establishes Lunar Surface Innovation Consortium**

On February 28, the National Aeronautics and Space Administration (NASA) Space Technology Mission Directorate (STMD) publicly unveiled its newly established Lunar Surface Innovation Consortium (LSIC). LSIC will effectively operationalize STMD's Lunar Surface Innovation Initiative (LSII) by fostering collaboration between NASA and its academic and private sector partners in a variety of technology areas focused on human exploration of cislunar space and the lunar surface. LSII represents the technology-focused component of the agency-wide Artemis program, which seeks to return humans to the Moon by 2024 and then lay the foundation for a sustained human presence there by 2028.

LSIC will be managed by the Johns Hopkins University Applied Physics Laboratory (JHU-APL), though funding will be available for consortium members to perform focused technology development activities through the Lunar Surface Technology Research (LuSTR) Opportunity. NASA has yet to publicly release any LuSTR solicitations, but Lewis-Burke has learned that, contingent upon appropriations, STMD intends to allocate up to \$30 million to support individual awards ranging in size between \$1 million and

\$2 million. Initial efforts will likely have two-year performance periods, but it is anticipated that continuation funding will be available for promising projects. Research and development will focus on sustainable power, lunar dust mitigation, in-situ resource utilization, and surface excavation and construction among several other lunar exploration-focused technology areas.

Under LSIC's management structure, JHU-APL will be responsible for project oversight and assistance on ancillary issues such as payload integration, allowing LuSTR award recipients to focus entirely on technology development. This arrangement represents NASA's response to congressional appropriations language encouraging the agency to expand its partnerships with academia under the University Affiliated Research Center (UARC) contract mechanism. By employing this model, which is commonly used by the Department of Defense to tackle engineering challenges not easily executed by the government, NASA intends to rapidly mature technologies that will be required for the agency to adhere to the ambitious Artemis timeline.

**Next Steps:** Organizations interested in joining LSIC should complete the survey that was launched following the kick-off event on February 28. Respondents will have an opportunity to specify their interest areas and desired level of involvement. The survey is available at <http://lsic.jhuapl.edu/Events/survey.php>.

*Sources and Additional Information:*

- Information about the LSIC kick-off meeting, including recorded remarks from NASA Associate Administrator Steve Jurczyk, is available at <http://lsic.jhuapl.edu/>.
- An overview of LSII is available at [https://www.nasa.gov/directorates/spacetech/Lunar\\_Surface\\_Innovation\\_Initiative](https://www.nasa.gov/directorates/spacetech/Lunar_Surface_Innovation_Initiative).

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### **DOE Applied Energy Research and Funding Initiatives**

The Department of Energy's (DOE) are making major investments in new research initiatives. These research initiatives are focused on meeting DOE missions such as grid modernization, materials for harsh environments, and finding alternatives to critical materials for energy technologies. The analysis linked below provides advance intelligence on future funding and research priorities for each major research initiative across the applied energy offices.

*Sources and Additional Information:*

- Lewis-Burke's analysis of the Department of Energy applied energy research and funding initiatives is available at [https://www.lewis-burke.com/sites/default/files/agency\\_update\\_-\\_outlook\\_on\\_major\\_department\\_of\\_energy\\_applied\\_energy\\_research\\_and\\_funding\\_initiatives.pdf](https://www.lewis-burke.com/sites/default/files/agency_update_-_outlook_on_major_department_of_energy_applied_energy_research_and_funding_initiatives.pdf).

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### **DOE Office of Science Research and Funding Initiatives**

The Department of Energy (DOE) Office of Science is making major investments in new research initiatives. Some of these research initiatives are tied to the Trump Administration's research and development priorities in the Industries of the Future, such as Artificial Intelligence and Quantum

Information Science, while others are unique to meeting DOE missions, such as critical materials for energy applications and revolutionizing polymer upcycling. The analysis linked below provides advance intelligence on future funding and research priorities for each major research initiative in the Office of Science.

*Sources and Additional Information:*

- Lewis-Burke's analysis of the Department of Energy Office of Science Research and Funding Initiatives is available at [https://www.lewis-burke.com/sites/default/files/agency\\_update\\_-\\_outlook\\_on\\_major\\_department\\_of\\_energy\\_research\\_and\\_funding\\_initiatives.pdf](https://www.lewis-burke.com/sites/default/files/agency_update_-_outlook_on_major_department_of_energy_research_and_funding_initiatives.pdf).

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## **Congressional Updates**

### **Senate Commerce Committee Examines Federal Actions to Support the Emerging Bioeconomy**

The federal government needs a coordinated approach to ensure U.S. leadership in new technologies that underpin the emerging bioeconomy, according to witnesses at a March 3 hearing held by the Senate Commerce, Science, and Transportation Subcommittee on Science, Oceans, Fisheries, and Weather. The hearing, entitled “Securing U.S. Leadership in the Bioeconomy,” faced sparse attendance by committee members due to ongoing Senate hearings on the coronavirus. Still, the hearing provided insights on Congress’ thinking around the emerging biotechnology sector. The panel heard testimony from four witnesses:

- Dr. Timothy Donohue, Director of the Great Lakes Bioenergy Research Center at the University of Wisconsin-Madison
- Mr. Jason Gammack, Chief Commercial Officer, Inscripta Inc.
- Dr. Jason Kelly, Co-Founder and Chief Executive Officer, Ginkgo Bioworks
- Dr. Megan Palmer, Senior Research Scholar, Center for International Security and Cooperation, Stanford University

During the hearing, Mr. Jason Gammack and Dr. Jason Kelly spoke to the wide variety of applications that new biotechnologies may have in sectors such as pharmaceuticals, food & agriculture, energy, health technologies, textiles, and many others. They noted that new biotechnologies would not only improve these sectors and make them much more sustainable, but would create new entirely new industries as well. Dr. Kelly used the example of engineering microbes for certain crops to lessen the need for synthetic fertilizers as an example of this transformative impact. Dr. Megan Palmer discussed how the government needs to support interdisciplinary research and other holistic efforts to help the industries leading the bioeconomy to better understand social and security implications of these technologies and to anticipate future policy and regulatory needs. Dr. Donohue spoke about his work in advancing research on new forms of bioenergy and biofuels, and how federal funding for basic research has been and will be critical in furthering these efforts across the bioeconomy.

Subcommittee Chairman Cory Gardner (R-CO) expressed excitement about the potential opportunities this emerging sector would bring, and asked the witnesses if additional funding for the National Science Foundation (NSF) to support biotechnology would benefit the bioeconomy. He also discussed the need for the U.S. to lead and set the standards for the ethical and responsible use of biotechnologies, especially in light of reporting on some of China’s [problematic](#) uses of DNA to track citizens. In response to questions from Senator Gardner, the panel unanimously expressed that there needs to be high-level interagency coordination, with Mr. Gammack noting the fact that each agency has its own interest in this sector and that no federal body has been coordinating efforts pertaining to biotechnology across the government. Dr. Palmer also spoke to the need to ensure that the science agencies and the national security community are coordinating in order to anticipate future issues that may stem from advances in biotechnology. She and the other witnesses expressed interest in the House’s *Engineering Biology Research and Development Act of 2019* ([H.R. 4373](#)), which would direct the White House Office of Science and Technology Policy (OSTP) to implement an interagency National Engineering Biology Research and Development Initiative, and direct NSF and other agencies to carry out specific activities

under this initiative. The House passed this bill on December 9, 2019, before it was received by the Senate Commerce, Science, and Transportation Committee for its consideration.

Subcommittee Ranking Member Tammy Baldwin (D-WI) asked how new biotechnologies could improve the economic resiliency of rural and manufacturing communities. The witnesses noted new industries under the bioeconomy would need to be well connected to existing sectors (such as the food, agriculture, and manufacturing industries), and stated that the bioeconomy would bring new opportunities to the Midwest and other regions beyond the coasts where these industries are prevalent. Senator Baldwin also discussed what federal efforts would be needed to develop a skilled workforce for the bioeconomy, as recommended in the National Academies of Sciences' report, "Safeguarding the Bioeconomy." Dr. Palmer spoke on the need to further support K-12 STEM education and to conduct outreach in order to build interest in and support for biotechnology across all U.S. communities. Dr. Kelly also noted that not every worker in the bioeconomy's workforce will need a PhD, but in many cases the federal government can support the retraining of workers in sectors that experience in shifts from new technologies.

Congress and the federal government have become increasingly interested in biotechnology, as one of the "Industries of the Future." It is expected that Congress may look at additional legislation and policies to address potential threats and opportunities stemming from these new technologies.

*Sources and Additional information:*

- A video of the hearing and written testimony from the witnesses can be found at <https://www.commerce.senate.gov/2020/3/securing-u-s-leadership-in-the-bioeconomy>.
- The National Academies of Sciences' report "Safeguarding the Bioeconomy" can be found at <https://www.commerce.senate.gov/2020/3/securing-u-s-leadership-in-the-bioeconomy>.

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