

Research Development & Grant Writing News

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By [Katherine E. Kelly](#), PhD

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[Mike Cronan](#) & [Lucy Deckard](#), co-Publishers

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About the co-publishers

[Mike Cronan, PE](#) (Texas 063512, inactive) has 23 years of experience developing and writing successful team proposals at Texas A&M University. He was named a **[Texas A&M University System Regents Fellow](#)** (2001-2010) for developing and writing A&M System-wide grants funded at over \$100 million by NSF and other funding agencies. He developed and directed two research development and grant writing offices, one for Texas A&M's VPR and the other for the Texas Engineering Experiment Station (15 research divisions state-wide).

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[Katherine E. Kelly](#), Ph.D., is a retired English professor from Texas A&M University. She is the author of several books and numerous articles and served as a contributing editor for an academic journal for five years. She provides **editorial services** to **[RD&GW News](#)** and to **[ARFS](#)** clients on proposals, journal articles, and manuscripts.

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Topics of Interest URLs

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Interdisciplinarity Makes for Strange Bedfellows

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By Mike Cronan, co-publisher

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As Trinculo, the court jester in Shakespeare's *The Tempest*, famously noted, "*Misery acquaints a man with strange bedfellows.*" This idiom then entered the political vernacular in the 1870's as "*politics makes for strange bedfellows.*" Today this idiom might be rephrased as "*interdisciplinarity makes for strange bedfellows,*" particularly as it relates to team building for research grants. An interdisciplinary team pushes the partnership boundaries in order to better address increasingly complex scientific and technical challenges. Most importantly, it reflects an aspect of potential disciplinary configurations on research grants that is too often given short shrift, if not neglected altogether, mostly out of inexperience, in building a truly integrated team structure and writing a research narrative that reflects it.

In some cases, interdisciplinarity may simply mean a research partnership, for example, among civil, electrical, and transportation engineers working in one area related to smart and sustainable cities. In other cases, it may amount to a partnership of researchers from computer science, operations research, and electrical engineering addressing some aspect of Big Data related to the smart grid or other infrastructures. While fitting the definition of interdisciplinarity, these examples do not push the boundaries of the term much beyond traditional research partnerships.

The boundaries are pushed by interdisciplinarity when the research objectives are sufficiently complex to introduce the "Star Trek Effect" into the team-building process through agency research goals analogous to "Exploring strange new worlds... Seek out new life; new civilizations... Boldly go where no one has gone before!" In practice, this means that there are an increasing number of funding opportunities for faculty that require establishing a new team specifically for the solicitation, something quite different from the traditional "gold standard" advice that success on team proposals requires a history of funding success as a team, as well as a history of joint publications and presentations.

While this gold standard may hold in many situations and may represent an ideal, an increasing number of solicitations, mostly for research, but a few in education as well, e.g., [NSF INCLUDES](#), can make the assembled applicant team look like it came straight out of the Star Wars Cantina, a well known hangout for a diverse clientele of alien races from across the universe seeking "entrepreneurial" partnerships among freight pilots like Han Solo. Admittedly, a research team comprised of engineers and computational scientists assembled to address Big Data analytics related to smart grid performance that requires adding an economist to the team to evaluate models for monetizing aspects of data use, storage and formatting is not as over the top as the Cantina, but for historically siloed disciplines interdisciplinarity, whose "life blood" is teaming, can still be a challenge.

Of course, individual researchers linked together on one of the increasing number of proposals that push their individual boundaries don't inherently resist teaming—after all, everyone understands the goal is to be funded and whatever is required to that end will be done. The issue, however, is one of unfamiliarity among a diverse set of team members of what each contributes to the others research, and what the others' research contributes to

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theirs. This issue is too often sidestepped and insufficiently addressed in the research narrative, and there is seldom a process put in place to address it.

Instead, a default procedure emerges by which a team of several coPIs, each responsible for writing a section of narrative specific to their discipline, **trust, but do not sufficiently understand, the research expertise of other team members**. Considering the Big Data example above, it would be typical that team members from computer science and electrical engineering who collect, format, analyze, and store petabytes of real-time sensor data related to grid operations as open source for use by others, would have very little understanding that the economist's contribution to the project would be to monetize the process to sustain it.

The fundamental problem here is that if the team is insufficiently knowledgeable about how the interdisciplinary nature of the team coalesces to significantly enhance the proposed research, then this awareness can't be written convincingly into the research narrative. That is, interdisciplinarity cannot be viewed as merely a collection of the necessary disciplines needed to address the research goals; rather, it must enable the team's ability to move from disciplinary silos to disciplinary synthesis and synergy.

In too many cases, ***disciplinary silos are the common default condition in the research narrative***. The necessary disciplinary synthesis and synergy must be planned and worked for **as a team** throughout the proposal development process. This is an area where research offices assisting faculty in proposal development can give an early heads up to faculty teams about the often **hidden challenges of interdisciplinarity**, both in the planning and outlining stages of narrative development and as narrative drafts of the proposals go through a process of multiple iteration. Otherwise, a project description may do a very good job of addressing the discrete research topic areas (i.e., research strands or thrusts) of the participating PIs while ***lacking an explanation of how the interaction among component research elements enables the core research goals***.

Interdisciplinarity imposes new and challenging conditions on writing a successful research narrative, and none are more challenging than having a ***narrative integration plan*** in place for describing a more novel configuration of researchers. In practice, it is most often the case that proposals submitted in response to funding solicitations that push the boundaries of interdisciplinarity end up having a core number of team members that address the basic research goals, but to be fully responsive to the solicitation requires the addition of one or more team members in disciplines unrelated to but in some way enabling of the core research objectives.

For example, interdisciplinarity on NSF proposals has increased the number of disciplinary participants coming from distinct directorates, including the Social and Economic Sciences. While these disciplines are not necessarily "strange bedfellows" in the tradition sense of the idiom, there can be significant disciplinary isolation between, say, a computer scientist and an electrical engineer, who may then add an economist to the mix to monetize some aspect of Big Data or smart grids or smart cities, etc. None of these participants may fully understand any of the others' contributions. Or, it may be that researchers from both a department of economics and a department of communications are needed on an engineering project researching new models for operational optimization at the intersection of water, energy, and food production.

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Examples such as these, and numerous others, are abounding as funding agencies increasingly address complex research topics of significant societal impact, thereby requiring the integration into the team of even less familiar researchers from outside the traditional technical disciplines than might otherwise respond to a particular solicitation. ***Research narratives have always required integration to be successful; but achieving that integration is now becoming more difficult.***

Fortunately, integration in the research narrative has some fairly simple solutions unlike in mathematics, where difficult integration problems require other techniques such as integration by parts to solve.. Early on in the proposal development process, team members need to discuss their own role in the project and their perception of the other team members' roles. That is, they must answer the key question, "***Why are we a team?***" Getting that answer right is **key to getting funded**. Reviewers and program officers alike will judge your proposal on how well you answer that question. Remember that team proposals are most often about research interactions and research intersections among multiple disciplines configured to achieve novel benefits through disciplinary synergy.

Bottom line: how well you answer the core question, "***Why are we a team?***" has always been key to funding success. But now, interdisciplinarity requires casting a larger net to capture a research partnership fully able to address a more complex research challenge. In this case, or in the above example, the key is that the electrical engineer and the economist, or the computer scientist and the communications researcher, or all four of them, need to answer the "***Why are we a team?***" question **as a team**. If they don't, the research narrative will lapse to the default position of assuming, without discussion, that success will be achieved if each researcher demonstrates his or her research expertise in a specific topic area. **But it will not**—a siloed collection of research expertise by narrative section is no substitute for an integrated and, hence, synergistic project description.

National Microbiome Funding 2016/2017

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By Mike Cronan, co-publisher

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The recently released (May 2016) 22-page [Fact Sheet: Announcing the National Microbiome Initiative](#) (NMI) by the White House Office of Science and Technology Policy and the 34-page companion document [Report of the Fast-Track Action Committee on Mapping the Microbiome](#) offer excellent strategic planning documents for research offices that support faculty from numerous disciplines in long-term planning for proposal development. The NMI will launch with more than **\$121 million** of strategic investments from Federal agencies into interdisciplinary, multi-ecosystem microbiome research and tools development. This investment is based on funds appropriated in FY 2016 and proposed in the President's FY 2017 Budget.

Moreover, coinciding with the release of the Fact Sheet, NSF issued a [Dear Colleague Letter](#): Supporting Research Advances in Microbiomes in which the Directorate for Biological Sciences announces its "vision to support and encourage microbiome research across the phylogenetic spectrum and biological scales; from host - microbe interactions to ecosystems. NSF BIO will also foster the development of a national research infrastructure to support collaborative science on microbiomes." This May DCL followed the earlier March [Dear Colleague Letter](#): NSF-USDA Joint Funding Opportunity - Early Concept Grants for Exploratory Research (EAGERS) to Develop and Enable Breakthrough Technologies for Animal and Plant Phenomics and Microbiomes.

In terms of research strategic planning, NMI funding offers opportunities across colleges and disciplines including agriculture, science, engineering, medicine, geosciences, wildlife and fisheries, life sciences, computational sciences, and oceanography, among numerous others.

Importantly, this federal funding will be complemented by foundation funding for NMI research over the coming years. For example, The *Bill and Melinda Gates Foundation* will invest \$100 million over the next 4 years in human nutrition and crop protection. As noted by the Foundation, "These studies aim to translate knowledge generated in animal models about the importance of the microbiome in determining host nutritional and immune status. This investment will also support projects examining how components of the soil microbiome can be used to mitigate critical pests and diseases that affect crops grown in sub-Saharan Africa."

The NMI plan envisions scientists and engineers teaming up to answer fundamental questions about the microbiome – the billions of microorganisms that live on and in us, our homes, our food, and our planet. Questions such as, "What is a healthy microbiome?" and "How can we manage microbiomes to keep them resilient?" are applicable to microbiomes in habitats as diverse as oceans, soil, and the human body. As the Plan notes, "The basic principles common to all microbiomes are ***more likely to emerge from interdisciplinary teams*** that draw on a variety of expertise rather than a single scientist with knowledge of only one field." ***This is a key point to note when research offices work with faculty on strategic funding plans that serve to position interdisciplinary teams of faculty from multiple disciplines for NMI funding.***

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As noted in the NMI documents, “Microbiomes are the communities of microorganisms that live on or in people, plants, soil, oceans, and the atmosphere. Microbiomes maintain healthy function of these diverse ecosystems, influencing human health, climate change, food security, and other factors. Dysfunctional microbiomes are associated with issues including human chronic diseases such as obesity, diabetes, and asthma; local ecological disruptions such as the hypoxic zone in the Gulf of Mexico; **and reductions in agricultural productivity**. Numerous industrial processes such as **biofuel production and food processing depend on healthy microbial communities**. Although new technologies have enabled discoveries about the importance of microbiomes, **scientists still lack the knowledge and tools to manage microbiomes in a manner that prevents dysfunction or restores healthy function.**”

As noted in these reports, “There is no part of the human experience untouched by microorganisms. Microbiome science has the potential to revolutionize healthcare, agriculture, biomanufacturing, environmental management, and even building design and construction. Today, institutions across the country are making commitments to advance interdisciplinary microbiome research through new collaborative research endeavors, new research and therapeutic centers, grant opportunities that elucidate basic knowledge of microbiomes.”

Given the above, the NMI aims to “advance understanding of microbiome behavior and enable protection and restoration of healthy microbiome function by converging on three recommended areas of focus for microbiome science, which are **now the goals of the NMI**:

- 1) **Supporting interdisciplinary research** to answer fundamental questions about microbiomes in diverse ecosystems.
- 2) **Developing platform technologies** that will generate insights and help share knowledge of microbiomes in diverse ecosystems and enhance access to microbiome data.
- 3) **Expanding the microbiome workforce** through citizen science, public engagement, and educational opportunities. “

As the reports note, “the Federal Government has been investing in microbiome for many years. More than a dozen Federal departments and agencies support microbiome research today, and the magnitude of investment has recently grown: a 2015 [report](#) released by the National Science and Technology Council noted that annual Federal investment into microbiome research tripled over FY 2012–2014, with more than **\$922 million invested** during this 3-year period.”

As noted, the NMI will launch with more than **\$121 million** of strategic investments from Federal agencies into interdisciplinary, multi-ecosystem microbiome research and tools development. ***This investment is based on funds appropriated in FY 2016 and proposed in the President’s FY 2017 Budget***, as illustrated in below examples of NMI funding allocations given in the reports. For research offices, ***this is key information that can be used to help faculty better define the funding landscape for NMI research over the coming few years, help them better plan competitive interdisciplinary NMI teams, and help them better prepare, plan, develop, and write NMI-related research proposals as funding solicitations are posted.*** Most faculty do not have the time to sift through these two reports, a combined 56 pages, but a distilled abbreviation of the most important information, as given below, provides them with essentials for research strategic planning purposes:

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“The **DOE Office of Science** proposes **\$10 million** in new funding in **FY 2017** to support collaborative, interdisciplinary research on the microbiome. Research will focus on both experimental systems and new computational tools to generate predictive models of microbiomes. Priorities for funding ***new computational tools to generate predictive models of microbiomes*** will include **partnerships** among DOE national labs, academia, and field research facilities (such as those supported by USDA) and projects in mission-relevant environments, such as biomass-focused agricultural systems and terrestrial ecosystems vulnerable to climate change.

The **National Aeronautics and Space Administration** proposes **\$12.5 million** in new funding over multiple years to expand microbiome research across earth’s ecosystems and in space. This includes \$2.5 million for the Human Exploration Research Analog study, scheduled to begin in January 2017. NASA is also investing \$10 million in FY 2016 funding in the Ocean Worlds program, to support the development of life-detection technologies to search for microbiomes on other planetary bodies in our solar system.

In addition to its normal review and support of microbiome-related applications, **NIH will invest an extra \$20 million in grants in FY 2016 and FY 2017** with a particular emphasis on multi-ecosystem comparison studies and investigation into the design of new tools to explore and understand microbiomes. The microbiome sequence and other genomic data produced in these projects will be deposited in publicly available NIH repositories or other appropriate public repositories.

In FY 2017, **NIST** is devoting **\$1 million** to improve the reliability and reproducibility of microbiome measurements, and engineer and model microbial ecosystems *in vitro*. This investment will support the development of microbiome standards and reference materials, and of *in vitro* tools that allow complex microbial communities to be reproducibly engineered, measured, and modeled. Such resources will facilitate the translation of microbiome discoveries into useful applications in precision medicine, agriculture, and the environment.

The **NSF Biological Sciences Directorate** proposes **\$16 million in FY 2017** for microbiome research that spans the spectrum of ecosystems, species, and biological scales. This funding will be directed at interactions between microbes in the microbiomes (the inter-microbiome relationships), and also among the microbiomes of biological hosts. These studies will advance the discovery of fundamental principles and research tools that transcend habitats.

The **NSF-NIFA Plant Biotic Interactions Program (PBI)** includes **\$8.5 million in FY 2017 funding from NSF, and \$6 million in FY 2016 funding from NIFA, for a joint agency funding of \$14.5 million for proposals reviewed in FY 2016**. PBI supports research on processes that mediate beneficial and antagonistic interactions between plants and their viral, bacterial, oomycete, fungal, plant, and invertebrate symbionts, pathogens, and pests. This **joint NSF-NIFA** program supports projects focused in current and emerging model and non-model systems and agriculturally relevant plants.

USDA-ARS continues to invest substantially in animal, plant, soil, and human microbiome research efforts, with an estimated total investment of **\$16.9 million by the end of FY 2016**. **USDA-ARS has proposed over \$15.9 million for FY 2017** to expand computational capacities for microbiome research and human microbiome research. This includes the development of SCINet, a new high-speed, high-capacity research network to support

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computationally intensive analyses of plant, animal, and soil microbiome DNA sequence data at USDA-ARS. In addition, **ARS** and **DOE** scientists are working together to develop KBase, an open platform for comparative genome analysis for agriculturally relevant plants and microbes. And on the human side, ARS will use a computer-controlled artificial intestine to study the effects of foods and their isolated constituents on the microbiomes and the metabolites produced by the bacteria.

USDA-NIFA has proposed to invest approximately **\$8 million in new funding in the FY 2017** budget to support investigations of the microbiomes of plants, livestock animals, fish, soil, air, and water as they influence food production systems. The agency will also support studies on the role of the microbiome in the occurrence and management of antimicrobial resistance from farm to table, and the impact of climate on the microbiomes in agricultural production systems.” Earlier this year, **USDA-NIFA** and **NSF BIO** established a joint funding opportunity, with **\$3 million from each agency (for a total of \$6 million)** to support the development of transformative plant and animal Phenomics and microbiome technologies.

Finally, as noted in the [NSF DCL](#), “NSF BIO encourages proposals that advance discovery in the realm of microbiomes with support through ***several programs in fiscal year 2017***. These programs cross the entire BIO Directorate and span basic science through translational research that addresses pressing global challenges and support the development of tools needed for the 21st century.

Development of tools and infrastructure to enable new areas of microbiome research will be supported through programs such as the Enabling Discovery through **GE**nomics tools (EDGE) in the Division of Integrative Organismal Systems (IOS). ***The first EDGE awards will be made in FY2017 and encourage the development of tools that can impact broad communities of investigators.*** Projects of interest could include but are not limited to: elucidating fundamental principles by studying multiple microbiomes and across different ecosystems, and the development of computational and modeling tools for studying microbiomes.

Research proposals in plant - microbe symbiosis and the phytobiomes are being encouraged for support through the new Plant Biotic Interactions (PBI) program ***jointly supported by NSF BIO and the USDA National Institute for Food and Agriculture***. The first awards in this program will also ***be made in FY2017***. The scope of the PBI program extends from fundamental mechanisms in model systems to translational efforts that advance agriculture. Exploratory projects that enable the development of [breakthrough technologies for animal and plant Phenomics and microbiomes](#) are being supported through the EAGER mechanism in collaboration with USDA/NIFA, with awards expected in late FY2016.

The Symbiosis, Defense and Self-recognition (SDS) program in ***IOS supports research in animal - microbe interactions and animal microbiomes as well as symbiotic interactions among microbial communities***. SDS also supports research on the virome and animal health and the origins of emerging infectious diseases, an area identified of underinvestment by the FTAC-MM.

Within the Division of Environmental Biology (DEB) all four program clusters (Population and Community Ecology, Evolutionary Processes, Systematics and Biodiversity Science, and Ecosystem Science) support microbiome-related research, in addition to two special programs: Dimensions of Biodiversity and Ecology and Evolution of Infectious Disease.

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Within the Division of Biological Infrastructure (DBI), the Advances in Biological Informatics (ABI) program supports the ***development of robust cyberinfrastructure and informatics tools to support the large data analyses as these relate to microbiome research.*** In the Division of Molecular and Cellular Biosciences (MCB), the Systems and Synthetic Biology Cluster support the application of quantitative and interdisciplinary tools to the study of microbial communities and the microbiome.”

IES Basic Grants Webinar Report

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By Lucy Deckard, co-publisher

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The [Institute of Education Sciences \(IES\)](#), the part of the Department of Education that funds basic research, has recently announced FY 2017 funding opportunities (proposals due in 2016). IES presented a webinar entitled “Basic Overview of Funding Opportunities at the Institute of Education Sciences” on May 26th. Below we discuss the highlights of the webinar. At the time of this writing, it appears that IES hasn’t yet posted the webinar slides, so we have posted them [here](#).

The webinar covered funding opportunities supported by two parts of IES: the [National Center for Education Research \(NCER\)](#), which supports research on education from early childhood to adult, and the [National Center for Special Education Research \(NCSEER\)](#), which supports research on special education from birth through high school for children with disabilities. Each center runs its own grant programs, which we list separately below.

NCER Funding Opportunities

New Requests for Applications (RFAs) for NCER programs are listed below, along with changes from last year:

- [Education Research Grants \(84.305A\)](#) – this is NCER’s primary grant program.
 - You apply to a specific research topic (field) and research goal (type of work) as specified in the RFA. Your program officer will be determined based on which of the [12 available topics](#) you pick.
 - Letters of intent were due May 5, 2016 but if you missed that deadline talk to your Program Officer. Applications are due August 4, 2016.
 - **New:** Special topics this year are: 1) Arts in Education, 2) Career and Technical Education, and 3) Systematic Approaches to Educating Highly Mobile Students
 - **New:** The Development and Innovation goal is being competed this round.
 - **New:** The former Improving Education Systems topic has been split into 1) Improving Education Systems and 2) Education Leadership.
 - **New:** You have the option of using [SciENCv](#) to create biosketches.
- [Research Training Programs in the Education Sciences \(84.305B\)](#) – this RFA supports training to increase the supply of scientists and researchers in education. The FY 2017 RFA supports three topics:
 - [Pathways to the Education Sciences Research Training](#)
 - [Postdoctoral Research Training Program](#)
 - [Methods Training for Education Researchers](#)
 - Letters of Intent were due May 19, 2016 (talk to your program officer if you missed that deadline), and applications are due August 4, 2016.
- [Low-Cost, Short-Duration Evaluations \(84.305L\)](#) – Funds evaluations that rely on administrative data or other sources of secondary data. Funds can be used only for evaluation, not implementation of an intervention. [Related links and info here](#).

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- Letters of Intent were due May 19, 2016 but if you missed that deadline talk to your Program Officer. The application is due August 4, 2016.
- [Statistical & Research Methodology in Education \(84.305D\)](#)
 - The FY 2017 RFA is supporting two topics: 1) Regular Grants and 2) Early Career grants (for researchers who completed their doctorates within the last 5 years). [For more info and links go here](#).
 - Letters of intent were due May 5, 2016 but if you missed that deadline talk to your Program Officer. Applications are due August 4, 2016.
- [Partnerships & Collaborations Focused on Problems of Practice & Policy \(84.305H\)](#) – Research activities are carried out by a partnership composed of a minimum of a research institution and a state or local education agency. The FY 2017 RFA is supporting two topics:
 - [Researcher-Practitioner Partnerships in Education Research](#)
 - [Evaluation of State and Local Education Programs and Policies](#)
 - Letters of Intent were due May 19, 2016 but if you missed that deadline talk to your Program Officer. The application is due August 4, 2016.
- [Research Networks Focused on Critical Problems of Education Policy and Practice \(84.305N\)](#) – Focuses on high priority education problems to create a structure and process for researchers to share ideas, build new knowledge, and strengthen research and dissemination capacity. The 2015 RFA supports two topics:
 - [Exploring Science Teaching in Elementary School Classrooms](#)
 - [Scalable Strategies to Support College Completion](#)
 - Letters of Intent were due May 19, 2016 but if you missed that deadline talk to your Program Officer. The application is due August 4, 2016.

NCSER Funding Opportunities

New Requests for Applications for NCSER programs are listed below, along with changes from last year:

- [Special Education Research Grants \(84.324B\)](#) – This is NCER’s primary grant program.
 - You apply to a specific research topic (field) and research goal (type of work) as specified in the RFA. Your program officer will be determined based on which of the [11 available topics](#) you pick.
 - **New:** For FY 2017 applications, applicants, regardless of topic, **must** address a) **teacher and/or other instructional personnel outcomes**, and b) student educational outcomes.
 - Letters of intent were due May 5, 2016 but if you missed that deadline talk to your Program Officer. Applications are due August 4, 2016.
- [Research Training Programs in Special Education \(84.324B\)](#) – This NCSER program supports training to increase the supply of scientists and researchers in special education.
 - The FY 2017 RFA supports only one topic: [Early Career Development and Mentoring](#).
 - Letters of Intent were due May 19, 2016 (talk to your program officer if you missed that deadline), and applications are due August 4, 2016.
- [Low-Cost, Short-Duration Evaluations \(84.324L\)](#) – Funds evaluations that rely on administrative data or other sources of secondary data. Funds can be used only for evaluation, not implementation of an intervention. [Related links and info here](#).

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- Letters of Intent were due May 19, 2016 but if you missed that deadline talk to your Program Officer. The application is due August 4, 2016.

Additional Advice for PIs

The presenters also provided the following advice for grantseekers:

- Talk to your program officer! Since program officers are not involved in the review process, they are free to provide advice and guidance to researchers preparing applications, ***including reading your draft application and providing feedback***. (Note: This is a great opportunity for PIs that isn't available at most funding agencies, and one you should definitely take advantage of.)
- Look up what has already been funded related to your topic (see link to funded projects search below).
- Participate in funding program-specific webinars (see IES Webinar link below).

More Information

If you are interested in pursuing any of these funding opportunities, be sure to take advantage of the wealth of information provided on the IES website:

- [What's New at IES](#)
- [NCSEER What's New](#)
- [NCER What's New](#)
- [IES Webinars](#)
- [IES Funding Opportunities](#)
- [Register for IES News Flash](#)
- [Search previously funded projects](#)
- [Abstracts of NCER previously funded projects](#)
- [Abstracts of NCSEER previously funded projects](#)
- [Resources for Researchers](#)

Where is NSF Going & Why & Where Will the \$'s Be?

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By Mike Cronan, co-publisher

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The May 6 presentation by NSF director France Córdoba to the National Science Board outlines an ambitious research vision for that agency over the coming decades. This NSF vision is presented in two complementary documents recently published: [NSF Supporting Research to Benefit the Nation](#) and [Ideas for Future Investment](#), along with Cordova's March 22 testimony to Congress on the [NSF FY 2017 budget](#). These reports reveal that one thing is certain: ***the future at NSF is all about interdisciplinarity, which means teaming at all scales.*** These reports, and the referenced documents within them, represent key strategic planning documents for research offices that support faculty who submit or plan to submit proposals to NSF, ***particularly as the documents give a more nuanced insight into future team configurations required for funding success at NSF.***

Moreover, as hockey player Wayne Gretzky famously noted, "success comes from knowing where the puck will be, not from knowing where it has been." This is "true in spades" for NSF, and these documents offer some very clear insights into what the future research funding landscape will look like, or where the "research funding puck" will be in the coming years. Helpful background to using these documents as a basis for strategic funding plans is the May 2014 document by the National Academies, [Convergence: Facilitating Transdisciplinary Integration of Life Sciences, Physical Sciences, Engineering, and Beyond](#) (read online [here](#)). As noted by NSF's Córdoba, ***"Today's grand challenges invite a convergence approach, and NSF is well positioned to foster convergence because of its deep connections to all fields of science and engineering."***

You might think of interdisciplinarity, teaming and convergence as the NSF research triumvirate of the future. In total, this offers invaluable information for long-term team planning that better positions faculty for funding success at NSF. **NSF's research ideas for future investment outlined by Director Córdoba are:**

- *Harnessing Data for 21st Century Science and Engineering*
- *Shaping the New Human – Technology Frontier*
- *Understanding the Rules of Life: Predicting Phenotype*
- *The Quantum Leap: Leading the Next Quantum Revolution*
- *Navigating the New Arctic*
- *Windows on the Universe: The Era of Multi-messenger Astrophysics*

The key take away from the below quotations from the *NSF Ideas for Future Investment* documents is that this ***future landscape will need to be understood and navigated by those seeking future research funding from NSF as well as those who support them in that effort.*** Funding success will require mapping faculty research interests, expertise, and capacities to this new and evolving funding landscape. **One thing is clear:** future funding success at NSF will

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require broadly interdisciplinary and team-based efforts, as noted in the following three abbreviated quotes selected from the six descriptions in the NSF report.

Harnessing Data for 21st Century Science and Engineering

Building on NSF's past investments, we ***propose a bold initiative to engage NSF's research community in the pursuit of fundamental research in data science and engineering, the development of a cohesive, federated, national-scale approach to research data infrastructure, and the development of a 21st-century data-capable workforce.*** Advances will be required across the breadth of NSF's research community, from ***fundamental research in mathematics, statistics and computational science*** that will enable data-driven discovery and decision-making through visualization, modeling and analysis of complex data; to ***fundamental research on data topics*** such as data discovery and integration, predictive analytics, data mining, machine learning; data semantics, open data-centric architectures and systems, reproducibility, privacy and protection, and the human-data interface; to ***the engagement of the research domains*** supported across NSF in using the advances in data science and the cyberinfrastructure to further their research; to ***the embodiment of these innovations in a robust, comprehensive, open, science-driven, cyberinfrastructure (CI) ecosystem*** capable of accelerating a broad spectrum of data intensive research, including that in large-scale and MREFC facilities; to ***the development and evaluation of innovative learning opportunities and educational pathways***, grounded in an education-research-based understanding of the knowledge and skill demands needed by a 21st century data-capable workforce.

This initiative will enable and accelerate future discovery by providing the fundamental techniques, tools, research cyberinfrastructure, and educational foundations to harness the data revolution. ***The initiative itself could include (i) the creation of a network of national center scale activities, each with a specific focus but linked with each other and with industry, government and international partners to maximize collective impact; (ii) increased directorate and cross-directorate activities and investments; (iii) the development, deployment, operation and evolution of national-scale, open, data-centric CI, that is integrated with NSF's existing CI capabilities and evolved through mid-scale pilot activities.*** As the only federal agency broadly funding fundamental research, NSF can uniquely lead a bold initiative to create a data-enabled future for the Nation's science, engineering and educational enterprises, and for the country more broadly.

Shaping the New Human – Technology Frontier

NSF envisions a world in which technologies – sensors, communication, computation, and intelligence – are embedded around, on, and in us. ***We propose a bold initiative to catalyze the interdisciplinary science and engineering needed to shape that future and the human centered engineered and social systems that those technologies will enable.*** The research challenges range broadly from:

- developing new machine learning algorithms, computing system structures, and underlying neuromorphic architectures for machine intelligence and “brain like” computations; to
- dramatically increasing the energy efficiency of sensing, communications, and computing; to

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- designing, building and deploying the human-centered engineered systems with cognitive and adaptive capacities that are best matched to collaboration with humans, individually and in their smart-and-connected communities;
- to understanding how technologies affect human behavior and social organizations -- from individual psychology to the very nature of work and the work place to skills, jobs, and employment -- and how technologies are and can be shaped through interactions with people and designers;
- to determining how new learning will be possible and will be needed, and how technology can improve and extend learning to support the next generation of science; and designing, implementing, and testing new learning environments inside and outside of schools that incorporate that knowledge; and
- to addressing the technical and social research challenges in privacy and security NSF will fund networked center activities, living labs and community-scale testbeds as well as coordinated directorate-level investments. This integrated interdisciplinary initiative will enable the creation of the human-centered technologies and the technology-rich environments that will serve the pursuit of more satisfying, happier and productive lives.

Understanding the Rules of Life: Predicting Phenotype

The universally recognized biggest gap in our biological knowledge is our ***inability to predict the phenotype of a cell or organism from what we know about the genome and environment***. The traits of an organism are emergent properties of multiple types of information processed across multiple scales, e.g., biophysical, genomic, evolutionary, ecological, environmental, time. It is an enormous challenge to unravel because of the complexity of information and nonlinear processes involved; we simply do not understand the rules that govern phenotypic emergence at this scale. ***Unpacking phenotypic complexity will require convergence of research across biology, computer science, mathematics, the physical sciences, behavioral sciences and engineering.***

Key Questions

- 1) How can computational modeling and informatics methods enable data integration for the purpose of analysis and prediction of complex living systems?
- 2) Variation in traits expressed by organisms is a feature of all life; what are the genetic, epigenetic and environmental factors that explain its magnitude and occurrence?
- 3) How to predict the behavior of living systems, from single molecules to whole cells, whole organisms, and whole ecosystems? To what degree do group interactions and behavior affect phenotypic expression?
- 4) To what degree is an organism's phenome a result of the microorganisms that live in symbiosis with it? To what degree is the production of a phenotype a 'joint effort' among genomes of different organisms?
- 5) Can we synthesize cells and organisms based on knowledge of genome sequence and physical features of other basic molecules?

An Overview of the Big Data Strategic Plan

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By Mike Cronan, co-publisher

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The May 25 46-page report [The Federal Big Data Research and Development Strategic Plan](#) by the National Coordination Office for Networking and Information Technology Research and Development (NITRD/NCO) offers yet another instance of a federal plan that can also serve as a key strategic planning document for faculty and research offices seeking to understand the funding landscape over the next several years. In this case, the strategic focus of the document is on Big Data. **Federal research agencies will use the priorities outlined in this document to better plan future funding solicitations in Big Data as well as to seek greater coordination among funding agencies in the Big Data domain.** For the foreseeable future, **federal research agencies will be entering the Big Data equivalent of the Big Bang.**

Faculty and research offices alike need to ask themselves, **“When I read this report and consider the strategic priority areas for Big Data research in the future, where do I see my own expertise or our institutional expertise best reflected and at which funding agency or agencies?”** In finding your research place in the Big Data Universe, keep in mind that the report notes that the IoT (Internet of Things) is a rapidly emerging source of Big Data. Estimates are that **by 2018 over half of Internet traffic will originate not from computers but from devices.** The devices in this category include sensors of all types, mobile phones, and other consumer and industrial electronic devices. **Instrumented systems or environments increasingly are becoming the norm in science and engineering scenarios.**

The NITRD/NCO report was produced by numerous members from key federal agencies critical to university research, including NSF, NIH, DOE, DoD, NOAA, NASA, DARPA, DHS, and EPA, among several others. The Big Data R&D Strategic Plan provides a shared vision for Big Data R&D that will drive applications that benefit the economy and society in the coming years. It is based on such earlier reports as the 2014 [National Big Data R&D Initiative](#). **Importantly for universities**, Big Data is truly an interdisciplinary landscape as noted in the need for the engagement of the social and behavioral sciences in human-centered Big Data, as well in **Strategy 6 which calls for a comprehensive Big Data education strategy** for student training and workforce development at all degree levels, including new Big Data curricula, courses, modules, workshops, and professional development.

As noted in the report, “Big Data has the potential to radically improve the lives of all Americans. **It is now possible to combine disparate, dynamic, and distributed datasets and enable everything from predicting the future behavior of complex systems to precise medical treatments, smart energy usage, and focused educational curricula**

Moreover, the Plan defines in detail this set of interrelated strategies for Federal agencies that conduct or sponsor R&D in data sciences, data-intensive applications, and large-scale data management and analysis. “These strategies,” the report notes, **“support a national Big Data innovation ecosystem in which the ability to analyze, extract information from, and make decisions and discoveries based on large, diverse, and real-time datasets** enables new capabilities for both Federal agencies and the Nation at large; accelerates the process of scientific discovery and innovation; leads to new fields of research and new areas of inquiry

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that would otherwise be impossible; educates the next generation of 21st century scientists and engineers; and promotes new economic growth.”

Priorities listed within each strategy highlight the intended outcomes that can be addressed by the missions and research funding of NITRD agencies. ***It is here where faculty and research offices can get very valuable strategic planning information on future funding directions and Big Data research focus areas specific to most federal research agencies.*** Such overarching Big Data uses include, the report notes, “advancing human understanding in all branches of science, medicine, and security; ensuring the Nation’s continued leadership in research and development; and enhancing the Nation’s ability to address pressing societal and environmental issues facing the Nation and the world through research and development.”

The report identifies seven key strategic areas of Big Data that will drive agency research funding investments in the future, as noted in the excerpts below:

Strategy 1: Create next-generation capabilities by leveraging emerging Big Data foundations, techniques, and technologies. Continued, increasing investments in the next generation of large-scale data collection, management, and analysis will allow agencies to adapt to and manage the ever-increasing scales of data being generated, and leverage the data to create fundamentally new services and capabilities. Advances in computing and data analytics will provide new abstractions to deal with complex data, and simplify programming of scalable and parallel systems while achieving maximal performance. Fundamental advances in computer science, machine learning, and statistics will ***enable future data-analytics systems that are flexible, responsive, and predictive.*** Innovations in deep learning will be needed to create knowledge bases of interconnected information from unstructured data. Research into **social computing** such as crowdsourcing, citizen science, and collective distributed tasks will help develop techniques to enable humans to mediate tasks that may be beyond the scope of computers. New techniques and methods for interacting with and visualizing data will enhance the “human-data” interface.

Strategy 2: Support R&D to explore and understand trustworthiness of data and resulting knowledge, to make better decisions, enable breakthrough discoveries, and take confident action. To ensure the trustworthiness of information and knowledge derived from Big Data, appropriate methods and quantification ***approaches are needed to capture uncertainty in data as well as to ensure reproducibility and replicability of results.*** This is especially important when data are repurposed for a use different than the one for which the data were originally collected, and when data are integrated from multiple, heterogeneous sources of different quality. Techniques and tools are needed to promote ***transparency in data-driven decision making***, including tools that provide detailed audits of the decision-making process to show, for example, the steps that led to a specific action. Research is needed on metadata frameworks to support ***trustworthiness of data***, including recording the context and semantics of the data, which may evolve over time. Interpreting the results from analyses to decide upon appropriate courses of action may require human involvement. ***Interdisciplinary research is needed in the use of machine learning in data-driven decision making and discovery systems to examine how data can be used to best support and enhance human judgment.***

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Strategy 3: Build and enhance research cyberinfrastructure that enables Big Data innovation in support of agency missions. A coordinated national strategy is needed to identify the needs and requirements for *secure, advanced cyberinfrastructure to support handling and analyzing the vast amounts of data*, including large numbers of real-time data streams from the Internet of Things (IoT), available for applications in commerce, science, defense, and other areas with Federal agency involvement—all while preserving and *protecting individual privacy*. Shared benchmarks, standards, and metrics will be essential for a well-functioning cyberinfrastructure ecosystem. Participatory design is necessary to optimize the usefulness and minimize the consequences of the infrastructure for all stakeholders. *Education and training to build human capacity is also critical*: users must be properly educated and trained to fully utilize the tools available to them.

Strategy 4: Increase the value of data through policies that promote sharing and management of data. More data must be made available and accessible on a sustained basis to maximize value and impact. *The scale and heterogeneity of Big Data present significant challenges in data sharing*. Encouraging *data sharing*, including sharing of source data, interfaces, metadata, and standards, and *encouraging interoperability of associated infrastructure*, improves the accessibility and value of existing data, and enhances the ability to perform new analyses on combined datasets. Research is necessary at the *“human-data” interface* to support the development of flexible, efficient, and usable data interfaces to fit the specific needs of different user groups.

Strategy 5: Understand Big Data collection, sharing, and use with regard to privacy, security, and ethics. Privacy, security, and ethical concerns are key considerations in the Big Data innovation ecosystem. *Techniques and tools are needed to help assess data security, and to secure data, in the highly distributed networks that are becoming increasingly common in Big Data application scenarios*. The ability to perform comprehensive evaluations of data lifecycles is necessary to determine the long-term risk of retaining, or removing datasets.

Strategy 6: Improve the national landscape for Big Data education and training to fulfill increasing demand for both deep analytical talent and analytical capacity for the broader workforce. *A comprehensive education strategy is essential* to meet increasing workforce demands in Big Data and ensure that the United States remains economically competitive. Efforts are needed to *determine the core educational requirements of data scientists*, and investments are needed to support the next generation of data scientists and increase the number of data-science faculty and researchers. As scientific research becomes richer in data, domain scientists need access to opportunities to further their data-science skills, including projects that foster collaborations with data scientists, data-science short courses, and initiatives to supplement training through seed grants, professional-development stipends, and fellowships. In addition, employees and managers in all sectors need access to training “boot camps,” professional-development workshops, and certificate programs to learn the relevance of Big Data to their organizations. *More university courses on foundational topics and other short-term training modules are also necessary* to help transform the broader workforce into data-enabled citizens. *Data-science training should extend to all people through online*

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courses, citizen-science projects, and K-12 education. Research in data-science education should ***explore the notion of data literacy, curricular models for providing data literacy, and the data-science skills to be taught at various grade levels.***

Strategy 7: Create and enhance connections in the national Big Data innovation ecosystem.

Persistent mechanisms should be established to increase the ability of agencies to partner in Big Data R&D both by removing the bureaucratic hurdles for technology and data sharing and by building sustainable programs. One such possible mechanism is the creation of cross-agency development sandboxes or testbeds to help agencies collaborate on new technologies and convert R&D output into innovative and useful capabilities. Another is the development of policies to allow for rapid and dynamic sharing of data across agency boundaries in response to urgent priorities, such as national disasters. A third is the formation of Big Data “benchmarking centers” that focus on grand challenge applications and help determine the datasets, analysis tools, and interoperability requirements necessary in achieving key national priority goals.

Hopefully, as you read through these seven strategic priority areas, as well as the more detailed examples of specific research directions at specific agencies, you will see your own research interests or those of your institution clearly reflected in one or more of the strategic focus areas and can better position yourself for new funding solicitations resulting from this report.

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[NIH Funding Opportunity Announcements Explained](#)

A sometimes underappreciated but critical element of the application process is the detail found in NIH funding opportunity announcements (FOAs). Our new [annotated FOA](#) highlights the importance of each section of the FOA as it relates to your application submission. It lives on the [finding and understanding funding opportunities](#) page in our [application guide](#) for your convenience. If you like this resource, you might really appreciate our [annotated application forms](#)!

[The Future of Bioenergy Is In This Book-less Library](#)

The Bioenergy Feedstock Library contains no books. What it does contain is information about biomass — organic material such as corn [stover, switchgrass, wood chips and wheat straw](#). Nearly 50,000 biomass database entries and more than 35,000 physical samples reside in a repository ([Bioenergy Feedstock Library](#)) located at the Department of Energy's [Biomass Feedstock National User Facility](#). The Bioenergy Feedstock Library is both a physical repository and a knowledge database of biomass feedstock quality that:

- supports research
- provides fundamental data on biomass characteristics (i.e., quality attributes such as ash or composition)
- presents tools to allow decision making

The Library is the cornerstone tool for effectively evaluating the impacts of feedstock *quality characteristics, formulation, preprocessing, and preconversion* on **bioenergy production efficiency** and **conversion costs**. The Library provides a robust mechanism to *store, record, track, retrieve, access* and *analyze* critical information about **biomass feedstock resources**.

[New Portal to Human Subjects Protections Information](#)

Confused as to whether your proposed study is considered human subjects research? Looking to obtain a Certificate of Confidentiality for additional protection of identifiable data from the individuals participating in your research? Want to take NIH's free training on the protection of human subjects? The new NIH Human Subjects website can help! This site not only provides regulatory guidance and links to human subjects protection information, but also contains a number of tools and guides to help investigators and institutions meet federal and HHS/NIH standards for human subjects research protections. You can apply for certificates of confidentiality from NIH through this web site, as well. Visit humansubjects.nih.gov to learn more.

[What Criteria Will Be Used to Assess How I Address Scientific Rigor In My Application?](#)

The guidance reviewers use to assess rigor and transparency is available on the NIH website: [Reviewer Guidance on Rigor and Transparency](#). In addition to reviewing the [applicant](#)

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[resources](#) and the NIH application guide, we encourage applicants to familiarize themselves with [the peer review criteria](#) that will be used for their application.

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The Condition of Education 2016

NCES has a mandate to report to Congress on the condition of education by June 1 of each year. The Condition of Education 2016 summarizes important developments and trends in education using the latest available data. The 2016 report presents 43 key indicators on the status and condition of education and are grouped under four main areas: (1) population characteristics, (2) participation in education, (3) elementary and secondary education, and (4) postsecondary education. Also included in the report are 3 Spotlight indicators that provide a more in-depth look at some of the data.

New Math Report: University of Chicago School Mathematics Project Courses Have Potentially Positive Effects for Secondary Students

University of Chicago School Mathematics Project (UCSMP) is a core mathematics curriculum that emphasizes problem solving, real-world applications, and the use of technology. The curriculum is based on a student-centered approach with a focus on active learning that incorporates reading and uses a flexible lesson organization. This review focuses on students in the following secondary courses: Algebra, Geometry, Advanced Algebra, Functions, Statistics, and Trigonometry, and Precalculus and Discrete Mathematics.

Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways

Nearly 40 percent of the students entering 2- and 4-year postsecondary institutions indicated their intention to major in science, technology, engineering, and mathematics (STEM) in 2012. But the barriers to students realizing their ambitions are reflected in the fact that about half of those with the intention to earn a STEM bachelor's degree and more than two-thirds intending to earn a STEM associate's degree fail to earn these degrees 4 to 6 years after their initial enrollment. Many of those who do obtain a degree take longer than the advertised length of the programs, thus raising the cost of their education. Are the STEM educational pathways any less efficient than for other fields of study? How might the losses be "stemmed" and greater efficiencies realized? These questions and others are at the heart of this study.

Barriers and Opportunities for 2-Year and 4-Year STEM Degrees reviews research on the roles that people, processes, and institutions play in 2-and 4-year STEM degree production. This study pays special attention to the factors that influence students' decisions to enter, stay in, or leave STEM majors—quality of instruction, grading policies, course sequences, undergraduate learning environments, student supports, co-curricular activities, students' general academic preparedness and competence in science, family background, and governmental and institutional policies that affect STEM educational pathways.

Because many students do not take the traditional 4-year path to a STEM undergraduate degree, Barriers and Opportunities describes several other common pathways and also reviews what happens to those who do not complete the journey to a degree. This

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book describes the major changes in student demographics; how students, view, value, and utilize programs of higher education; and how institutions can adapt to support successful student outcomes. In doing so, Barriers and Opportunities questions whether definitions and characteristics of what constitutes success in STEM should change. As this book explores these issues, it identifies where further research is needed to build a system that works for all students who aspire to STEM degrees. The conclusions of this report lay out the steps that faculty, STEM departments, colleges and universities, professional societies, and others can take to improve STEM education for all students interested in a STEM degree.

NSF Broadening Participation Portfolio

NSF has taken a variety of approaches to broaden participation across its many programs. While broadening participation is included in the NSF review criteria, some program announcements and solicitations go beyond the standard criteria. They range from encouraging language to specific requirements. Investments range from capacity building, research centers, partnerships, and alliances to the use of co-funding or supplements to existing awards in the core research programs. The portfolio represented [here](#) is divided into three categories: (1) programs that are primarily focused on broadening participation, (2) programs that have broadening participation as one of several emphases, and (3) Dear Colleague Letters expressing interest in specific aspects of broadening participation.

New Math Report: Saxon Algebra I Has No Discernible Effects on Algebra Achievement for Secondary Students

Saxon Math is a core curriculum for students in grades K–12 that uses an incremental approach to instruction and assessment. This approach limits the amount of new math content delivered to students each day and allows time for daily practice. New concepts are introduced gradually and integrated with previously introduced content so that concepts are developed, reviewed, and practiced over time rather than being taught during discrete periods of time, such as in chapters or units. This review focuses on students in the following secondary courses: Algebra I, Algebra II, Geometry, and Advanced Math.

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Dear Colleague Letter: Strengthening Transfer of Students from Two-year Hispanic-serving Institutions to Four-year STEM Programs

The National Science Foundation (NSF) supports science, technology, engineering, and mathematics (STEM) education research and other activities in order to develop innovative strategies for broadening the participation of women and men from groups underrepresented in all levels of the nation's STEM educational system and workforce. This effort is integral to the Strategic Re-envisioning for the Education and Human Resources Directorate (EHR). NSF is interested in receiving proposals to existing programs, listed below, that support the development of a comprehensive, knowledge-based and knowledge-generating opportunity that seeks to facilitate the successful transfer of students (particularly those who are historically underrepresented in STEM) from two-year Hispanic-serving Institutions (HSIs) to four-year institutions of their choice in order to pursue STEM baccalaureate degrees.

This is not a special competition or new program. Proposals submitted in response to this Dear Colleague Letter (DCL) must meet the requirements and deadlines of the program to which they are submitted. Two-year HSIs are particularly encouraged to submit proposals in response to this DCL. All four-year institutions are eligible to submit proposals; however, four-year institutions are strongly encouraged to partner with a two-year HSI. NSF encourages the submission of proposals that focus on innovative, evidence-based student recruitment and retention strategies at the community college level that show the greatest promise for strengthening progression to four-year STEM degree programs by students from groups traditionally underrepresented in STEM, with particular emphasis on Hispanic students.

Supported activities may include: Employing evidence-based team and cohort building operations (e.g., mentoring, learning communities, and social integration activities); student academic support (e.g. supplemental instruction and peer-led team learning); undergraduate research activities (e.g., research methods and hands-on experimentation); professional development and career support (e.g., conference attendance and presentation, participation in seminars, and colloquia) or other activities designed to enhance student retention in STEM and successful transfer to STEM baccalaureate-degree programs.

How New US Overtime Provisions Will Affect Postdoctoral Researchers

The [Fair Labor Standards Act \(FLSA\)](#) is the law that contains overtime pay provisions for employees across the United States, entitling all US workers to overtime pay unless they are exempted because they are paid on fixed, preset salaries; are engaged in executive, administrative, or professional duties; and are paid at least \$23,660 per year. Today, a historic change to this act has occurred – under the [new rule](#), the overtime pay threshold will be increased to \$47,476, effective December 1, 2016.

Understandably, many members of the community have reached out to us with questions about how this rule will affect post-doctoral researchers, who are critical players in the biomedical research enterprise. During the FLSA revision public comment period, many universities and professional organizations provided feedback to the Department of Labor.

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Likewise, NIH communicated with the Department of Labor to echo the importance of supporting and acknowledging the significant contributions of postdoctoral researchers to NIH-supported research. In recent years we made increases to NRSA stipends as a result of analysis and recommendations stemming from the [Advisory Committee to the Director biomedical workforce working group](#). Stakeholders ranging from [academic faculty](#) to scientific [professional societies](#) have recommended further increases post-doctoral compensation, and early-career researchers have likewise been vocal about [the types of challenges postdocs face in the current research ecosystem](#). We acknowledge that more is needed to support the scientific leaders of tomorrow.

As described in a *Huffington Post* [Op-Ed](#) by NIH Director Francis Collins and U.S. Secretary of Labor Thomas E. Perez, NIH is fully supportive of the increased salary threshold for postdocs. In response to the proposed FLSA revisions, NIH will increase postdoctoral NRSA stipends to levels at or above the new threshold. Institutions that employ postdocs through non-NRSA support can choose how to follow the new rule. They may choose to carefully track their postdocs' hours and pay overtime. Or, keeping with the fact that biomedical research – as in many professional and scientific careers – does not fit into neatly defined hourly shifts, institutions can choose to raise salaries to the new FLSA salary threshold or above it, if they do not yet pay postdocs at or above that level.

[Dear Colleague Letter: Seeking Community Input on Advanced Cyberinfrastructure](#)

NSF is conducting a review of ACI's position within NSF, now that there exist several years of experience operating in this new configuration; this review is meant to be forward-looking and data-driven. Input from the science and engineering research community is an important component of this review process. To inform any comments, we provide relevant data on proposals, awards, and budgets for the period spanning fiscal years (FY) 2011-2015, which covers OCI as well as ACI operations: <https://www.nsf.gov/od/aci-review-data.jsp>.

NSF is particularly interested in community input on the following questions¹:

1. Based on the data and trends available at the above link, your interactions with ACI Division, and in the context of NSF's overall mission, please indicate the extent to which ACI's current role within NSF supports and anticipates the cyberinfrastructure needed by science and engineering research communities.
2. Based on the data and trends available at the above link, and your interactions with ACI Division, what additional improvements can you suggest to further ACI's role and contribution to research cyberinfrastructure in support of NSF's mission?
3. Are there particular positive or negative trends that, in your opinion, arise directly from the realignment of the Office of Cyberinfrastructure within CISE?

Comments from the interested community should be submitted by 6/30/2016. Participation is voluntary and comments received are intended for NSF internal use only. Comments received will not be posted publicly and the names of commenters will be protected from public disclosure to the extent permitted by law. Succinct responses are most useful to the review group, but there are no formal restrictions on the form or length of comments.

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Dear Colleague Letter: Call for Submission of Conference Proposals to Inform the Design and Success of the Alliances and National Network for NSF INCLUDES

With this DCL, NSF is calling for submission of conference proposals to inform the design of the communications and support structures for how individual NSF INCLUDES Alliances will work together with the NSF INCLUDES National Network. NSF seeks community input and participation in identifying and specifying the most critical design features of both Alliances and the National Network so that they can effectively work together to achieve mutual goals. As such, NSF invites those who have ideas and experiences in building successful large-scale Alliances and Networks (or Networks of Networks) to propose conferences, both face-to-face and virtual, that will bring together various stakeholders who can provide insight on models and designs. In particular, it is expected that representatives of the (soon to be funded) NSF INCLUDES Design and Development Launch Pilots will participate in the conferences, thereby influencing future Alliance proposals and formations. These conference activities will help inform the design and implementation of the NSF INCLUDES National Network as well as how it can function across communities.

In this call for conference proposals, NSF seeks new ideas for leveraging research, effective practices, and emerging technologies to manage the multi-site complexities of Design and Development Launch Pilots, the Alliances, and the NSF INCLUDES National Network. Those ideas would be about how to support vision development, alignment, shared measurement practices, implementation research, evaluation, public support and engagement, policy change and implementation, leveraging of funding, and communication. Each conference proposal should focus on exemplary and/or innovative ideas supported by research for designing an infrastructure that helps to mobilize, coordinate, facilitate and achieve a continuous state of planning, execution and evaluation among the NSF INCLUDES participants. Ideas should build on proven mechanisms of success with technical assistance support structures, resource networks and centers, and other related efforts to create communities of practice.

NSF expects to fund 10-12 conferences, up to \$250,000 each, to inform the design of the NSF INCLUDES backbone organization(s) at both the level of Alliances and the National Network. The conferences should be inclusive in terms of presenters and participants, engaging a range of stakeholders and organizations (e.g., representatives from K-12, 2-year and 4-year postsecondary institutions, philanthropic and community-based organizations, and the business sector). The conferences are expected to be equivalent to two to three days of meetings to focus on possible roles and responsibilities of the mini-backbones and national backbone organization in each of the key phases of NSF INCLUDES. Conference activities may include contrasting the collective impact model to other models associated with scaling and sustaining innovations designed to address grand challenges in broadening participation in STEM. NSF is open to creative approaches to convening these events, such as virtual meetings, crowd sourcing, social networking, and Wikis.

It is expected that competitive proposals will address how the alliances and the network can incorporate novel, innovative features that leverage various kinds of technology resources to advance the NSF INCLUDES initiative. Proposals are expected to address the goals and objectives for the conference activity and the expertise of the investigator(s) and members of the organizing committee especially as their qualifications relate to issues of organizational change, broadening participation, collective impact or similar frameworks. Proposers are also

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asked to address essential components of the backbone infrastructure for addressing both the short-term and longer-term aspects of NSF INCLUDES at the level of Alliances and/or the National Network (please specify). The conference proposal should also discuss suggested presenters/invitees; proposed topics/sessions/draft agenda, including approaches for assessing feedback from the attendees; strategies for engaging with participant communities; timeline and potential venue; and the framework/outline for the conference report. It is anticipated that all conferences will be completed by the spring of 2017 and the conference summary reports will be publicly available by early summer of 2017.

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The Nation's Report Card: Technology and Engineering Literacy

This online report presents results from the National Assessment of Educational Progress (NAEP) 2014 technology and engineering literacy (TEL) assessment. The report includes national results on the performance of eighth-grade students. Results are presented in terms of average scale scores and as percentages of students performing at or above the three NAEP achievement levels: *Basic*, *Proficient*, and *Advanced*. In addition to overall scores, results are reported by racial/ethnic groups, gender, type of school, and other demographic groups. Results are also reported based on students' responses to a survey questionnaire about their technology and engineering learning inside and outside of school. In addition, thorough descriptions of four released scenario-based tasks help to illustrate the types of skills measured as part of this first-ever NAEP TEL assessment. Overall findings indicate that female students scored higher than male students in TEL overall.

Genetically Engineered Crops: Experiences and Prospects

Genetically engineered (GE) crops were first introduced commercially in the 1990s. After two decades of production, some groups and individuals remain critical of the technology based on their concerns about possible adverse effects on human health, the environment, and ethical considerations. At the same time, others are concerned that the technology is not reaching its potential to improve human health and the environment because of stringent regulations and reduced public funding to develop products offering more benefits to society. While the debate about these and other questions related to the genetic engineering techniques of the first 20 years goes on, emerging genetic-engineering technologies are adding new complexities to the conversation.

Genetically Engineered Crops builds on previous related Academies reports published between 1987 and 2010 by undertaking a retrospective examination of the purported positive and adverse effects of GE crops and to anticipate what emerging genetic-engineering technologies hold for the future. This report indicates where there are uncertainties about the economic, agronomic, health, safety, or other impacts of GE crops and food, and makes recommendations to fill gaps in safety assessments, increase regulatory clarity, and improve innovations in and access to GE technology.

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New Funding Opportunities

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Solicitations Remaining Open from Prior Issues of the Newsletter
Open Solicitations and BAAs

[User Note: URL links are active on date of publication, but if a URL link breaks or changes a **Google search** on the key words will typically take you to a working link. Also, entering a grant title and/or solicitation number in the **Grants.gov search box** will typically work as well.]

New Funding Solicitations Posted Since May 15 Newsletter

[CDNR-RIDGE-2016-001 Request for Applications for Competitive Grant Award To Establish a USDA RIDGE Center for Food and Nutrition Assistance](#)

The U.S. Department of Agriculture (USDA) Economic Research Service (ERS), in collaboration with USDA's Food and Nutrition Service (FNS), invites applications for a competitively awarded grant to establish a research center to administer the Research Innovation and Development Grants in Economics (RIDGE) Program. The USDA Ridge Center will: 1. Provide renewed focus on economic aspects of food and nutrition assistance research; 2. Stimulate innovative research on domestic food and nutrition assistance issues by providing small grants for new analyses of the USDA major food and nutrition assistance programs, food security, and smaller, less studied programs such as the Summer Food Service Program; 3. Broaden the network of social scientists who collaborate in expanding the understanding of the economic, nutrition, and health outcomes of participation in USDA's food assistance programs, as well as of the issues surrounding program implementation and delivery, and 4. Achieve cost savings through consolidating the previous two RIDGE Centers into one institution. ERS anticipates that \$600,000 will be awarded in fiscal year 2016 to support this activity with additional funding, subject to availability, for 2 more years. **Due August 1.**

[Agriculture and Food Research Initiative - Water for Agriculture Challenge Area](#)

This AFRI Challenge Area addresses critical water resources issues such as drought, excess soil moisture, flooding, quality and others in an agricultural context. Funding will be used to develop management practices, technologies, and tools for farmers, ranchers, forest owners and managers, public decision makers, public and private managers, and citizens to improve water resource quantity and quality. The long-term goal of the AFRI Water for Agriculture Challenge Area is to tackle critical water issues by developing both regional systems for the sustainable use and reuse, flow and management of water, and at the watershed and farm scales, water issues focused on production and environmental sustainability efforts. Project

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types supported within this Challenge area are multi-function Integrated Research, Education, and/or Extension Projects and Food and Agricultural Enhancement Grants. **Due August 4.**

Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII)

With the goal of encouraging research independence immediately upon obtaining one's first academic position after receipt of the PhD, the Directorate for Computer and Information Science and Engineering (CISE) will award grants to initiate the course of one's independent research. Understanding the critical role of establishing that independence early in one's career, it is expected that funds will be used to support untenured faculty or research scientists (or equivalent) in their first three years in a primary academic position after the PhD, but not more than a total of five years after completion of their PhD. One may not yet have received any other grants or contracts in the Principal Investigator (PI) role from any department, agency, or institution of the federal government, including from the CAREER program or any other program, post-PhD, regardless of the size of the grant or contract, with certain exceptions noted below. Serving as co-PI, Senior Personnel, Postdoctoral Fellow, or other Fellow does not count against this eligibility rule. Grants, contracts, or gifts from private companies or foundations; state, local, or tribal governments; or universities do not count against this eligibility rule. It is expected that these funds will allow the new CISE Research Initiation Initiative PI to support one or more graduate students for up to two years. Faculty at undergraduate and two-year institutions may use funds to support undergraduate students, and may use the additional RUI designation (which requires inclusion of a RUI Impact Statement) -- see http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5518 for additional information. In addition, submissions from all institutions may use funds for postdoctoral scholars, travel, and/or research equipment. **Due August 10.**

Campus Cyberinfrastructure (CC*)

The Campus Cyberinfrastructure (CC*) program invests in coordinated campus-level cyberinfrastructure (CI) components of data, networking, and computing infrastructure, capabilities, and integrated services leading to higher levels of performance, reliability and predictability for science applications and distributed research projects. Learning and workforce development (LWD) in CI is explicitly addressed in the program. Science-driven requirements are the primary motivation for any proposed activity.

CC* awards will be supported in seven areas:

1. Data Driven Multi-Campus/Multi-Institution Model Implementations awards will be supported at up to \$3,000,000 total for up to 4 years.
2. Cyber Team awards will be supported at up to \$1,500,000 total for up to 3 years.
3. Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported at up to \$500,000 total for up to 2 years.
4. Network Design and Implementation for Small Institutions awards will be supported at up to \$400,000 total for up to 2 years.
5. (Network Integration and Applied Innovation awards will be supported at up to \$1,000,000 total for up to 2 years.
6. Campus Computing awards will be supported at up to \$500,000 for up to 3 years.

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7. Innovative Integrated Storage Resources awards will be supported at up to \$200,000 for up to 2 years.

Due August 23.

Developing a National Research Infrastructure for Neuroscience (NeuroNex)

The goal of this solicitation is to foster the development and dissemination of (1) innovative research resources, instrumentation, and neurotechnologies, and (2) theoretical frameworks for understanding brain function across organizational levels, scales of analysis, and/or a wider range of species, including humans. This interdisciplinary program is one element of NSF's broader effort directed at Understanding the Brain, a multi-year activity that includes NSF's participation in the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative (<http://www.nsf.gov/brain/>) and the phased approach to develop a national research infrastructure for neuroscience as outlined in the [Dear Colleague Letter NSF16-047](#). NSF envisions a connected portfolio of transformative, integrative projects that create synergistic links across investigators and communities, yielding novel ways of tackling the challenges of understanding the brain in action and in context. This program solicits proposals that will develop and disseminate innovative neurotechnologies and/or theoretical frameworks that will transform our understanding of the linkages between neural activity and cognition and behavior across different systems, environments, and species, while also providing an avenue for widespread dissemination of these technologies and theoretical frameworks as well as broad training opportunities. **LOI September 2; full October 21.**

Agriculture and Food Research Initiative - Foundational Program

Program:

[Agriculture and Food Research Initiative \(AFRI\)](#) | [AFRI Foundational Program](#) | [Nanotechnology Program](#) | [Soil Programs](#) | [Food Safety](#) | [Water Programs](#) | [Horticulture Programs](#) | [Food Science & Technology Programs](#) | [Crop Protection and Pest Management Program](#) | [Plant Breeding, Genetics & Genomics Programs](#)

The AFRI Foundational Program is offered to support grants in the six AFRI priority areas to continue building a foundation of knowledge critical for solving current and future societal challenges. The six priority areas are: Plant Health and Production and Plant Products; Animal Health and Production and Animal Products; Food Safety, Nutrition, and Health; Bioenergy, Natural Resources, and Environment; Agriculture Systems and Technology; and Agriculture Economics and Rural Communities. Single-function Research Projects, multi-function Integrated Projects, and Food and Agricultural Science Enhancement (FASE) Grants are expected to address one of the Program Area Priorities (see Foundational Program RFA for details). **Due September 10.**

Agriculture and Food Research Initiative Sustainable Bioenergy and Bioproducts (SBEBP) Challenge Area

In the Agriculture and Food Research Initiative Sustainable Bioenergy and Bioproducts (SBEBP) Challenge Area specific program areas are designed to achieve the long term outcome of reducing the national dependence on foreign oil through the development and production of

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regionally-appropriate sustainable bioenergy systems that materially deliver advanced liquid transportation biofuels, biopower, and bioproducts. **Due September 22.**

NOAA-NOS-NCCOS-2017-2004875 NOAA RESTORE Act Science Program

The purpose of this document is to advise the public that NOAA/NOS/NCCOS is soliciting applications for the NOAA RESTORE Act Science Program for projects from 1 to 3 years in duration. This funding opportunity is focused on living coastal and marine resources and their habitats and requests proposals under two program priorities. One priority focuses on research and the other priority focuses on science application in the form of decision-support tools. Funding is contingent upon the availability of funds in the Gulf Coast Restoration Trust Fund. It is anticipated that final recommendations for funding under this Announcement will be made in March, 2017, and that projects funded under this Announcement will have a June 1, 2017 start date. Total funding for this competition is up to approximately \$17 million. Approximately 5 to 10 projects are expected to be funded for a total of approximately \$12 million under the research priority. **Approximately 5 to 10 projects are expected to be funded for a total of approximately \$5 million under the decision-support tool priority.** Electronic Access: The NOAA Restore Act Science Program website (<http://restoreactscienceprogram.noaa.gov/>) furnishes supplementary information. Applications should be submitted through grants.gov (<http://www.grants.gov>). Dates: **A letter of intent (LOI) is required for this Announcement. The deadline for receipt of required LOIs at the National Centers for Coastal Ocean Science / NOAA RESTORE Act Science Program (NCCOS/RASP) office is 11:59 p.m., Eastern Time on July 8, 2016.** LOIs should be submitted by email to Laurie.Golden@noaa.gov. The deadline for receipt of full applications at the NCCOS/RASP office is 11:59 p.m., Eastern Time on **September 27, 2016.**

Applications should be submitted through grants.gov (<http://www.grants.gov>). LOIs and full applications received after the closing time and date will not be accepted. NOAA will also accept paper applications subject to further details described in this Announcement that are postmarked or provided to a commercial carrier with tracking number and receipt on or before 11:59 p.m., Eastern Time on September 27, 2016. Private metered postmarks will not be accepted. Applicants submitting by paper are responsible for tracking their applications and should notify the Associate Director (refer to Section VII) that they are submitting by paper. Investigators are advised to submit full proposals well in advance of the deadline as a precaution against unanticipated delays. Applicants must register with grants.gov before submitting application materials, which requires a Dun and Bradstreet Data Universal Number System (DUNS) number and registration in the System for Award Management (SAM) as prerequisites (refer to Section IV.G.1.). The entire registration process, including grants.gov, DUNS, and SAM, may take up to three weeks to complete. In addition, there may be up to a two business day lag before grants.gov validates or rejects submitted materials. Please plan ahead. **Due September 27.**

DARPA-BAA-16-46 Defense Sciences Office Office-wide

The mission of the Defense Advanced Research Projects Agency (DARPA) Defense Sciences Office (DSO) is to identify and pursue high-risk, high-payoff research initiatives across a broad spectrum of science and engineering disciplines and to transform these

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initiatives into game-changing technologies for U.S. national security. In support of this mission, the DSO Office-wide BAA invites proposers to submit innovative basic or applied research concepts in one or more of the following technical areas: Mathematics, Modeling and Design; Physical Systems; Human-Machine Systems; and Social Systems. Each of these areas is described below and includes a list of example research topics that highlight several (but not all) potential areas of interest. Proposals must investigate innovative approaches that enable revolutionary advances. DSO is explicitly not interested in approaches or technologies that primarily result in evolutionary improvements to the existing state of practice. **Open until June 22, 2017.**

URL Links to New & Open Funding Solicitations

- [HHS Grants Forecast](#)
- [American Cancer Society Index of Grants](#)
- [SAMHSA FY 2014 Grant Announcements and Awards](#)
- [DARPA Microsystems Technology Office Solicitations](#)
- [Open Solicitations from IARPA \(Intelligence Advanced Research Projects Activity\)](#)
- [Bureau of Educational and Cultural Affairs, Open Solicitations, DOS](#)
- [ARPA-E Funding Opportunity Exchange](#)
- [DOE Funding Opportunity Exchange](#)
- [NIAID Funding Opportunities List](#)
- [NPS Broad Agency Announcements \(BAAs\)](#)
- [NIJ Current Funding Opportunities](#)
- [NIJ Forthcoming Funding Opportunities](#)
- [Engineering Information Foundation Grant Program](#)
- [Comprehensive List of Collaborative Funding Mechanisms, NORDP](#)
- [ARL Funding Opportunities — Open Broad Agency Announcements \(BAA\)](#)
- [HHS Grants Forecast](#)
- [American Psychological Association, Scholarships, Grants and Awards](#)
- [EPA 2014 Science To Achieve Results \(STAR\) Research Grants](#)
- [NASA Open Solicitations](#)
- [Defense Sciences Office Solicitations](#)
- [The Mathematics Education Trust](#)
- [EPA Open Funding Opportunities](#)
- [CDMRP FY 2014 Funding Announcements](#)
- [Office of Minority Health](#)
- [Department of Justice Open Solicitations](#)
- [DOE/EERE Funding Opportunity Exchange](#)
- [New Funding Opportunities at NIEHS \(NIH\)](#)
- [National Human Genome Research Institute Funding Opportunities](#)
- [Army Research Laboratory Open Broad Agency Announcements \(BAA\)](#)

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- [SBIR Gateway to Funding](#)
- [Water Research Funding](#)
- [Fellowship and Grant Opportunities for Faculty Humanities and Social Sciences](#)
- [DARPA Current Solicitations](#)
- [Office of Naval Research Currently Active BAAs](#)
- [HRSA Health Professions Open Opportunities](#)
- [NIH Funding Opportunities Relevant to NIAID](#)
- [National Institute of Justice Current Funding Opportunities](#)
- [Funding Opportunities by the Department of Education Discretionary Grant Programs](#)
- [EPA's Office of Air and Radiation \(OAR\) Open Solicitations](#)
- [NETL Open Solicitations](#)
- [DoED List of Currently Open Grant Competitions](#)
- [Foundation Center RFP Weekly Funding Bulletin](#)

Solicitations Remaining Open from Prior Issues of the Newsletter

Materials Research Science and Engineering Centers

Materials Research Science and Engineering Centers (MRSECs) provide sustained support of interdisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. MRSECs address research of a scope and complexity requiring the scale, synergy, and interdisciplinarity provided by a campus-based research center. They support materials research infrastructure in the United States, promote active collaboration between universities and other sectors, including industry and international institutions, and contribute to the development of a national network of university-based centers in materials research, education, and facilities. A MRSEC may be located at a single institution, or may involve multiple institutions in partnership. **Preliminary July 1; full December 2.**

USDA-NIFA-AFRI-005823 AFRI Food Security Challenge Area

The [AFRI Food Security Challenge Area](#) focuses on the societal challenge to keep American agriculture competitive and end world hunger by ensuring the availability and accessibility of safe and nutritious food. The long-term goal of the AFRI Food Security Challenge Area is to sustainably increase agricultural productivity and the availability and accessibility of safe and nutritious food. Project types supported within this Challenge Area will propose multi-function Integrated Research, Education, and/or Extension Projects, Food and Agricultural Science Enhancement (FASE) Grants, and conferences and/or workshops. **Priority Area:** New Frontiers in Pollinator Health: From Research to Application. **Due July 7.**

2016-NIST-NICE-01 Regional Alliances and Multistakeholder Partnerships to Stimulate (RAMPS) Cybersecurity Education and Workforce Development

The National Initiative for Cybersecurity Education, led by NIST, is soliciting applications from eligible applicants for the establishment of state or regional consortia to identify cybersecurity workforce development pathways that address local workforce needs. **Due July 12.**

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[PA-AFRL-AFOSR-2016-0001 Fiscal Year 2017 Defense University Research Instrumentation Program \(DURIP\)](#)

The Department of Defense (DoD) announces the Fiscal Year 2017 Defense University Research Instrumentation Program (DURIP). DURIP is designed to improve the capabilities of accredited United States (U.S.) institutions of higher education to conduct research and to educate scientists and engineers in areas important to national defense, by providing funds for the acquisition of research equipment or instrumentation. For-profit organizations are not eligible for DURIP funding. This announcement seeks proposals from universities to purchase equipment and instrumentation in support of research in areas of interest to the DoD. DoD interests include the areas of research supported by the Army Research Office (ARO), the Office of Naval Research (ONR), and the Air Force Office of Scientific Research (AFOSR), hereafter generally referred to collectively as “we, our, us, or administering agency.” Each administering agency will make grant awards to fund the purchase of research equipment or instrumentation costing \$50,000 or more that cannot typically be purchased within the budgets of single-investigator awards. We generally cannot make any individual award that exceeds more than \$1,500,000 in DoD funding unless your proposal qualifies for an exception. We intend to award approximately \$47 million this competition, subject to availability of funds. DURIP awards are typically one year in length. DURIP is part of the University Research Initiative (URI). All the application forms you need are available electronically on Grants.gov. We will not provide paper copies of this announcement, or accept paper applications. All applications must be submitted electronically through Grants.gov. **Due July 22.**

[DARPA-BAA-16-39 TRADES](#)

The Defense Sciences Office (DSO) at the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative ideas to transform design, enabling designs that are unimaginable today. DSO is specifically interested in fundamental research to develop new mathematics and algorithms that enable full incorporation of new materials and fabrication methods in design. Proposed research should investigate innovative approaches that enable revolutionary advances in design. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice. **Due July 26.**

[USDA-NIFA-AFRI-005822 Agriculture and Food Research Initiative: Water for Agriculture Challenge Area](#)

This AFRI Challenge Area addresses critical water resources issues such as drought, excess soil moisture, flooding, quality and others in an agricultural context. Funding will be used to develop management practices, technologies, and tools for farmers, ranchers, forest owners and managers, public decision makers, public and private managers, and citizens to improve water resource quantity and quality. The long-term goal of the AFRI Water for Agriculture Challenge Area is to tackle critical water issues by developing both regional systems for the sustainable use and reuse, flow and management of water, and at the watershed and farm scales, water issues focused on production and environmental sustainability efforts. Project types supported within this Challenge area are multi-function Integrated Research, Education, and/or Extension Projects and Food and Agricultural Enhancement Grants. **Due August 4.**

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Joint DMS/NIGMS Initiative to Support Research at the Interface of the Biological and Mathematical Sciences (DMS/NIGMS)

The Division of Mathematical Sciences in the Directorate for Mathematical and Physical Sciences at the National Science Foundation and the National Institute of General Medical Sciences at the National Institutes of Health plan to support research in mathematics and statistics on questions in the biological and biomedical sciences. Both agencies recognize the need and urgency for promoting research at the interface between the mathematical sciences and the life sciences. This program is designed to encourage new collaborations, as well as to support existing ones. **Due September 14.**

Prediction of and Resilience against Extreme Events National Science Foundation

Natural disasters cause thousands of deaths annually, and in 2013 alone caused over \$130 billion in damage worldwide. There is clear societal need to better understand and mitigate the risks posed to the US by natural hazards, consistent with the mandate of the National Science Foundation (NSF); to promote the progress of science [and] advance the national health, prosperity, and welfare; NSF and the Directorate for Geosciences (GEO) have long supported basic research in scientific and engineering disciplines necessary to understand natural hazards and extreme events, including through the Interdisciplinary Research in Hazards and Disasters (Hazards SEES) program and multiple core programs in the GEO Directorate. PREEVENTS is designed as a logical successor to Hazards SEES and is one element of the NSF-wide Risk and Resilience activity, which has the overarching goal of improving predictability and risk assessment, and increasing resilience, in order to reduce the impact of extreme events on our life, society, and economy. PREEVENTS will provide an additional mechanism to support research and related activities that will improve our understanding of the fundamental processes underlying natural hazards and extreme events in the geosciences. PREEVENTS is focused on natural hazards and extreme events, and not on technological or deliberately human-caused hazards. The PREEVENTS portfolio will include the potential for disciplinary and multidisciplinary research at all scales, particularly aimed at areas ripe for significant near- or medium-term advances. PREEVENTS seeks projects that will (1) enhance understanding of the fundamental processes underlying natural hazards and extreme events on various spatial and temporal scales, as well as the variability inherent in such hazards and events, and (2) improve our capability to model and forecast such hazards and events. All projects requesting PREEVENTS support must be primarily focused on these two targets. In addition, PREEVENTS projects will improve our understanding of the effects of natural hazards and extreme events and will enable development, with support by other programs and organizations, of new tools to enhance societal preparedness and resilience against such impacts. **Due September 19.**

AFRI Sustainable Bioenergy and Bioproducts RFA

In the Agriculture and Food Research Initiative Sustainable Bioenergy and Bioproducts (SBEBP) Challenge Area specific program areas are designed to achieve the long term outcome of reducing the national dependence on foreign oil through the development and production of regionally-appropriate sustainable bioenergy systems that materially deliver advanced liquid transportation biofuels, biopower, and bioproducts. In FY2016, the SBEBP is soliciting applications in the following priority areas: (1) Regional Bioenergy Coordinated Agricultural

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Projects (CAPs) that focus on the production and delivery of regionally-appropriate sustainable biomass feedstocks for bioenergy and bioproducts. While the focus of CAPs will be on feedstocks, competitive proposals must present the feedstock development and production in the context of a comprehensive regional sustainable bioenergy and bioproducts supply chain systems; and (2) Investing in America's Scientific Corps: Preparing a New Generation of Students, Faculty, and Workforce for Emerging Challenges in Bioenergy, Bioproducts, and the Bioeconomy. The anticipated amount available for grants in FY 2016 is approximately \$21 million. **Due September 22.**

Bridges to the Baccalaureate (R25)

The NIH Research Education Program (R25) supports research education activities in the mission areas of the NIH. The over-arching goal of this NIGMS R25 program is to support educational activities that enhance the diversity of the biomedical, behavioral and clinical research workforce. To accomplish the stated over-arching goal, this FOA will support creative educational activities with a primary focus on Courses for Skills Development, Research Experiences, and Curriculum or Methods Development. A proposed program must include each activity and describe how they will be integrated. The Bridges to Baccalaureate Program is intended to provide these activities to community college students to increase transfer and retention to BS graduation in biomedical sciences. This program requires partnerships between community colleges or other two-year post-secondary educational institutions granting the associate degree with colleges or universities that offer the baccalaureate degree. Applicants should directly address how the set of activities will complement and/or enhance the training of a workforce to meet the nation's biomedical and clinical research needs by discussing 1) the rationale underlying the balance of effort and resources dedicated to each activity; 2) how the activities integrate; and 3) objective indicators that can measure the effectiveness of the program. Recruitment and retention plans are required elements of the program. **Due September 25.**

Bridges to the Doctorate (R25)

The NIH Research Education Program (R25) supports research education activities in the mission areas of the NIH. The over-arching goal of this NIGMS R25 program is to support educational activities that enhance the diversity of the biomedical, behavioral and clinical research workforce. To accomplish the stated over-arching goal, this FOA will support creative educational activities with a primary focus on Courses for Skills Development and Research Experiences. The Bridges to Doctorate Program is intended to provide these activities to master's level students to increase transition to and completion of PhDs in biomedical sciences. This program requires partnerships between master's degree-granting institutions with doctorate degree-granting institutions. Applicants should directly address how the set of activities will complement and/or enhance the training of a diverse workforce that also meets the nation's biomedical and clinical research needs by discussing 1) the rationale underlying the balance of effort and resources dedicated to each activity; 2) how the activities integrate; and 3) objective indicators that can measure the effectiveness of the program. A program application must include each activity, and describe how they will be synergized to make a

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comprehensive program. Additionally, recruitment and retention plans are expected as part of the application. **Due September 25.**

20160929-FT Summer Stipends National Endowment for the Humanities

Summer Stipends support individuals pursuing advanced research that is of value to humanities scholars, general audiences, or both. Eligible projects usually result in articles, monographs, books, digital materials and publications, archaeological site reports, translations, editions, or other scholarly resources. Summer Stipends support continuous full-time work on a humanities project for a period of two consecutive months. Summer Stipends support projects at any stage of development. **Due September 29.**

N00014-16-R-FO05 Multidisciplinary Research Program of the University Research Initiative Department of Defense Office of Naval Research

The MURI program supports basic research in science and engineering at U.S. institutions of higher education (hereafter referred to as "universities") that is of potential interest to DoD. The program is focused on multidisciplinary research efforts where more than one traditional discipline interacts to provide rapid advances in scientific areas of interest to the DoD. As defined in the DoD Financial Management Regulation: Basic research is 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. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It is farsighted high payoff research that provides the basis for technological progress (DoD 7000.14-R, vol. 2B, chap. 5, para. 050201.B). DoD's basic research program invests broadly in many specific fields to ensure that it has early cognizance of new scientific knowledge. The FY 2017 MURI competition is for the topics listed below. Detailed descriptions of the topics and the Topic Chief for each can be found in Section VIII, entitled, "Specific MURI Topics," of this FOA. The detailed descriptions are intended to provide the offeror a frame of reference and are not meant to be restrictive to the possible approaches to achieving the goals of the topic and the program. **Due November 15.**

Open Solicitations and BAAs

[BAA's remain open for one or more years. During the open period, agency research priorities may change or other **modifications are made to a published BAA**. If you are submitting a proposal in response to an open solicitation, as below, check for modifications to the BAA at Grants.gov or by utilizing [Modified Opportunities by Agency](#) to receive a Grants.gov notification of recently modified opportunities by agency name.]

APS-OAA-15-000048 U.S. Agency for International Development (Higher Education Partnerships for Innovation and Impact (HEPII) Annual Program Statement (APS)

The United States Agency for International Development (USAID) is seeking concept papers from qualified U.S. and non-U.S. higher education institutions (HEIs) to work with USAID to advance strategic priorities and objectives and achieve sustainable development outcomes,

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results, and impact. This Annual Program Statement (APS) has the flexibility to award Cooperative Agreements, Grants, Fixed Amount Awards, and leader with Associate Awards. This APS is not supported by specific funding, and any funding for any USAID-HEI partnership proposed under this APS would have to be requested from the specific USAID Mission, Bureau, or Independent Office with which the prospective applicant seeks to collaborate and to which the Concept Paper will be submitted. USAID seeks to optimize its relationship with HEIs by identifying and promoting successful partnerships and collaboration models, and increasing USAID's access to higher education technical resources. The purpose of this APS is to promote opportunities for leveraging HEI capabilities across USAID's portfolio and its program cycle, and strengthen developing country HEI capabilities to respond to and solve critical development challenges. **Original Closing Date for Applications: Jun 29, 2016**

DARPA-BAA-15-39 DSO Office-wide BAA Department of Defense

The mission of the Defense Advanced Research Projects Agency (DARPA) Defense Sciences Office (DSO) is to identify and pursue high-risk, high-payoff research initiatives across a broad spectrum of science and engineering disciplines and to transform these initiatives into important, radically new, game-changing technologies for U.S. national security. In support of this mission, this DSO Office-wide BAA invites proposers to submit innovative basic or applied research concepts in one or more of the following technical areas: Physical Systems; Mathematics, Modeling and Design; and Human-Machine Systems. Each of these areas is described below and includes a list of example research topics. For each technical area addressed, proposed research should investigate innovative approaches that enable revolutionary advances. DSO is explicitly not interested in approaches or technologies that primarily result in evolutionary improvements to the existing state of practice. **Open to July 2, 2016.**

FY 2016 Continuation of Solicitation for the Office of Science Financial Assistance Program

The Office of Science (SC) of the Department of Energy hereby announces its continuing interest in receiving grant applications for support of work in the following program areas: Advanced Scientific Computing Research, Basic Energy Sciences, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, and Nuclear Physics. On September 3, 1992, DOE published in the Federal Register the Office of Energy Research Financial Assistance Program (now called the Office of Science Financial Assistance Program), 10 CFR 605, as a Final Rule, which contained a solicitation for this program. Information about submission of applications, eligibility, limitations, evaluation and selection processes and other policies and procedures are specified in 10 CFR 605. This Funding Opportunity Announcement (FOA), DE-FOA-0001414, is our annual, broad, open solicitation that covers all of the research areas in the Office of Science and is open throughout the Fiscal Year. **This FOA will remain open until September 30, 2016, 11:59 PM Eastern Time, or until it is succeeded by another issuance, whichever occurs first.**

DoD USAMRMC FY16 Broad Agency Announcement for Extramural Medical Research

The U.S. Army Medical Research and Materiel Command's (USAMRMC) mission is to provide solutions to medical problems of importance to the American Service member at home and

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abroad, as well as to the general public at large. The scope of this effort and the priorities attached to specific projects are influenced by changes in military and civilian medical science and technology, operational requirements, military threat assessments, and national defense strategies. The extramural research and development programs play a vital role in the fulfillment of the objectives established by the USAMRMC. General information on USAMRMC can be obtained at <https://mrmc.detrack.army.mil/>. This Fiscal Year 2016 (FY16) Broad Agency Announcement (BAA) is intended to solicit extramural research and development ideas and is issued under the provisions of the Competition in Contracting Act of 1984 (Public Law 98-369), as implemented in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016. In accordance with FAR 35.016, projects funded under this BAA must be for basic and applied research and that part of development not related to the development of a specific system or hardware procurement. Projects must be for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding rather than focusing on a specific system or hardware solution. Research and development funded through this BAA is intended and expected to benefit and inform both military and civilian medical practice and knowledge. This BAA provides a general description of USAMRMC's research and development programs, including research areas of interest, evaluation and selection criteria, pre-proposal/pre-application and full proposal/application preparation instructions, and general administrative information. Specific submission information and additional administrative requirements can be found in the document titled "General Submission Instructions" available in Grants.gov along with this BAA. This FY16 BAA is continuously open for a 12-month period, from October 1, 2015 through September 30, 2016, at 11:59 p.m. Eastern Time. Submission of a pre-proposal/pre-application is required and must be submitted through the electronic Biomedical Research Application Portal (eBRAP) (<https://eBRAP.org/>). Pre-proposals/pre-applications may be submitted at any time throughout the 12-month period. If the USAMRMC is interested in receiving a full proposal/application, the PI will be sent an invitation to submit via eBRAP. A full proposal/application must be submitted through Grants.gov (<http://www.grants.gov/>). **Invited full proposals/applications can be submitted under the FY16 BAA through September 30, 2016.**

W912HZ-16-BAA-01 2016 Broad Agency Announcement Department of Defense Engineer Research and Development Center

The U.S. Army Engineer Research and Development Center (ERDC) has issued a Broad Agency Announcement (BAA) for various research and development topic areas. The ERDC consists of the Coastal and Hydraulics Lab (CHL), the Geotechnical and Structures Lab (GSL), the Environmental Lab (EL), and the Information Technology Lab (ITL) in Vicksburg, Mississippi; the Cold Regions Research and Engineering Lab (CRREL) in Hanover, New Hampshire; the Construction Engineering Research Lab (CERL) in Champaign, Illinois; and the Topographic Engineering Center (TEC) in Alexandria, Virginia. The ERDC is responsible for conducting research in the broad fields of hydraulics, dredging, coastal engineering, instrumentation, oceanography, remote sensing, geotechnical engineering, earthquake engineering, soil effects, vehicle mobility, self-contained munitions, military engineering, geophysics, pavements, protective structures, aquatic plants, water quality, dredged material, treatment of hazardous waste, wetlands, physical/mechanical/chemical properties of snow and other frozen

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precipitation, infrastructure and environmental issues, computer science, telecommunications management, energy, facilities maintenance, materials and structures, engineering processes, environmental processes, land and heritage conservation, and ecological processes. The BAA is available at <http://erdc.usace.army.mil> and is open until superseded. Proposals may be accepted at any time. For questions regarding proposals to CHL, EL, GSL, TEC & ITL, contact Mike Lee at 601-634-3903 or via email at Michael.G.Lee@usace.army.mil. For questions regarding proposals to CERL, contact Wanda Huber at 217-373-6730 or via email at Wanda.L.Huber@usace.army.mil or Andrea Krouse at 217-373-6746 or via email at Andrea.J.Krouse@usace.army.mil. For questions regarding proposals at CRREL, contact Ashley Jenkins at 217-373-7297 or via email at Ashley.M.Jenkins@usace.army.mil. Contact the technical personnel listed at the end of each topic area for questions concerning the topic areas themselves. **Open until January 31, 2017.**

US Special Operations Command Broad Agency Announcement

This BAA is intended to solicit extramural research and development ideas, and is issued under the provisions of the Competition in Contracting Act of 1984 (Public Law 98-369), as implemented in Federal Acquisition Regulation 6.102(d) (2) and 35.016. This announcement provides a general description of USSOCOM's research areas of interest, general information, evaluation and selection criteria, and proposal/application preparation instructions. In accordance with FAR 6.102, projects funded under this announcement must be for basic and applied research and that part of development not related to the development of a specific system or hardware procurement. Projects must be for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding. Projects that are for the development of a specific system or hardware procurement will not be considered. The selection process is highly competitive and the quantity of meaningful proposal/applications (both pre-proposal/pre-applications and full proposal/full applications) typically received exceed the number of awards that available funding can support. This BAA provides a general description of USSOCOM's research and development programs, including research areas of interest, evaluation and selection criteria, pre-proposal/pre-application and full proposal/application preparation instructions, and general administrative information. Specific submission information and additional administrative requirements can be found in the document titled "General Submission Instructions" available in Grants.gov along with this BAA. **Open to May 14, 2017.**

Open Solicitations from IARPA (Intelligence Advanced Research Projects Activity) Army Research Laboratory Broad Agency Announcement for Basic and Applied Scientific Research

This Broad Agency Announcement (BAA), which sets forth research areas of interest to the [**Army Research Laboratory**](#) (ARL) Directorates and Army Research Office (ARO), is issued under the paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of basic research proposals. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provision of Public Law 98-369, "The Competition in Contracting Act of 1984" and subsequent amendments. **Open June 1, 2012 to March 31, 2017.**

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[W911NF-12-R-0012 Army Research Office Broad Agency Announcement for Basic and Applied Scientific Research](#)

The purpose of this Broad Agency Announcement (BAA) is to solicit research proposals in the engineering, physical, life, and information sciences for submission to the Army Research Office (ARO) for consideration for possible funding. For ease of reference, this BAA is an extraction of the ARO sections of the Army Research Laboratory BAA.

(www.arl.army.mil/www/default.cfm?page=8). **Open to May 31, 2017**

[ARL Core Broad Agency Announcement for Basic and Applied Scientific Research for Fiscal Years 2012 through 2017](#)

[University Small Grants Broad Agency Announcement](#)

This is a five-year, open-ended Broad Agency Announcement (BAA) to solicit research proposals for the United States Air Force Research Laboratory (AFRL) Directed Energy (RD) Directorate.

This BAA is a university grant vehicle that can provide small grants of \$100k or less to students/professors in a timely manner for the purpose of engaging U.S./U.S. territories' colleges and universities in directed energy-related basic, applied, and advanced research projects that are of interest to the Department of Defense. **Open to April 1, 2017.**

[HM0210-14-BAA-0001 National Geospatial-Intelligence Agency Academic Research Program](#)

NGA welcomes all innovative ideas for path-breaking research that may advance the GEOINT mission. The NGA mission is to provide timely, relevant, and accurate geospatial intelligence (GEOINT) in support of national security objectives. GEOINT is the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. GEOINT consists of imagery, imagery intelligence, and geospatial information. NGA offers a variety of critical GEOINT products in support of U.S. national security objectives and Federal disaster relief, including aeronautical, geodesy, hydrographic, imagery, geospatial and topographical information. The NGA Academic Research Program (NARP) is focused on innovative, far-reaching basic and applied research in science, technology, engineering and mathematics having the potential to advance the GEOINT mission. The objective of the NARP is to support innovative, high-payoff research that provides the basis for revolutionary progress in areas of science and technology affecting the needs and mission of NGA. This research also supports the National System for Geospatial Intelligence (NSG), which is the combination of technology, systems and organizations that gather, produce, distribute and consume geospatial data and information. This research is aimed at advancing GEOINT capabilities by improving analytical methods, enhancing and expanding systems capabilities, and leveraging resources for common NSG goals. The NARP also seeks to improve education in scientific, mathematics, and engineering skills necessary to advance GEOINT capabilities. It is NGA's intent to solicit fundamental research under this BAA. Fundamental research means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from Industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security

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reason. (National Security Decision Directive (NSDD) 189, National Policy on the Transfer of Scientific, Technical, and Engineering Information). NGA seeks proposals from eligible U.S. institutions for path-breaking GEOINT research in areas of potential interest to NGA, the DoD, and the Intelligence Community (IC). **Open to September 30, 2017.**

NOAA-NFA-NFAPO-2016-2004791 FY2016 to FY2017 NOAA Broad Agency Announcement

This notice is not a mechanism to fund existing NOAA awards. The purpose of this notice is to request applications for special projects and programs ***associated with NOAA's strategic plan and mission goals***, as well as to provide the general public with information and guidelines on how NOAA will select proposals and administer discretionary Federal assistance under this Broad Agency Announcement (BAA). **This BAA is a mechanism to encourage research, education and outreach, innovative projects, or sponsorships that are not addressed through our competitive discretionary programs.** Funding for activities described in this notice is contingent upon the availability of Fiscal Year 2016 and Fiscal Year 2017 appropriations. Applicants are hereby given notice that funds have not yet been appropriated for any activities described in this notice. Publication of this announcement does not oblige NOAA to review an application beyond an initial administrative review, or to award any specific project, or to obligate any available funds. **Open to September 30, 2017.**

NOAA-OAR-SG-2016-2004772 National Sea Grant College Program 2016-17 Special Projects

The purpose of this notice is to request proposals for special projects associated with the National Sea Grant College Program's (Sea Grant) strategic focus areas, and to provide the general public with information and guidelines on how Sea Grant will select proposals and administer Federal assistance under this announcement. This announcement is a mechanism to encourage research or other projects that are not normally funded through Sea Grant national competitions. This opportunity is open only to Sea Grant Programs. Section III of this announcement describes eligibility requirements in more detail. Funding has not yet been made available to support applications submitted to this Federal Funding Opportunity (FFO), but such funding may become available during the year. Section II.A. below describes individual competition announcements that will be used to announce when funding is available; any restrictions or requirements on such funding, such as matching funds; and other funding details. Awards will be made under this FFO only if funds have been announced as provided in this FFO. **Open to September 30, 2017.**

BAA-16-100-SOL-00002 Broad Agency Announcement (BAA) for the Advanced Development of Medical Countermeasures for Pandemic Influenza- BARDA

BARDA ([full announcement](#)) encourages the advanced research, development and acquisition of medical countermeasures such as vaccines, therapeutics, and diagnostics, as well as innovative approaches to meet the threat of Pandemic Influenza in support of the preparedness mission and priorities of the HHS Public Health Emergency Medical Countermeasures Enterprise (PHEMCE) articulated in the 2014 PHEMCE Implementation Plan. The Implementation Plan is located on the ASPR website:

<http://www.phe.gov/Preparedness/mcm/phemce/Documents/2014-phemce-sip.pdf> The Pandemic and All Hazard Preparedness Act Pub. L. No. 109-417, 42 U.S.C. § 241 et seq. (PAHPA;

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<http://www.gpo.gov/fdsys/pkg/PLAW-109publ417/pdf/PLAW-109publ417.pdf>) and The Pandemic and All Hazard Preparedness Reauthorization Act Pub. L. No. 113-5, (PAHPRA: <http://www.gpo.gov/fdsys/pkg/PLAW-113publ5/pdf/PLAW-113publ5.pdf>) authorizes BARDA to (i) conduct ongoing searches for, and support calls for, potential qualified countermeasures and qualified pandemic or epidemic products; (ii) direct and coordinate the countermeasure and product advanced research and development activities of the Department of Health and Human Services; (iii) establish strategic initiatives to accelerate countermeasure and product advanced research and development (which may include advanced research and development for purposes of fulfilling requirements under the Federal Food, Drug, and Cosmetic Act or section 351 of this Act) and innovation in such areas as the Secretary may identify as priority unmet need areas; and (iv) award contracts, grants, cooperative agreements, and enter into other transactions, for countermeasure and product advanced research and development. Development Area of Interest: The purpose of this BAA is to solicit proposals that focus on one or more of the following area of interest as listed below: Development Area of Interest; Personal Protective Equipment (Mask and Respirators) for Influenza Infection for All- Hazards; Full-Featured Continuous Ventilators for Influenza and All-Hazards; Influenza Test Systems and Diagnostic Tools; Influenza Therapeutics; Influenza Vaccines BARDA anticipates that research and development activities awarded from this Broad Agency Announcement (BAA) will serve to advance the knowledge and scientific understanding of candidates' to protect the civilian population of the United States against pandemic influenza and serve to advance candidate medical countermeasures towards licensure or approval by the Food and Drug Administration (FDA). **Open to Oct. 24, 2017.**

AFRL Research Collaboration Program

The objective of the AFRL Research Collaboration program is to enable collaborative research partnerships between AFRL and Academia and Industry in areas including but not limited to Materials and Manufacturing and Aerospace Sensors that engage a diverse pool of domestic businesses that employ scientists and engineers in technical areas required to develop critical war-fighting technologies for the nation's air, space and cyberspace forces through specific AFRL Core Technical Competencies (CTCs). **Open until December 20, 2017.**

United States Army Research Institute for the Behavioral and Social Sciences Broad Agency Announcement for Basic, Applied, and Advanced Scientific Research (FY13-18)

Announcement for Basic, Applied, and Advanced Scientific Research. This Broad Agency Announcement (BAA), which sets forth research areas of interest to the United States Army Research Institute for the Behavioral and Social Sciences, is issued under the provisions of paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of proposals. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provisions of Public Law 98-369 (The Competition in Contracting Act of 1984) and subsequent amendments. The US Army Research Institute for the Behavioral and Social Sciences is the Army's lead agency for the conduct of research, development, and analyses for the improvement of Army readiness and performance via research advances and applications of the behavioral and social sciences that address personnel, organization, training, and leader

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development issues. Programs funded under this BAA include basic research, applied research, and advanced technology development that can improve human performance and Army readiness. The funding opportunity is divided into two sections- (1) Basic Research and (2) Applied Research and Advanced Technology Development. The four major topic areas of research interest include the following: (1) Training; (2) Leader Development; (3) Team and Inter-Organizational Performance in Complex Environments; and (4) Solider/Personnel Issues. Funding of research and development (R&D) within ARI areas of interest will be determined by funding constraints and priorities set during each budget cycle. **Open to February 5, 2018.**

BAA-HPW-RHX-2014-0001 Human-Centered Intelligence, Surveillance Air Force Research Lab

This effort is an open-ended BAA soliciting innovative research concepts for the overall mission of the Human-Centered Intelligence, Surveillance, & Reconnaissance (ISR) Division (711 HPW/RHX). It is intended to generate research concepts not already defined and planned by RHX as part of its core S&T portfolio. The core RHX mission is to develop human-centered S&T that (1) enables the Air Force to better identify, locate and track humans within the ISR environment and (2) enhance the performance of ISR analysts. To accomplish this mission, the RHX core S&T portfolio is structured into three major research areas: (1) Human Signatures - develop technologies to sense and exploit human bio-signatures at the molecular and macro (anthropometric) level, (2) Human Trust and Interaction – develop technologies to improve human-to-human interactions as well as human-to-machine interactions, and (3) Human Analyst Augmentation – develop technologies to enhance ISR analyst performance and to test the efficacy of newly developed ISR technologies within a simulated operational environment. The RHX mission also includes research carried over from the Airman Biosciences and Performance Program. While not directly linked to the core S&T strategic plan, there exists a unique capability resident within RHX to address critical Air Force operational and sustainment needs resulting from chemical and biological hazards. Research areas include contamination detection, hazard assessment and management, individual and collective protection, and restoration and reconstitution of operational capability. **Open to Feb. 12, 2018.**

Air Force BAA - Innovative Techniques and Tools for the Automated Processing and Exploitation (APEX) Center

The AFRL/RIEA branch performs Research and Development (R&D) across a broad area of Air Force Command, Control, Communications, Computers/Cyber, and Intelligence (C4I). All applicable "INTs" are investigated with emphasis on Ground Moving Target Indication (GMTI), Electronic Intelligence (ELINT), Signals Intelligence (SIGINT), Image Intelligence (IMINT), Non Traditional Intelligence, Surveillance and Reconnaissance (NTISR), and Measurement and Signature Intelligence (MASINT). The APEX Center is used to perform analysis for seedling efforts, provide baseline tool development for major programs, and to provide realistic operational systems/networks/databases for integration efforts. The APEX Center resources will be used by the Government to perform the necessary research, development, experimentation, demonstration, and conduct objective evaluations in support of emerging capabilities within the Processing and Exploitation (PEX) area. Software tools, data sets, metrics (Measures of Performance/Measures of Effectiveness), and analysis are needed for the Government to perform the vetting, maturing, and analysis of efforts related to PEX, e.g. Automatic Tracking, Activity Based Intelligence, Entity, Event & Relationship (EER) Extraction,

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Association & Resolution (A&R), Analysis & Visualization (A&V), Social Network Analysis, Network Analytics, Pattern Discovery, Scalable Algorithms, and Novelty Detection. The AFRL APEX Center is the AFRL/RI gateway into the cross-directorate PCPAD-X (Planning & Direction, Collection, Processing & Exploitation, Analysis & Production, and Dissemination eXperimentation) initiative. **Open to FY 2018.**

PAR-16-242 Bioengineering Research Grants (BRG) (R01) Department of Health and Human Services National Institutes of Health

The purpose of this funding opportunity announcement is to encourage collaborations between the life and physical sciences that: 1) apply a multidisciplinary bioengineering approach to the solution of a biomedical problem; and 2) integrate, optimize, validate, translate or otherwise accelerate the adoption of promising tools, methods and techniques for a specific research or clinical problem in basic, translational, or clinical science and practice. An application may propose design-directed, developmental, discovery-driven, or hypothesis-driven research and is appropriate for small teams applying an integrative approach to increase our understanding of and solve problems in biological, clinical or translational science. **Open to May 9, 2019.**

BAA-RQKD-2014-0001 Open Innovation and Collaboration Department of Defense Air Force -- Research Lab

Open innovation is a methodology to capitalize on diverse, often non-traditional talents and insights, wherever they reside, to solve problems. Commercial industry has proven open innovation to be an effective and efficient mechanism to overcome seemingly impossible technology and/or new product barriers. AFRL has actively and successfully participated in collaborative open innovation efforts. While these experiences have demonstrated the power of open innovation in the research world, existing mechanisms do not allow AFRL to rapidly enter into contractual relationships to further refine or develop solutions that were identified. This BAA will capitalize on commercial industry experience in open innovation and the benefits already achieved by AFRL using this approach. This BAA will provide AFRL an acquisition tool with the flexibility to rapidly solicit proposals through Calls for Proposals and make awards to deliver innovative technical solutions to meet present and future compelling Air Force needs as ever-changing operational issues become known. The requirements, terms and specific deliverables of each Call for Proposals will vary depending on the nature of the challenge being addressed. It is anticipated that Call(s) for Proposals will address challenges in (or the intersection between) such as the following technology areas: Materials: - Exploiting material properties to meet unique needs - Material analysis, concept / prototype development, and scale up Manufacturing Processes that enable affordable design, production and sustainment operations Aerospace systems: - Vehicle design, control, and coordinated autonomous and/or manned operations - Power and propulsion to enable next generation systems Human Effectiveness: - Methods and techniques to enhance human performance and resiliency in challenging environments - Man – Machine teaming and coordinated activities Sensors and Sensing Systems: - Sensor and sensing system concept development, design, integration and prototyping - Data integration and exploitation. **Open to July 12, 2019.**

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HDTRA1-14-24-FRCWMD-BAA Fundamental Research to Counter Weapons of Mass Destruction

** Fundamental Research BAA posted on 20 March 2015.** Potential applicants are strongly encouraged to review the BAA in its entirety. **Please note that ALL general correspondence for this BAA must be sent to HDTRA1-FRCWMD-A@dtra.mil. Thrust Area-specific correspondence must be sent to the applicable Thrust Area e-mail address listed in Section 7: Agency Contacts.** **Open to Sept. 30, 2019.**

BAA-RQKH-2015-0001 Methods and Technologies for Personalized Learning, Modeling and Assessment Air Force -- Research Lab

The Air Force Research Laboratories and 711th Human Performance Wing are soliciting white papers (and later technical and cost proposals) on the following research effort. This is an open ended BAA. The closing date for submission of White Papers is 17 Nov 2019. This program deals with science and technology development, experimentation, and demonstration in the areas of improving and personalizing individual, team, and larger group instructional training methods for airmen. The approaches relate to competency definition and requirements analysis, training and rehearsal strategies, and models and environments that support learning and proficiency achievement and sustainment during non-practice of under novel contexts. This effort focuses on measuring, diagnosing, and modeling airman expertise and performance, rapid development of models of airman cognition and specifying and validating, both empirically and practically, new classes of synthetic, computer-generated agents and teammates. An Industry Day was held in November 2014. Presentation materials from the Industry Day and Q&A's are attached. If you would like a list of Industry Day attendees, send an email request to helen.williams@us.af.mil **Open until November 17, 2019.**

BAA-AFRL-RQKMA-2016-0007 Air Force Research Laboratory, Materials & Manufacturing Directorate, Functional Materials and Applications (AFRL/RXA) Two-Step Open BAA

Air Force Research Laboratory, Materials & Manufacturing Directorate is soliciting White Papers and potentially technical and cost proposals under this two-step Broad Agency Announcement (BAA) that is open for a period of five (5) years. Functional Materials technologies that are of interest to the Air Force range from materials and scientific discovery through technology development and transition, and support the needs of the Functional Materials and Applications mission. Descriptors of Materials and Manufacturing Directorate technology interests are presented in the context of functional materials core technical competencies and applications. Applicable NAICS codes are 541711 and 541712. **Open to April 20, 2021.**

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