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Research Development & Grant Writing News ©

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Private Foundations that Fund Academic Research: A Quick Guide

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By Lucy Deckard, co-publisher

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There are many private foundations that fund a variety of projects, but only a portion of those foundations fund academic research. Below is a table of some of the largest foundations that fund academic research and a short description of what they currently fund. Remember, however, that the priorities and topics of interest of these foundations often change, so be sure to check the foundation websites at the links below to check their current funding priorities. (This list is not meant to be comprehensive but may help you get started on your funding search.) For more information on foundations, see the [Foundation Center](#).

Funding Agency and Funding Links	What They Currently Fund	Comments
Alfred P. Sloan Foundation	Funds STEM research , Science of STEM learning , Data and computational research , Economics , Energy & Environment , and other select issues .	Also funds Public Understanding of Science, Technology & Economics , (including books, TV, films, etc.), as well as research fellowships for early-career scientists and scholars. Tips for writing a successful grant proposal to Sloan here.
Andrew W. Mellon Foundation	Funds scholarship in the humanities , arts and cultural heritage , and scholarship in other countries	Also funds Mellon Mays Undergraduate Fellowships , dissertation, postdoc and early career faculty grants focusing on the humanities to support diversity, HBCUs and tribal colleges, and higher education in the US and other countries, and projects to digitize scholarly communications (research libraries, archives, etc.).
Beckman Foundation	Funds basic research in chemistry, biochemistry and medicine. Includes Beckman Young Investigators , Beckman Scholars , Beckman-Argyros Award in Vision Research , Beckman Postdoctoral Fellows .	Invitations to apply to Beckman Scholars sent to a relatively large number of major universities and scholars. Must be at an invited institution to be eligible.
Bill and Melinda Gates Foundation	Projects to improve: global health and development (especially preventing disease in children and empowering women and girls), and education of underprivileged US students. Also fund special projects in Washington state.	Grand Challenges opportunities announced here . Awarded grants database here . FAQs here . While much of the funding is focused on interventions, they do fund basic research (especially related to disease prevention).
Burroughs Wellcome Fund	Supports basic research to advance medical sciences. Fund career awards for medical scientists and travel grants, career award at the scientific interface , postdoctoral enrichment grants ,	Also fund and other scientific and educational activities. Special emphasis on North Carolina.

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Funding Agency and Funding Links	What They Currently Fund	Comments
	investigators in pathogenesis of infectious disease , research in regulatory science , and preterm birth initiative .	
Dana Foundation	Supports programs in science, health and education, including clinical neuroscience research and neuroimaging .	Grant Guidelines are here . Funded grants search here .
David & Lucile Packard Foundation	Projects to improve the lives of children, families and communities, and restore and protect the environment. Current program areas are: Conservation and Science ; Population and Reproductive Health ; Children, Families and Communities ; and local grants for projects in northern California and Pueblo, Colorado.	Fund “use-inspired” research as well as communication of science to decision-makers. Also fund Packard Fellowships Science and Engineering for early-career researchers (nominated by presidents of 50 invited institutions). Grants database here . FAQs here . Not all programs accept unsolicited proposals. Check each program page for info.
Ewing Marion Kauffman	Supports research on entrepreneurship and entrepreneurship education and the intersection of technology, public policy, and the economics of education.	Most external funding for intervention and support projects in education, entrepreneurship and rather than research. Supports entrepreneurship.org . Special focus on Kansas City.
Ford Foundation	Funds projects that challenge inequality, including civil engagement and government , free expression and creativity , equitable development , inclusive economies and gender, racial and ethnic justice , internet freedom and youth opportunity and learning . Funds large fellowship programs for underrepresented grad students who aspire to careers in academia. Also funds films and new media projects	BUILD grants focus on building institutions and networks.
Henry Luce Foundation	Projects in American Art , East Asia , Luce Scholars to advance understanding of Asia (among those who are not Asia scholars), Theology , Religion in International Affairs , Public Policy and the Environment ,	Also funds capacity building in Higher Education and scholarships, graduate fellowship and professorships for women in science, mathematics and engineering (through Clare Boothe Luce program).
Howard Hughes Medical Institute	Projects to advance biomedical research and science education . Includes HHMI Investigator Program and Faculty Scholars Program	Check eligible institutions list before applying.
John Templeton Foundation	Funds programs on Science and the Big Questions , Character Virtue Development , Genetics , and Individual Freedom & Free Markets , and Exceptional Cognitive Talent and	Includes research on philosophy and theology. Especially interested in bold ideas that cross disciplinary boundaries to engage the Big Questions. Funded grants here .

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Funding Agency and Funding Links	What They Currently Fund	Comments
	Genius.	
McKnight Foundation	Neuroscience research , early literacy research , clean and resilient power and energy action for the midwest , and international research in southeast Asia and on collaborative crop systems . Special emphasis on Minneapolis area.	Grants database here. Funding FAQ here.
Robert Wood Johnson Foundation	Projects to improve health and health care of Americans.	Awarded grants here. FAQs here. Emphasis on public health, life style factors, communication, etc. rather than pharmaceutical therapies.
Spencer Foundation	Research on education and improvement of its practice. Includes Small Research Grants , Lyle Spencer Research Award , Strategic Initiatives , Research-Practice Partnership Grants , and Midcareer grants .	Also fund dissertation and postdoc fellowships ,
W.K. Kellogg Foundation	Projects to promote educated kids , healthy kids , and secure families . Focus on early childhood (prenatal to age 8), within the context of their families and community. Committed to racial equity and community & civic engagement . Special interest in Michigan.	Applications accepted throughout the year; no set deadlines. Most grants that include research combine interventions with research. Awarded grants database here. Submission tips. Required application information. Sign up for email updates here.
W. M. Keck Foundation	Supports research in science, engineering and medical research. Funds a Research Program , Undergraduate Education Program , and Southern California Program .	Encourages high-risk, potentially transformative projects from early career and senior investigators. FAQ here. Funded grant abstracts for the Research Program are here .
William and Flora Hewlett Foundation	Projects to help people build measurably better lives, including improving education , protecting the environment , addressing global development and population , and supporting performing arts in California Special emphasis on California and the Bay Area.	Interactive tool to explore awarded grants. Most of their funding goes to non-research focused grants and support. Letters of inquiry accepted only for certain programs (see program pages).

Research Narrative Knowledge Base

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By Mike Cronan, co-publisher

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Proposal writing is a knowledge-based skill gained largely from experience, workshops, mentors, self study, lessons from failures and successes, of which there are likely far fewer than failures. Proposal writing is a skill set that allows you to better pitch a great idea to a funder, obviously not always winning, but always with the goal of competing for funding on the first submittal and an odds on pick to be funded on a subsequent resubmittal.

Mistakes in proposal writing noted by review panels as the reason for a declined proposal offer the best opportunity to learn and improve and become proficient at the craft of grant writing. Fortunately, researchers will have many such opportunities to learn from mistakes if they are in the proposal development and writing business. However, always keep in mind that ***applying grant-writing skills to a research idea of modest significance is like applying CPR to a training dummy in hopes it will spring to life.*** It just ain't going to happen!

Always keep in mind that research development and grant writing are knowledge-based enterprises. For instance, while programs running in the background can be an annoyance on the computer as they gobble up physical memory and spike CPU usage, perhaps for some mysterious diagnostics known only to coders, when actually developing and writing a proposal's research narrative, ***four "background programs" should always be running in the "physical memory" of those planning, developing, and writing a research narrative:***

- (1) your generic (experience-based) knowledge about what proposal practices result in a well written research narrative to ***any agency in any disciplinary area;***
- (2) your generic (experience-based) knowledge about what proposal practices result in a poorly written research narrative to ***any agency in any disciplinary area;***
- (3) the agency- and program-specific narrative requirements enumerated in the funding solicitation, including any referenced documents and review criteria that must be addressed in the research narrative; and
- (4) the proposal development and writing team's collective knowledge about the specific agency's mission, culture, research priorities, recent funding history in the research topic area, etc., that will better inform the planning, development, and writing of the proposal.

Moreover, keep in mind that the actual writing process represents an author's decisions made at multiple levels, such as the words chosen, the chosen structure of each sentence, the chosen order of paragraphs, the chosen level of detail and specificity, etc. After all, the goal of a proposal narrative is to produce a persuasive argument for funding. When you write a research narrative, you make a decision after every word, after every sentence, after every paragraph, after every section, etc., in terms of what arguments you put forward and how you support those arguments by details, specificities, examples, references, relevant research contexts, etc. Your core guide in making these narrative decisions comes, to a large extent, from the four enumerated items above that "run in the background" as you write. How well

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these four items inform your narrative as you write will determine how well you present your proposed research to program officers and reviewers reading your proposal.

Furthermore, in most cases, proposals are the product of small or large teams, each member of the team playing a specific role or bringing a needed expertise to the effort, either research expertise or proposal development expertise, or some other expertise needed for a competitive effort. Most likely, one or a few people on the research team will take on the task of actually writing the research narrative, or at least the first draft of the many edits and rewrite iterations that will follow in order to converge on narrative perfection. **Bottom line:** *anything worth writing once is worth writing again, and again, and again...*

The important point to keep in mind when you start writing a research narrative is that you **do not** begin with a “**blank page**” that confronts the author like a looming black void of anxiety, perhaps equivalent to the horror of looking at the scale after the holidays. Proposal narratives are not all that open ended, allowing you to wander around for 15, 20, or more unscripted and unguided pages, or as H. L. Mencken noted as “*an army of ten thousands words marching across the page in search of an idea.*”

In practice, you begin with a very specific set of agency-enumerated initial conditions and questions to answer and review criteria to follow that have an enormous impact on how you write, structure, and argue the research narrative. The most important of these initial conditions is the ***use of the funding solicitation as a narrative organizational template***. Too many proposal authors ignore, in whole or in part, the narrative guidelines in the solicitation, thereby ensuring a declined proposal. Some authors’ persistent and perplexing failure to follow the instructions of the funding solicitation is truly a mystery, but it does have the advantage of reducing the pool of competitive grants for funding, thereby increasing your odds of funding if you are fully responsive to the agency’s requirements.

In Brief: NIH New Strategic Plan (2016-2020)

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By Mike Cronan, co-publisher

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Several weeks ago, NIH published its [research strategic plan](#) for Fiscal Years 2016-2020. This 48-page document complements, but does not replace, the strategic plans of the individual Institutes, Centers, and Program Offices. It is an important document for anyone involved in the planning, development, and writing of proposals to NIH, either as a researcher or a research office assisting faculty seeking NIH funding. Moreover, it is a helpful document to those who seek funding from both NIH and NSF, or for those whose primary “research home” is either NIH or NSF, but feel there are potential research opportunities at the other agency.

To this point, the strategic plan notes that **“NIH also will promote health and encourage disease prevention by facilitating collaboration across biomedical, behavioral and social sciences, as well as disciplines not traditionally considered to involve health, such as architecture, transportation, and urban planning.”** How this collaboration unfolds over the coming years will be of particular interest to research offices that work with faculty from a broad range of disciplines.

In this regard, the strategic plan will assist in better clarifying and differentiating the NIH’s mission interest in the biological sciences as opposed to the interests of NSF in the biological sciences, or biochemistry. Other areas, such as Big Data, genomic technologies, or antimicrobials will also be distinguished by agency, offering key distinctions important to those who may seek support from both agencies. These distinctions are of growing importance in emerging research areas that are becoming **increasingly interdisciplinary and funded across multiple agencies, albeit tied to each agency’s mission.**

In the latter case, the strategic plan notes that, of many federal science agencies, NIH often coordinates and works closely with the Centers for Disease Control and Prevention, the Food and Drug Administration, the Agency for Healthcare Research and Quality, the HHS Office of the Assistant Secretary for Preparedness and Response, the National Science Foundation (e.g., [BRAIN Initiative](#)[®], also with DARPA), the Department of Energy (e.g., Structural biology with linear accelerator beam lines), Defense Advanced Research Projects Agency (e.g., [Tissue Chip for Drug Screening](#)), Department of Defense (e.g., [Federal Interagency Traumatic Brain Injury Research](#) (FITBIR)), Department of Agriculture (e.g., [National Collaborative on Childhood Obesity Research](#)), Environmental Protection Agency (e.g., [Toxicology Testing in the 21st Century](#) (Tox21)), and with FDA.

The NIH mission, the strategic plan notes, is to “seek fundamental knowledge about the nature and behavior of living systems and to apply that knowledge to enhance health, lengthen life, and reduce illness and disability.... To achieve its mission, NIH must support the many types of fundamental scientific inquiry that are so essential to the progress of biomedicine. Fundamental science includes basic biological research that generates the knowledge of **how living systems work at the molecular, cellular, and organismal level.**”

Some of the research areas mentioned in the strategic plan as of particular interest to NIH include **“microbiomics**, in which next-generation DNA sequencing is being used to explore the complex communities of microbes that live on and in the human body and how they

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interact with human cells to influence health and disease.” NIH is but one of many federal agencies (e.g., CDC, USDA, NSF) seeking to find new ways to combat the growing threat of antibiotic-resistant bacteria. For example, the strategic plan notes “an ingenious **microfluidic** system that can trap and sort single cells (that) has enhanced efforts to mine one of nature’s richest sources of potential antibiotics: **dirt**. Certain microorganisms that naturally live in soil produce antibiotic-like compounds that are highly toxic to other microbes.”

Other frontiers in fundamental science noted in the strategic plan include: “**molecular immunology**, which is using RNA sequencing and other transcriptome analysis tools to characterize in unprecedented detail how immune cell repertoires vary in health and disease; **structural biology**, which is undergoing a major leap forward in defining three-dimensional submicroscopic structures because of the development of cryo-electron microscopy (cryo-EM); and **cell biology**, which is benefiting from novel approaches to light microscopy that have pushed resolution below the diffraction limit. In addition, the development of innovative ‘**tissue- and organ-on-a-chip**’ systems is helping to bridge the gap between fundamental and translational science, providing new models of complex pathology for understanding basic mechanisms of disease.”

At NIH, the strategic plan notes, fundamental science also includes “**basic behavioral and social science research** that generates knowledge of how living systems interact with and are influenced by experiences at the individual, family, social, organizational, and environmental levels.” In other areas, “NIH-supported research on the neurobiological and learning mechanisms of goal-directed versus habitual behaviors provide important insights on how unhealthy habitual behaviors can be brought under greater control and how behavior change can be maintained.”

The strategic plan notes that “**Data science** also holds tremendous potential, not only for enhancing the efficiency of the conduct of science, but also for increasing the impact of fundamental science, along with many other areas of biomedical research. To this end, NIH will serve as a focal point for catalyzing this historic research opportunity, continuing to leverage its roles as an influential convener and major funding agency to encourage rapid, open sharing of data and greater harmonization of scientific efforts.”

“NIH will also maintain and expand its support of research aimed at addressing new computational challenges in accessing, managing, analyzing, integrating, and mining the huge amounts of data, often referred to as ‘**Big Data**,’ being generated by biomedical scientists. One hope is that advances in **bioinformatics and computational biology** will lead to basic researchers conducting more experiments via computer simulation (in silico), with the ensuing results being used to generate and test novel hypotheses that will be rapidly shared with the broad research community.”

Going forward, the strategic plan notes, “NIH will take additional steps to enhance the transparency of its decision process by **making public a standard metric for funding each year**. NIH will also harmonize approaches to decision making by ensuring ICOs set their individual paylines—the funding cutoff point for grant applications based solely upon peer-review scores—to provide maximum flexibility for use of the select pay option. Select pay refers to funds set aside to support grant applications that, based upon scores from peer review, do not fall within the payline, but that fill an important research gap and/or are of particular programmatic relevance to an ICO’s scientific and health priorities.”

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Another strategic research area of interest to NIH is the need for additional research on pain. To this end, NIH “has established the [Interagency Pain Research Coordinating Committee](#), which has generated a [National Pain Strategy](#) and facilitated collaborations aimed at advancing fundamental understanding of pain and improving pain-related treatment.”

Moreover, according to the strategic plan, “NIH will also accelerate and expand upon its efforts to encourage development of more precise, individualized ways of managing and preventing disease. Known collectively as [precision medicine](#), these emerging approaches for preventing, diagnosing, and treating disease take into account individual variability in genes, environment, and lifestyle. While individualized, molecularly based strategies are in use for some conditions, including cancer, HIV/AIDS, and hepatitis C, more research is needed to realize precision medicine’s promise for all conditions. Among the frontiers in this area is [pharmacogenomics](#), which studies how an individual’s genetic makeup (or the genetic makeup of a tumor) affects response to drugs. The goal of such research is to enable health-care providers to prescribe the right drug at the right dose at the right time for each patient.”

“Over the next 5 years, NIH will support research aimed at addressing a wide range of obstacles that lie at various points throughout the therapeutic development process. NIH will strive to forge new connections across research disciplines to advance understanding of molecular mechanisms and discovery of treatments and cures for a wide range of illnesses. ***Systems-based and interdisciplinary approaches are vital to making progress toward treatments tailored to individual patients.***...Over the next 5 years, NIH’s health promotion and disease prevention efforts will place **particular emphasis on research in several key areas: *studying healthy individuals across the lifespan; applying technological advances in early detection, diagnosis, and prevention; and utilizing evidence-based interventions to reduce health disparities.***”

It is important to note in the strategic plan that “***the relative burden that various diseases place upon human health and wellbeing will serve as a crucial, but not the only, consideration in aligning NIH’s research priorities with public health needs.*** To this end, NIH will work with its many partners, including CDC, to strengthen the collection of high quality, comparable data on the burden of disease and will integrate analyses of such data into its priority setting process.”

It is worth noting that in fiscal year 2014, “NIH reviewed more than 51,000 research project grant (RPG) applications and awarded approximately 10,000 new and competing RPGs to institutions/organizations to support specific projects performed by designated investigators in areas representing their research interests and competencies. The average duration of an NIH grant award is about 4 years.”

Moreover, the strategic plan notes, “NIH consists of [27 Institutes and Centers](#) (ICs), along with Program Offices, which collectively are referred to as ICOs. These ICOs have [individual strategic plans](#) and specific research agendas, which are aligned with the legislative mandates that are often related to specific diseases or body systems. NIH currently devotes approximately 84% of its budget to grants and contracts supporting more than 300,000 members of the research workforce ([extramural](#)), including 35,000 principal investigators, in the extramural biomedical and behavioral/social sciences research communities. Because a broad research portfolio is critical for carrying out NIH’s mission, the agency’s portfolio of grants and contracts covers the full range of biomedical, behavioral, and social sciences

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research, from basic to applied. In addition to research supported by individual ICOs, the [NIH Common Fund](#), within the NIH Office of the Director, funds cross-cutting, trans-NIH scientific programs that are high impact, transformative, and managed against defined milestones.”

This is a particularly informative strategic plan and well worth a read in its entirety by those who work with faculty whose research might lead them to submit a proposal to NIH, particularly in gaining a better understanding whether and where their research is a fit for NIH funding.

Write Like You Are the Reviewer

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By Mike Cronan, co-publisher

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A well written proposal is one that answers all the questions reviewers need answered to make an informed funding determination. Many of these questions are known early on, both to you and the reviewers, from a close and repeated reading of the funding solicitation, including the review criteria and possibly other referenced documents. In many ways, these function as enumerated “checklist” questions that can guide your writing of the research narrative. In many solicitations, the list of questions you must address in the narrative can be very extensive. Failure to address any one of them will introduce a fatal flaw into the narrative, and is one of the more common reasons proposals are declined for funding.

Proposals flawed by a failure to address the agency’s expectations are simply inexcusable, but, again, not uncommon. A funder’s questions can be used to improve the writing, rewriting, and editing of a proposal by simply listing these questions from the solicitation, comparing them to the narrative, and making sure each is addressed. This is the rationale for using the funding solicitation as a narrative template to ensure a proposal fully responsive to an agency’s every question.

In this context, it is important to also keep in mind that reviewers are selected to ensure that, as an aggregate, they bring to the review process a suite of expertise that faithfully complements the full scope and scale of the solicitation’s research objectives. For example, as solicitations become increasingly interdisciplinary, so too must the composition of the review team. Moreover, many solicitations, particularly from NSF, often include additional program components that complement the research core, e.g., perhaps education and training, or many of the other areas that typically fall under a broader impacts umbrella.

The point here is that this inclusion will diversify the review team considerably. You will have to anticipate such a diversification based on the scope of the solicitation and write your research narrative with this in mind, i.e., ***you need to write to your audience*** (review panel), keeping in mind that that it likely will not be comprised entirely of experts in your field.

Moreover, having a more diverse set of reviewers will mean a more diverse set of likely questions about your narrative during the review process. For example, if you are writing a large-team proposal to NSF, you can expect an education and training component to the proposal. In such a case, you would assume the review team will include a member with a background in education, training, and evaluation. Consequently, you would take care to write a research narrative that is accessible to every member of the review team, not just a technical subset of experts in your field.

In addition to the known questions the reviewers will expect to have answered in your research narrative, there will be less obvious questions, ***and it is here that you need to learn to think, question, and write as a reviewer.*** These questions may arise from the way you have written the proposal and are specific only to your narrative. For example, questions may arise from unsupported or insufficiently supported claims made in the research narrative. An author may write, “Our proposed research is transformational and will significantly impact the field,” yet offer insufficient details and specificity to validate the claim, thereby leaving the reviewers

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to wonder “Why is this research transformational; how specifically does it impact the field; is there sufficient research detail to warrant funding?” etc.

In other cases, reviewers at basic research agencies may question whether the proposed research is sufficiently fundamental to meeting the solicitation’s intent, a question often asked by NSF review panels, and one best anticipated and convincingly answered by those who write proposals to that agency. These are the kinds of questions reviewers will ask and the questions you must anticipate while writing the narrative to prevent them being asked, or, if they are asked, to ensure they can be answered by convincing information provided in the narrative.

Of course, as you write, you must always keep in mind the overarching questions reviewers will seek to have answered in your narrative, such as: *What do you propose to do; why do you propose to do it; how will you do it; why is it significant; how will it impact the field and advance the discipline; where does your research fit in the current context of the field; why is it transformational, etc.* These questions are really a **generic distillation** of the specific overarching review criteria of federal research agencies such as NIH and NSF.

For example, NSF advises reviewers: *“When evaluating NSF proposals, reviewers should consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits would accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions.”*

Applicants may also lack insight into more specific agency instructions to reviewers. Most of these can reasonably be surmised, but it is also helpful to deepen this insight by talking to colleagues who have reviewed for specific agencies about the review process. In other cases, that information is provided by the agency online to reviewers. In these cases, it benefits the applicant to read this information. Your goal is to read these instructions as a reviewer might.

NSF provides the below instructions to reviewers of proposals to that agency, all good questions to keep in mind as you write:

“The following elements should be considered in the review for **both criteria**:

What is the potential for the proposed activity to:

1. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or institution to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?”

In terms of the actual review, NSF instructs reviewers of “things to do in a review,” including:

- Detail the strengths and weaknesses, including **why** they are strengths or weaknesses.

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- Provide specific information that supports your rating, referring to each of the merit review criteria.
- Write a summary statement providing a justification for how you arrived at your overall rating based on how you weighted the two merit review criteria: intellectual merit and broader impacts.

With these instructions in mind, the author of a research narrative will want to address these issues in the proposal in a clear and organized way **to make life easy for reviewers** and to capture the essence of the significance of the research. Moreover, because what you write in the narrative will be used (often verbatim or paraphrased) by the reviewers in drafting their reviews, ***you want to make it easy for them to summarize your strengths and relate them to the review criteria.*** Doing your job well makes it easier for reviewers to do their job well. So, if you write like you are a reviewer, you will keep reviewers happy and that will work to your funding benefit.

Nexus of Food, Energy, and Water Systems

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By Mike Cronan, co-publisher

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NSF's long awaited agency-wide solicitation, in partnership with USDA/NIFA, *Innovations at the Nexus of Food, Energy and Water Systems* ([INFEWS](#)), was recently published with a due date of March 22. This is not a long open period, given the inherent complexity of the interdisciplinarity and team structure required to be competitive. The goals of INFEWS are not trivial, as NSF states below, and writing a successful proposal to this program will challenge even the most experienced PIs:

"The overarching goal of INFEWS is to catalyze the well-integrated interdisciplinary research efforts to **transform scientific understanding** of the FEW nexus **in order to improve system function and management, address system stress, increase resilience, and ensure sustainability**. The NSF INFEWS initiative is designed specifically to attain the following goals:

1. Significantly advance our understanding of the food-energy-water (**FEW**) system **through quantitative and computational modeling**, including support for relevant cyberinfrastructure;
2. Develop real-time, cyber-enabled interfaces that **improve understanding of the behavior of FEW systems and increase decision support capability**;
3. Enable research that will lead **to innovative system and technological solutions to critical FEW problems**; and
4. Grow the **scientific workforce capable of studying and managing the FEW system**, through education and other professional development opportunities."

In addition, the solicitation notes, "pursuing INFEWS and INFEWS-related research topics and projects may require that novel capabilities be added to existing shared cyberinfrastructure to be successful. This solicitation also seeks potential investments that would **introduce new capabilities and novel cyberinfrastructure approaches** to addressing the scientific challenges inherent in INFEWS research, leading to previously unattainable results."

A systems approach is required, inclusive of physical processes, natural processes, biological processes, social and behavioral processes, and cyber-elements, for three research tracks: Track 1, FEW System Modeling; Track 2, Visualization and Decision Support for Cyber-Human-Physical Systems at the FEW Nexus; and Track 3, Research to Enable Innovative Solutions. Track 4 targets Education and Workforce Development. Moreover, NSF notes, "INFEWS proposals must incorporate science from three or more intellectually distinct disciplines that, in aggregate, represent scientific areas typically supported **by three or more of the participating NSF directorates or two (or more) directorates and USDA/NIFA**."

Also, keep in mind that this is a new program at NSF. This typically means that NSF has not yet settled on what constitutes a successful proposal, but will start making that determination in response to the proposals received under this competition. INFEW solicitations in future competitions will likely become more detailed and specific than the current solicitation, which is somewhat open ended.

Regardless, proposals must define the FEW systems intended for study, identify the systems boundaries, identify the primary food, energy, and water component systems, identify

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the feedback mechanisms and dynamics among the FEW system components, and identify how the research will account for exogenous inputs to the system. These requirements are not trivial and will challenge the narrative authors to respond with clarity, detail, and specificity rather than generalities.

Moreover, INFEW integration across disciplines must go beyond existing approaches that can be addressed within an individual discipline. NSF intends this program to bridge significant existing gaps between disciplinary foci ***and to foster new lines of research that emerge only in an interdisciplinary context***. As stated in the solicitation, proposals “must document that the proposed research is truly interdisciplinary, that the respective components are fully integrated and necessary for the successful execution of the proposed project, and that the research team contains sufficient expertise to carry out all dimensions of the research plan. Plans for integration of the respective research components must be fully outlined in the proposal.”

Like many NSF programs requiring an integrated team structure capable of transformational research, a competitive INFEWS proposal will need to define the existing research context to which the proposed research must be juxtaposed to accentuate ***exactly how*** it will transform scientific understanding of the FEW nexus. Common failures in proposals such as these (a) begin with an unwieldy research team lacking a clearly defined vision and focus and thereby producing a proposal that excessively belabors informational background on the problem; (b) include a proposal team that spends too much narrative space describing what will be done, and insufficiently explaining specifically how it will be done; (c) a team that fails to sufficiently explain clearly and with specificity where the proposed research fits in the current state of the field/research context and how it will transform it; (d) and a proposal narrative drafted as a series of a silos rather than as an integrated research narrative. As such, it fails to demonstrate the interdisciplinary nature of the research and the experience of the team working in that environment together.

Bottom line: INFEWS is envisioned as a long term investment in multiple programs at NSF and other agencies over the coming five years, or more. The INFEW will be a challenging proposal to write, but likely well worth the effort long term if the FEW nexus is a fit for your research.

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[A Grant Submission New Year's Resolution](#)

Posted on [December 30, 2015](#) by [Mike Lauer](#), NIH

On December 29, 2014, two days before New Year's Day, Reuters posted a [headline](#), "New Year's resolutions may be more procrastination than motivation." Dorene Internicola, who wrote the accompanying story, cited a study from the University of Scranton which found that "While about 45 percent of Americans make New Year's resolutions, only about 8 percent succeed." Among the [most common American New Year's resolutions](#) is "Getting Organized," which by [some interpretations](#) might mean avoiding procrastination. One [recent posting](#) suggests that "to stop procrastinating" is "the only New Year Resolution you should set." Procrastination is highly prevalent. In the words of Scarlett O'Hara, "I can't think about that right now. If I do, I'll go crazy. I'll think about that tomorrow."

Procrastination is actually related to task avoidance, which is a symptom of anxiety and depression. Since grant applications are anxiety producing, it is only natural that people would avoid finishing them. But hard facts about how applications fare in peer review when they are submitted closer to the receipt date may give applicants the cognitive tools they need to overcome their inclination to delay.

I particularly like the abstract from [this paper](#):

Strong and consistent predictors of procrastination were task aversiveness, task delay, self-efficacy, and impulsiveness, as well as conscientiousness and its facets of self-control, distractibility, organization, and achievement motivation. These effects prove consistent with temporal motivation theory, an integrative hybrid of expectancy theory and hyperbolic discounting. Continued research into procrastination should not be delayed, especially because its prevalence appears to be growing.

One might think that scientists and the institutions might be different, particularly when it comes to submitting grant applications. The stakes are high – should a submission with errors come in too late, it may be too late to fix. Months of work are lost. Scientists, being highly organized people who spend countless hours designing experiments and study designs, surely must be the kind of people who would not put off submitting grants until the last possible day. So we might hypothesize...(more at above URL)

INFORMATION WEBCAST: The NSF will hold an informational webcast on **Friday, January 22, 2015 at 1:30pm** to discuss the CRISP program and answer questions about this solicitation. More details about the webcast will be posted on the CMMI website, <http://www.nsf.gov/eng/cmmi>, as they become available.

[Could 2015 Be a Turning Point in NIH Funding?](#)

It's a "different atmosphere than we've seen in over a decade" said Mary Woolley, the president of the advocacy group Research! America. In the wake of September 11, she said, national defense and fighting terrorism crowded out research funding. "We took our eyes off the ball collectively on focusing on making sure that research for health—and I would say

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science broadly for that matter—was adequately supported,” Woolley said. She attributes the change this year to “the steady drumbeat of loss of life.” MORE at above URL.

Department of Health and Human Services' Grants Forecast

The Department of Health and Human Services' Grants Forecast is a database of planned grant opportunities proposed by its agencies. Each Forecast record contains actual or estimated dates and funding levels for grants that the agency intends to award during the fiscal year. Forecast opportunities are subject to change based on enactment of congressional appropriations. When funding is available and an agency is ready to accept applications, the agency will issue an official notice, known as a Funding Opportunity Announcement (FOA), which will be available on Grants.gov. The FOA provides guidance on how to receive an application kit and instructions on how to apply.

The National Science Foundation

NSF invites you to view the plenary session webcast presentations from the Fall 2015 NSF Grants Conference held on November 2-3 in Arlington, Virginia. **Free on-demand webcast viewing is available at:** <http://www.tvworldwide.com/events/nsf/151102/>. Registration is required. If you previously registered for the live webcasts, you can log in with your registered email to view the recorded webcasts. If you are not registered on the TV Worldwide site, please register online by providing your name, title, organization, and email. **The conference presentation slides are posted on the Policy Office [website](#).**

The below webcast sessions are available for on-demand viewing:

- Welcoming Remarks*
- Introduction & NSF Overview*
- Proposal Preparation*
- Merit Review Process*
- Post Award Monitoring & Compliance*
- Award Management*
- NSF Policy Update*
- Office of the Inspector General*
- Funding Mechanism Overview*
- Faculty Early Career Development (CAREER) Program*

For webcast on-demand viewing technical support, please email info@tvworldwide.com. Grants conference and NSF policy questions may be directed to grants_conference@nsf.gov. The next NSF Grants Conference will be held February 29 - March 1, 2016, in Portland, Oregon, and will be hosted by Portland State University. Please visit the NSF Grants Conference Notification [website](#) to be placed on the mailing list for the Portland event, as well as for future NSF Grants Conferences. In addition, to receive conference and other NSF updates by email, please register for NSF's free email subscription service by selecting "Get Events Updates by Email" on the NSF events [webpage](#).

Updates on Addressing Rigor in Your NIH Applications

As NIH moves ahead with implementing measures to enhance rigor, transparency and reproducibility in NIH-supported research, I'd like to give a brief update on these efforts, and highlight some important timeline changes for implementation in applications for institutional

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training grants (T), institutional career development awards (K12), and individual fellowships (F).

To briefly recap, in October, NIH announced updates to the application instructions and review criteria for most research grants and individual mentored career development awards. These updates instruct applicants to address four key areas NIH deems important for enhancing rigor and transparency in research: 1) the scientific premise forming the basis of the proposed research; 2) rigorous experimental design for valid, robust, and unbiased results; 3) consideration of relevant biological variables; and 4) authentication of key biological and/or chemical resources. My October blog post, "[Bolstering Trust in Science Through Rigorous Standards](#)," describes the rationale behind the changes and the steps NIH has taken to engage the community in these efforts.

For the January 25, 2016 application due dates, the updates apply to most NIH research grant applications, with some exceptions, [as described in the October NIH Guide notice](#). We also announced requirements to address rigor in individual [mentored career development award applications](#) submitted after January 25, 2016. In addition, [Research Performance Progress Reports](#) (RPPR) for these programs must also address rigor if they are submitted on or after January 25.

As you consider how to address rigor in your NIH applications, I would like to remind you of resources that should help along the way. Your first stop should be the [NIH Office of Extramural Research \(OER\) web page on rigor and reproducibility](#), which links to a variety of resources from OER, and across NIH. For example, you might want to watch [our NIH staff training module](#). While this tutorial was initially created for NIH program officers and scientific review officers, it provides lots of content that would be useful to you too—including a general policy overview on rigor and transparency, as well as updates on the changes to our grant applications and review language.

We also [recently extended](#) the timeline for implementing rigor and transparency policy changes for institutional training grants, institutional career development grants, and individual fellowships. We recognized that applicants to these programs would require significant time and resources to design substantive instructional plans and new curricula to ensure the in-depth training in rigorous experimental design for trainees and fellows. This is especially true given the breadth of different training and career development programs funded across NIH. As early as fiscal year 2017, we will be asking applicants to include plans for instructing trainees and fellows in rigorous experimental design (stay tuned for future NIH Guide notices). As you start to think about future applications, you may wish to review some different approaches for addressing experimental design and reproducibility in curricula and training. For example, NIGMS recently issued a funding opportunity to support the development of "[Training Modules to Enhance Data Reproducibility](#)." You can review summaries of the [awarded projects](#) on NIH RePORT. NIGMS has also compiled award abstracts describing predoctoral training curricula [on their website](#). We also recognize that each grant application will need to develop specific instructional material that matches the specific area of training and research.

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[Comparative Indicators of Education in the United States and Other G-20 Countries: 2015](#)

Comparative Indicators of Education in the United States and Other G-20 Countries draws on the information about education from the International Indicators of Education Systems (INES) project at the Organization for Economic Cooperation and Development (OECD), as well as international assessments ranging across the lifespan from grade 4 through adulthood. Topics covered include population and school enrollment, academic performance, contexts for learning, expenditure for education, and educational attainment and income. The G-20 countries, which are among the most economically developed, represent 85 percent of the world's economy and two-thirds of its population, and are some of the United States' largest economic partners. This report is the latest in a series that has been published since 2002. Previous reports focused on the G-8 countries. This is the first to focus on the G-20 countries.

[Webinar Series: How to Successfully Evaluate a Professional Development Program](#)

Join research experts from the Regional Educational Laboratory (REL) Southeast for a free webinar series on developing a strong evaluation design for professional development programs.

[Course-Based Undergraduate Research Experiences Can Make Scientific Research More Inclusive](#)

Course-based undergraduate research experiences (CUREs) may be a more inclusive entry point to scientific research than independent research experiences, and the implementation of CUREs at the introductory level may therefore be a way to improve the diversity of the scientific community.

[Assessment of course-based undergraduate research experiences: a meeting report](#)

The Course-Based Undergraduate Research Experiences Network (CUREnet) was initiated in 2012 with funding from the National Science Foundation program for Research Coordination Networks in Undergraduate Biology Education. CUREnet aims to address topics, problems, and opportunities inherent to integrating research experiences into undergraduate courses. During CUREnet meetings and discussions, it became apparent that there is need for a clear definition of what constitutes a CURE and systematic exploration of what makes CUREs meaningful in terms of student learning. Thus, we assembled a small working group of people with expertise in CURE instruction and assessment to: 1) draft an operational definition of a CURE, with the aim of defining what makes a laboratory course or project a "research experience"; 2) summarize research on CUREs, as well as findings from studies of undergraduate research internships that would be useful for thinking about how students are influenced by participating in CUREs; and 3) identify areas of greatest need with respect to CURE assessment, and directions for future research on and evaluation of CUREs. This report summarizes the outcomes and recommendations of this meeting.

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[Undergraduate research experiences: Impacts and opportunities](#)

Most undergraduates give high ratings to research experiences. Studies report that these experiences improve participation and persistence, often by strengthening students' views of themselves as scientists. Yet, the evidence for these claims is weak. More than half the 60 studies reviewed rely on self-report surveys or interviews. Rather than introducing new images of science, research experiences may reinforce flawed images especially of research practices and conceptual understanding. The most convincing studies show benefits for mentoring and for communicating the nature of science, but the ideas that students learn are often isolated or fragmented rather than integrated and coherent. Rigorous research is needed to identify ways to design research experiences so that they promote integrated understanding. These studies need powerful and generalizable assessments that can document student progress, help distinguish effective and ineffective aspects of the experiences, and illustrate how students interpret the research experiences they encounter. To create research experiences that meet the needs of interested students and make effective use of scarce resources, we encourage systematic, iterative studies with multiple indicators of success.

[Vision and Change in Undergraduate Biology Education: Chronicling Change, Inspiring the Future](#)

This report highlights the 2013 Vision and Change conference discussions and recommendations, and chronicles many of the accomplishments and challenges biologists and educators nationwide have faced in improving undergraduate biology education. It also synthesizes the road maps participants suggested for accelerating change and moving forward. Examples of programs inspired by the original Vision and Change initiative are highlighted throughout, with additional projects and programs listed in the appendix.

[Integrating Discovery-Based Research into the Undergraduate Curriculum: Report of a Convocation](#)

Students who participate in scientific research as undergraduates report gaining many benefits from the experience. However, undergraduate research done independently under a faculty member's guidance or as part of an internship, regardless of its individual benefits, is inherently limited in its overall impact. Faculty members and sponsoring companies have limited time and funding to support undergraduate researchers, and most institutions have available (or have allocated) only enough human and financial resources to involve a small fraction of their undergraduates in such experiences.

Many more students can be involved as undergraduate researchers if they do scientific research either collectively or individually as part of a regularly scheduled course. Course-based research experiences have been shown to provide students with many of the same benefits acquired from a mentored summer research experience, assuming that sufficient class time is invested, and several different potential advantages. In order to further explore this issue, the Division on Earth and Life Studies and the Division of Behavioral and Social Sciences and Education organized a convocation meant to examine the efficacy of engaging large numbers of undergraduate students who are enrolled in traditional academic year courses in the life and related sciences in original research, civic engagement around scientific issues, and/or intensive study of research methods and scientific publications at both two- and four-year colleges and

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universities. Participants explored the benefits and costs of offering students such experiences and the ways that such efforts may both influence and be influenced by issues such as institutional governance, available resources, and professional expectations of faculty. Integrating Discovery-Based Research into the Undergraduate Curriculum summarizes the presentations and discussions from this event.

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[NIH & AHRQ Announce Upcoming Changes to Policies, Instructions and Forms for 2016 Grant Applications](#)

This notice informs the biomedical and health services research communities of planned changes to policies, forms and instructions for grant applications submitted in 2016.

[Dear Colleague Letter: Leveraging GLOBE to Increase Student Engagement and Diversity](#)

The Global Learning and Observations to Benefit the Environment (GLOBE) program (www.globe.gov/) is an international science and education program providing students, educators, and the public with the opportunity to participate in protocol-driven data collection and the scientific process, while also contributing meaningfully to our understanding of the Earth system and global environment. Now entering its twentieth year of activity, GLOBE is an effective model for using inquiry-based approaches to strengthen science, technology, engineering, and mathematics (STEM) education. GLOBE now operates in one hundred and fifteen countries worldwide; in the United States, GLOBE implementation is currently overseen by one hundred and twenty-seven Partners located in forty-five states and two U.S. Territories. The international dimensions of the GLOBE program create a rich environment for students, educators, and scientists to engage with a culturally diverse community and participate in scientific exchanges regarding global environmental challenges. Since its inception, GLOBE has served more than twenty-eight thousand schools and more than twenty-three thousand teachers, contributing more than one hundred and thirty million measurements to a shared data base that is used by both the scientific community for research and by students for their own research projects.

Recent improvements to the technological infrastructure that underpins GLOBE program activities have opened up new opportunities to expand the reach of GLOBE within the United States. Although GLOBE has been implemented primarily within formal education settings, it is well-poised to reach a much larger informal education audience and support public participation in STEM research. Increasing the footprint of GLOBE operations would increase the number of students and citizen scientists being engaged in authentic environmental research activities, global observation campaigns, peer-to-peer collaborations, and virtual international science fairs using GLOBE-generated data. NSF is particularly interested in expanding GLOBE operations within highly diverse communities or within schools and informal learning programs that serve traditionally underserved and underrepresented populations in the STEM disciplines, including women, minorities, and persons with disabilities, in order to achieve its strategic goals for broadening participation. Thus, the Directorates for Geosciences (GEO) and Education and Human Resources (EHR) are partnering with GLOBE to build capacity for engagement of diverse student populations in the environmental sciences and geosciences and to evaluate GLOBE's impacts on student attitudes and learning. Such integration of research and education supports one of NSF's major strategic priorities (http://www.nsf.gov/about/performance/strategic_plan.jsp).

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Capitalizing on these opportunities to build capacity for GLOBE will require: (1) targeted training of educators in the use of GLOBE measurement protocols, data entry systems, and visualization tools; (2) implementation and on-going support for educators and students in formal and informal educational settings that use GLOBE resources; and, (3) documenting through evaluation and assessment the impacts of GLOBE activities on student attitudes toward STEM and STEM learning outcomes, particularly among traditionally underrepresented student groups, and on the impact of the GLOBE databases on scientific research. Successful projects are expected to both build on and contribute to the evidence base regarding effective STEM learning and learning environments.

In 2016, NSF is initiating an activity to broaden participation in the sciences: INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science). As an INCLUDES pilot activity, NSF invites submission of funding requests that will increase the capacity for using, as well as use of, the extensive resources of the GLOBE program, by addressing the requirements identified above. All submissions should follow the guidelines provided in the NSF Grant Proposal Guide (GPG) (see http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).

Full proposals submitted in response to this DCL must be identified by starting the proposal title with the term: "INCLUDES - GLOBE (NSF 16-031): *(Insert Project Title Here)*". Proposers may submit relevant requests through any of the following mechanisms:

- New proposals submitted for consideration by either the Discovery Research Pre K-12 (DRK-12) program or Advancing Informal STEM Learning (AISL) program, managed within the EHR Directorate.
 - The DRK-12 solicitation [[NSF 15-592](#)] is available at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=500047. The next deadline for DRK-12 proposals is December 5, 2016.
 - The A ISL solicitation [[NSF 15-593](#)] is available at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504793. The next deadline for A ISL proposals is November 8, 2016.
- Requests for supplemental funding for awards previously funded through the DRK-12 program that will remain active through the end of Fiscal Year 2016. Supplemental proposals must enhance existing projects by incorporating or exploring the concepts described in this DCL, while demonstrating how the proposed work is related to the active project. Requests for supplemental funding must clearly indicate in the first sentence of the Summary of Proposed Work that the request is being submitted in response to DCL NSF 16-031.
- The Early-concept Grants for Exploratory Research (EAGER) proposals submitted for consideration by the Directorate for Geosciences, Office of the Assistant Director. The EAGER funding mechanism may be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. The EAGER mechanism should not be used

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for projects that are appropriate for submission as "regular" (i.e., non-EAGER) NSF proposals. Prospective Principal Investigators seeking to use this mechanism must contact the program director overseeing GEO's related activities, Dr. Lina Patino, prior to submission of an EAGER proposal. This will aid in determining the appropriateness of the work for consideration under the EAGER mechanism. EAGER proposals should be prepared following the guidelines of GPG Section 11.D.2. To be considered for funding in Fiscal Year 2016, EAGER proposals must be submitted to NSF by **April 1, 2016**.

Requests submitted in response to this DCL are most likely to be successful if the project team includes someone who has documentable experience with GLOBE resources and operations. The GLOBE Implementation Office will be offering two GLOBE "Boot Camps" during March and April, 2016, for prospective Principal Investigators who are interested in learning more about GLOBE. Details regarding the GLOBE Boot Camps are available at: <http://www.globe.gov/get-trained/workshops>.

Principal Investigators considering submission of a proposal or supplemental funding request in response to this opportunity are strongly encouraged to contact Lina Patino (lpatino@nsf.gov; 703-292-5047) or Dave Campbell (dcampbel@nsf.gov; 703-292-5093) for further guidance.

[Dear Colleague Letter: Robert Noyce Teacher Scholarship program Master Teaching Fellowship track](#)

The purpose of this Dear Colleague Letter is to inform the community of a significant change in the Robert Noyce Teacher Scholarship Program's Master Teaching Fellowships (MTF) track. The National Science Foundation's Division of Undergraduate Education in the Directorate for Education and Human Resources wishes to indicate an anticipated change in the Robert Noyce Teacher Scholarship program that would expand opportunities in the Master Teaching Fellowships track. This change results from Public Law 114-59, the "STEM Education Act of 2015," signed on October 7, 2015.

This "STEM Education Act of 2015" amends Section 10A of the NSF Authorization Act of 2002 (42 U.S.C. 1862n-1a) to allow for the support of Master Teaching Fellowships for teachers with a master's or bachelor's degree in their field. While previously only teachers with a master's degree were eligible for support in the MTF track, this insertion of "or bachelor's" allows for the potential of the expanded opportunity in the Master Teaching Fellowships track of the Robert Noyce Teacher Scholarship program.

As you consider this expanded opportunity, it is important to know that the legislation (42 U.S.C. 1862n-1a) has a "Matching" requirement for those seeking funding for the Master Teaching Fellowships. It states:

"An eligible entity receiving a grant under this section shall provide, from non-Federal sources, to carry out the activities supported by the grant:

- A. in the case of grants in an amount of less than \$1,500,000, an amount equal to at least 30 percent of the amount of the grant, at least one half of which shall be in cash; and
- B. in the case of grants in an amount of \$1,500,000 or more, an amount equal to at least 50 percent of the amount of the grant, at least one half of which shall be in cash."

This matching requirement has not changed from the previous legislation. P.L. 114-59 impacts only the Master Teaching Fellowships track of the Robert Noyce Teacher Scholarship program.

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NSF anticipates issuing a new solicitation for the Robert Noyce Teacher Scholarship program in 2016. There will be a minimum of ninety days between the release of the next solicitation and the next due date for submissions to this program.

Dear Colleague Letter: CPS EAGERs Supporting Participation in the Global City Teams Challenge

The National Institute of Standards and Technology (NIST) launched the 2016 Global City Teams Challenge (GCTC; see <http://www.nist.gov/cps/sagc.cfm>) with a kickoff meeting on November 12-13, 2015, in Gaithersburg, MD. This meeting brought together city planners and representatives from technology companies, academic institutions, and non-profits with the aim of fostering teams that will contribute to an overall vision for Smart and Connected Communities (S&CC) - effectively integrating networked information systems, sensing and communication devices, data sources, decision-making, and physical infrastructure to transform communities by improving quality of life, environmental health, social well-being, educational achievement, or overall economic growth and stability.

NIST's GCTC builds upon the National Science Foundation's (NSF) longstanding investments in cyber-physical systems (CPS). NSF established the CPS program in 2008 to develop the principles, methodologies, and tools needed to deeply embed computational intelligence, communications, and control, along with new mechanisms for sensing, actuation, and adaptation, into physical systems. The NSF CPS program, which today includes the participation of the U.S. Department of Homeland Security, U.S. Department of Transportation, National Aeronautics and Space Administration, and National Institutes of Health, has funded a strong portfolio of projects that together have pushed the boundaries of fundamental knowledge and systems engineering in core science and technology areas needed to support an ever-growing set of application domains. CPS investments are enabling systems that are central to emerging S&CC infrastructure and services, including in areas such as intelligent transportation systems (ground, aviation, and maritime), building control and automation, advanced manufacturing (including cyber-manufacturing), healthcare and medical devices, and the burgeoning Internet of Things (IoT). Dependability, security, privacy, and safety continue to be central priorities for the program in pursuing the vision of a world in which CPS dramatically improve quality of life. Along the way, the CPS program has also nurtured a vibrant CPS research community.

With this Dear Colleague letter (DCL), NSF is announcing its intention to fund EARly-Concept Grants for Exploratory Research (EAGER) proposals to support NSF researchers participating in the NIST GCTC, with the goal of pursuing novel research on the effective integration of networked computing systems and physical devices that will have significant impact in meeting the challenges of Smart and Connected Communities. Researchers must be members of, or be seeking to establish, GCTC teams that build upon the results of previous or active NSF-funded projects, and must provide evidence of active team membership and participation as part of the submission. [Note that, while this DCL is aligned with NSF's broader efforts in Smart and Connected Communities (see http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf15120), a key requirement for this DCL is active participation in a GCTC team.] Proposals should emphasize the fundamental research inherent to the real-world problems being addressed; the manner in which the

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proposed solutions will be adopted by one or more local communities; and the potential challenges with respect to both research and deployment. Successful proposals will quantify the magnitude of potential societal impacts; and will result in transformative, long-term benefits rather than incremental advances. Finally, proposals must address why the work is appropriate for EAGER funding (see details below), including what key risks will be mitigated to facilitate future high-reward advances and why the timing of the project will maximize the potential for success. The deadline for submission of EAGERS is April 1, 2016, but earlier submissions are encouraged, and decisions will be made on a first-come, first-serve basis.

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Agency Reports, Workshops & Research Roadmaps

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[Stormwater and Graywater Offer Alternative Water Sources, But Guidelines Needed on Their Safe Use](#)

In the face of drought and major water shortages, the U.S. is increasingly turning to alternative water sources like stormwater and graywater, but guidelines and research on their risk to public health and the environment are needed to support decisions for safe use, says a [new report](#) from the National Academies of Sciences, Engineering, and Medicine. Graywater and stormwater could significantly supplement traditional potable water supplies using existing technology to capture and treat the waters, but there is currently limited information on the costs, benefits, risks, and regulation of such projects, the report concludes. Additional research and changes in infrastructure will be necessary to take full advantage of the potential of graywater and stormwater, the report adds.

Graywater is untreated wastewater from bathroom sinks, showers, tubs, washers, and laundry sinks, and stormwater is runoff from rainfall or snowmelt from roofs, parking areas, and land surfaces. These types of water can be collected and treated for nonpotable uses including irrigation, toilet flushing, and laundry and outdoor washing. The committee that conducted the study and wrote the report undertook a comprehensive analysis of the risks, costs, and benefits of various uses of graywater and stormwater, as well as their capture and use at household, neighborhood, and regional scales.

More research and data on stormwater and graywater quality are necessary to assess the risks under various human exposures, particularly on the types and concentrations of pathogens that are likely to occur, the report says. Additional information is also needed on the organic chemicals in stormwater and their consequences for various uses.

The report recommends best practices and systems for the capture and use of stormwater and groundwater. In locations where it can be stored in aquifers for use during drought or dry seasons, stormwater captured at neighborhood and larger scales can significantly contribute to urban water supplies. Stormwater infiltration — groundwater recharge — is commonly practiced, but the designs and regulations may not adequately protect groundwater quality, particularly for urban stormwater. Graywater reuse for nonpotable uses like toilet flushing and subsurface irrigation may provide arid regions such as Los Angeles potentially substantial water savings and a steady water source during the summer months when there is little or no rainfall. However, larger irrigation systems and indoor reuse requires more complex plumbing and treatment systems that are typically more appropriate for new multi-residential buildings and developments and for future urban planning.

[How Microbes Can Help Feed the World, August 2013](#)

"How Microbes can Help Feed the World" looks in depth at the intimate relationship between microbes and agriculture including why plants need microbes, what types of microbes they need, how they interact and the scientific challenges posed by the current state of knowledge. It then makes a series of recommendations, including greater investment in research, the taking

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on of one or more grand challenges such as characterization of the complete microbiome of one important crop plant, and the establishment of a formal process for moving scientific discoveries from the lab to the field.

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 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.

New Funding Opportunities

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Content Order

New Funding Posted Since December 15 Newsletter
URL Links to New & Open Funding Solicitations
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 December 15 Newsletter

[ED-GRANTS-122215-001 Office of Postsecondary Education \(OPE\): Talent Search Program](#)

The purpose of the Talent Search Program is to identify qualified individuals from disadvantaged backgrounds with potential for education at the postsecondary level and encourage them to complete secondary school and undertake postsecondary education. Talent Search projects publicize the availability of, and facilitate the application for, student financial assistance for persons who seek to pursue postsecondary education, and encourage persons who have not completed programs at the secondary or postsecondary level to enter or reenter and complete these programs. Catalog of Federal Domestic Assistance (CFDA) Number: 84.044A. Applications for grants under the Talent Search Program, CFDA number 84.044A, must be submitted electronically using the Governmentwide Grants.gov Apply site at www.Grants.gov. Through this site, you will be able to download a copy of the application package, complete it offline, and then upload and submit your application. You may not email an electronic copy of a grant application to us. You may access the electronic grant application for the Talent Search Program at www.Grants.gov. You must search for the downloadable application package for this program by the CFDA number. Do not include the CFDA number's alpha suffix in your search (e.g., search for 84.044, not 84.044A). **Due February 5.**

[USDA-NIFA-AFRI-005576 Agriculture and Food Research Initiative - Food, Agriculture, Natural Resources and Human Sciences Education and Literacy Initiative](#)

The U.S. Department of Agriculture established the Agriculture and Food Research Initiative (AFRI) under which the Secretary of Agriculture may make competitive grants for fundamental and applied research, extension, and education to address food and agricultural sciences (as defined under section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (NARETPA) (7 U.S.C. 3103)), as amended, in six priority areas. The six priority areas include: 1) plant health and production and plant products; 2) animal health and production and animal products; 3) food safety, nutrition, and health; 4) bioenergy, natural

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resources, and environment; 5) agriculture systems and technology; and 6) agriculture economics and rural communities. NIFA requests applications for the AFRI's Food, Agriculture, Natural Resources and Human Sciences Education and Literacy Initiative (ELI) for fiscal year (FY) 2016 to provide fellowships to undergraduate students, predoctoral candidates, postdoctoral scholars, and professional development opportunities for secondary school teachers and educational professionals. The anticipated amount available for grants in FY 2016 is approximately \$18.9 million. There is no commitment by USDA to fund any particular application or to make a specific number of awards. **February 11, 2016** (for the Predoctoral and Postdoctoral Fellowships Programs), **March 18, 2016** (for the Professional Development Opportunities for Secondary School Teachers Programs) and **March 24, 2016** (for the Research and Extension Experiential Learning for Undergraduate Fellowships)

[USDA-NIFA-HSI-005597 Hispanic-Serving Institutions \(HSI\) Education Grants Program](#)

This competitive grants program is intended to promote and strengthen the ability of Hispanic-Serving Institutions to carry out higher education programs in the food and agricultural sciences. Programs aim to attract outstanding students and produce graduates capable of enhancing the Nation's food and agricultural scientific and professional work force. The purpose of NIFA's HSI Education Grants Program is to support innovative teaching or education applications with potential to impact Hispanic-Serving Institutions to build capacity and then to become models for other institutions that serve underrepresented students, at the regional or national level. HSI education projects should develop human capital relevant to overall program goals for U.S. agriculture. While research and extension activities may be included in a funded HSI Education project, the primary focus must be to improve teaching, enrollment, and graduation rates within a degree-granting program. All New Collaboration Project applications must be received by 5:00 p.m. Eastern Time on **February 9, 2016**. All Standard Project applications must be received by 5:00 p.m. Eastern Time on **February 10, 2016**. All Strengthening Project applications must be received by 5:00 p.m. Eastern Time on **February 12, 2016**.

[Science of Learning: Collaborative Networks \(SL-CN\)](#)

The goals of the Science of Learning (SL) Program are to: advance fundamental knowledge about learning through integrative research; connect the research to specific scientific, technological, educational, and workforce challenges; and enable research communities to capitalize on new opportunities and discoveries. The program supports projects that emphasize consilience of knowledge, adopting diverse disciplinary approaches to shared research questions. The program seeks to develop robust and integrated accounts of contexts, mechanisms, and effective strategies of learning. This solicitation invites proposals for the creation of new research networks to address important integrative questions in the science of learning. Each network must identify an integrative research goal involving convergence of evidence from the diverse disciplinary approaches represented by participants in the network. The proposed research must substantially advance understanding of learning in more than a single discipline. Networks may focus on advancing basic research through experiments and theory, as well as translating findings from basic research on learning to applications in order to benefit society and further inform fundamental theories of learning. This solicitation is for

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proposals that do not fit into existing NSF programs, by virtue of the emphasis on interdisciplinarity in service of knowledge consilience and integration. **LOI March 1; full April 4.**

[USDA-NIFA-ICGP-005596 Organic Transitions](#)

The overall goal of the Organic Transitions Program (ORG) is to support the development and implementation of research, extension and higher education programs to improve the competitiveness of organic livestock and crop producers, as well as those who are adopting organic practices. In FY 2014, ORG will continue to prioritize environmental services provided by organic farming systems in the area of soil conservation and climate change mitigation, including greenhouse gases (GHG). Two new priorities have been added to support (1) the development of educational tools for Cooperative Extension personnel and other agricultural professionals who advise producers on organic practices and (2) the development of cultural practices and other allowable alternatives to substances recommended for removal from the National Organic Programs National List of Allowed and Prohibited Substances. Practices and systems to be addressed include those associated with organic crops, organic animal production, and organic systems integrating plant and animal production. **Due April 15.**

[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

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details. Awards will be made under this FFO only if funds have been announced as provided in this FFO. **Open to September 30, 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 \(BAA\)](#)
- [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](#)

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- [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

Long-Term Ecological Research (LTER), New Site Competition

NSF currently supports 25 LTER research sites and, through this solicitation, invites proposals to establish three (3) new LTER sites. Research proposals should address questions in one of two broad ecosystems: Arid/semi-arid ecosystems: The Division of Environmental Biology (DEB) anticipates support and management of one (1) new site with a focus on arid or semi-arid ecosystems. The location of the research site for proposals submitted to develop a new arid/semi-arid ecosystem LTER must be within the United States, including its territories and protectorates. Ocean/coastal ocean ecosystems: The Division of Ocean Sciences (OCE) anticipates support and management of two (2) new sites that focus on ocean or coastal ocean ecosystems; defined as ecological systems from the shoreline outward on continental shelves and including the Laurentian Great Lakes, Congressionally defined as interior oceans. Preference will be given to proposals developing a new ocean/coastal ocean ecosystem LTER site located within the United States, including its territories and protectorates, but other locations are not precluded. To address ecological questions that cannot be resolved with short-term observations or experiments, NSF established the Long Term Ecological Research Program (LTER) in 1980. Two components differentiate LTER research from projects supported by other NSF programs: 1) the research is located at specific sites chosen to represent major ecosystem types or natural biomes; and 2) it emphasizes the study of ecological phenomena over long periods of time based on data collected in five core areas. The five core areas of long-term data collection are: 1) patterns and controls of primary production, 2) spatial and temporal population dynamics and food web interactions, 3) patterns and controls of organic matter accumulation and decomposition, 4) patterns of inorganic inputs and movements of nutrients, and 5) patterns and frequency of disturbances. The LTER program provides a unique opportunity for researchers to obtain an integrated, holistic understanding of ecosystems that is not possible through individual, short-term awards. Research at LTER sites must test important, current ecological theories and significantly advance understanding of the long-term dynamics of populations, communities and ecosystems. It often integrates multiple disciplines and, through cross-site interactions, examines patterns or processes over broad spatial scales. Recognizing that the value of long-term data extends beyond use at any individual site, NSF requires that data collected by all LTER sites be made broadly accessible. **Prelim Feb. 1; full August 2**

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[RFA-CK-16-002 Spatially Scalable Integrated Tick Vector/Rodent Reservoir Management to Reduce Human Risk of Exposure to Ixodes scapularis Ticks Infected with Lyme Disease Spirochetes](#)

Lyme disease, caused primarily by the spirochete *Borrelia burgdorferi sensu stricto* in the United States, is the most commonly reported vector-borne disease with >30,000 confirmed or probable cases reported annually and a recent estimate suggesting that ten-fold more cases may occur. There is currently no human vaccine against *B. burgdorferi*. However, tick/pathogen control efforts that combine killing of host-seeking ticks with targeting of natural rodent reservoirs for *B. burgdorferi* can reduce the abundance of host-seeking infected ticks on residential properties. The purpose of the project is to advance knowledge of the impact of protection of single versus multiple adjacent properties - in relation to human landscape use patterns and tick exposure locations- to reduce human exposure to ticks infected with Lyme disease spirochetes. **Due February 2.**

[Global Chemical Security Activities](#)

The Department of State's Office of Cooperative Threat Reduction (ISN/CTR) is pleased to announce an open competition for assistance awards through this Request for Proposals (RFP). ISN/CTR invites non-profit/non-governmental organizations, , public international organizations, and for-profit companies, and **educational institutions** to submit proposals for projects that will advance the mission of the Department's Chemical Security Program (CSP). ISN/CTR has approximately \$18,000,000 available in the current fiscal year to award multiple grants and cooperative agreements in this field. ISN/CTR prefers projects that cost less than \$250,000 including overhead, though awards may involve multiple projects that cumulatively exceed \$250,000. In order to apply for new funding opportunities which are open to the public for competition, you may access the Grants.gov website portal. All funding opportunities and application kits are made available on Grants.gov. If your organization has/had a grantee business relationship with a grant program serviced by the Office of Grants Management, and you are applying as part of ongoing grantee related activities, please access GrantSolutions.gov. In order to apply electronically you must first have a GrantSolutions user account. If you are already an existing grantee, please login to GrantSolutions using your existing grantee username and password. If you do not remember your account information or have not been assigned a grantee account, please contact the GrantSolutions Help Desk at (866)577-0771 or by email at help@grantsolutions.gov . GrantSolutions provides you the ability for existing grantee organizations to submit their entire application online. However, please note that all required signatures must still be "original hardcopy signatures" and must be received by the Grants Servicing Office by the due date requirements as specified in the grant announcement. **Due February 12.**

[EJ Collaborative Problem-Solving Cooperative Agreements Program](#)

The Environmental Justice Collaborative Problem-Solving (CPS) Cooperative Agreement Program provides funding for eligible applicants for projects that address local environmental and public health issues within an affected community. The CPS Program is designed to help communities understand and address exposure to multiple environmental harms and risks. **Due February 12.**

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[USDA-NIFA-BRAP-005435, Biotechnology Risk Assessment Grants Program](#)

The purpose of the BRAG program is to support the generation of new information that will assist Federal regulatory agencies in making science-based decisions about the effects of introducing into the environment genetically engineered organisms (GE), including plants, microorganisms (**including fungi, bacteria, and viruses**), arthropods, fish, birds, mammals and other animals excluding humans. Investigations of effects on both managed and natural environments are relevant. The BRAG program accomplishes its purpose by providing Federal regulatory agencies with scientific information relevant to regulatory issues. [See RFA for details.](#)
LOI Feb. 12; full April 15

[Next Generation Humanities PhD Grants National Endowment for the Humanities](#)

In recent years, research published by Humanities Indicators, among others, has revealed that humanities PhDs pursue careers in many different professions—both inside and outside academia. Yet most humanities PhD programs in the United States still prepare students primarily for tenure-track professor positions at colleges and universities. The increasing shortage of such positions has changed students' expected career outcomes. NEH therefore hopes to assist universities in devising a new model of doctoral education, which can both transform the understanding of what it means to be a humanities scholar and promote the integration of the humanities in the public sphere. Next Generation Humanities PhD Planning Grants support universities in preparing to institute wide-ranging changes in humanities doctoral programs. Humanities knowledge and methods can make an even more substantial impact on society if students are able to translate what they learn in doctoral programs into a multitude of careers. Next Generation PhD Planning Grants are designed to bring together various important constituencies to discuss and strategize, and then to produce plans that will transform scholarly preparation in the humanities at the doctoral level. Students will be prepared to undertake various kinds of careers, and humanities PhD programs will increase their relevance for the twenty-first century. Next Generation Humanities PhD Implementation Grants support universities in instituting wide-ranging changes in humanities doctoral programs. Humanities knowledge and methods can make an even more substantial impact on society if students are able to translate what they learn in doctoral programs into a multitude of careers. Next Generation PhD Implementation Grants are designed to produce plans that will transform scholarly preparation in the humanities at the doctoral level. Students will be prepared to undertake various kinds of careers, and humanities PhD programs will increase their relevance for the twenty-first century. NEH will support activities specific to each institution's needs: these may include (but are not limited to) multi-departmental collaboration, transformations in curricula, modifications in stipend structures, altered formats for dissertations, commitment to collection of alumni career information and outcomes, partnerships with non-university entities, as well as a pledge to encourage doctoral students to explore and prepare for multiple career trajectories. NEH intends the Implementation Grants program to promote best practices on the part of its awardee institutions, and thereby to establish a new model for graduate education in the humanities. Grantee institutions must provide funds (either their own funds or funds raised from nonfederal third parties) equal to the grant funds released by NEH. **Due February 17.**

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Gulf Research Program Fellowships

The Gulf Research Program is accepting applications for its [2016 Early-Career Research Fellowships and Science Policy Fellowships](#) now through Feb. 17, 2016. These fellowships offer early-career researchers and professionals a unique opportunity to focus on leadership development while conducting research or work that is relevant to the [mission and goals of the Gulf Research Program](#). **Due by February 17.**

USDA-NIFA-AFRI-005515 National Institute of Food and Agriculture International Wheat Yield Partnership Program

NIFA aims to support the G20 nations' Wheat Initiative which is committed to coordinate wheat research in the areas of genetics, genomics, physiology, breeding and agronomy internationally. NIFA in coordination with the International Wheat Yield Partnership (IWYP), requests applications to seek breakthroughs for cereal breeding using new technologies and also discoveries that lead to significantly greater grain size, grain set and grain filling duration following embryo formation, in diverse environments, without compromising grain protein concentration in Triticeae species. RFA: http://nifa.usda.gov/sites/default/files/rfa/16_NIFA-IWYP.pdf **LOI due March 1; full May 3.**

Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP)

The goals of the Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP) solicitation are to: (1) foster an interdisciplinary research community of engineers, computer and computational scientists and social and behavioral scientists, that creates new approaches and engineering solutions for the design and operation of infrastructures as processes and services; (2) enhance the understanding and design of interdependent critical infrastructure systems (ICIs) and processes that provide essential goods and services despite disruptions and failures from any cause, natural, technological, or malicious; (3) create the knowledge for innovation in ICIs so that they safely, securely, and effectively expand the range of goods and services they enable; and (4) improve the effectiveness and efficiency with which they deliver existing goods and services. **Due March 9.**

USDA-NIFA-ICGP-005517 Organic Agriculture Research and Extension Initiative

The OREI RFA (<http://nifa.usda.gov/sites/default/files/rfa/FY16%20OREI%20RFA.pdf>) seeks to solve critical organic agriculture issues, priorities, or problems through the integration of research, education, and extension activities. The purpose of this program is to fund projects that will enhance the ability of producers and processors who have already adopted organic standards to grow and market high quality organic agricultural products. Priority concerns include biological, physical, and social sciences, including economics. The OREI is particularly interested in projects that emphasize research, education and outreach that assist farmers and ranchers with whole farm planning by delivering practical research-based information. Projects should plan to deliver applied production information to producers. Fieldwork must be done on certified organic land or on land in transition to organic certification, as appropriate to project goals and objectives. Refer to the USDA National Organic Program (<http://www.ams.usda.gov/nop>) for organic production standards. Visit the NIFA website to

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access a factsheet on the Center of Excellence (COE) designation process, including COE criteria, and a list of programs offering COE opportunities in fiscal year 2016. You can also review a recording of COE outreach webinars held in February and March of 2015 from the site. The COE WebPages will be updated throughout FY 2016 with additional information, such as a summary of comments received from stakeholders. **Due March 10.**

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.]

[DARPA-BAA-15-27 Innovative Systems for Military Missions](#)

The Tactical Technology Office of the Defense Advanced Research Projects Agency is soliciting executive summaries, white papers and proposals for advanced research and development of innovative systems for military missions. This solicitation seeks system and subsystem level technologies that enable revolutionary improvements to the efficiency and effectiveness of the military. Novel concepts are sought in the following focus areas: Ground Systems, Maritime Systems, Air Systems, and Space Systems. Refer to the URL stated below for complete details of the BAA. **Open to April 29, 2016.**

[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, 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

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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 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.detrick.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

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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.**

[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.**

[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.**

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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 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.**

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; <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

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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 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

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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, 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,

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Collection, Processing & Exploitation, Analysis & Production, and Dissemination eXperimentation) initiative. **Open to FY 2018.**

[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.**

[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

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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.**

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