

Volume 9, Issue 3: November 15, 2018

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Published monthly since 2010 for faculty and research professionals by

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Topics of Interest URLs

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Where is NSF Going and What Does the Path Look Like?

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By Mike Cronan, co-publisher

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NSF is perhaps the least pigeonholed, or siloed, of all federal research agencies. New NSF funding directions are telegraphed by the outcomes of national reports and conferences, or input from the research community, as we can see in the [Dear Colleague Letter: Seeking Community Input for Topic Ideas for Emerging Frontiers in Research and Innovation \(EFRI\) Program](#) and the [NSF 2026 Idea Machine website](#).

NSF's broad reach and interconnectedness has created an agency-wide culture ([Crosscutting and NSF-wide Active Funding Opportunities](#)) that ties together all program activities. Moreover, those who *understand this crosscutting agency culture assume a competitive funding advantage across all directorates, divisions, and programs* by virtue of understanding the overarching agency paradigms that underpin many of the specific program goals and objectives listed in individual funding solicitations.

Bottom line: As an agency, NSF informs researchers programmatically at both the macro and micro scales and also illuminates the intersections and connections between these two scales in an integrated fashion that can help them write more successful proposals to that agency. Of course, the coin of the realm in grant writing is to **know your audience**, i.e., the culture and mission priorities of the funder. NSF does an excellent job of offering applicants an insight into its culture and mission that significantly impacts funding success—something like being offered the grant writer's equivalent of free beer and wide roads.

However, for those accustomed to a more static agency culture, NSF will appear to be a constantly moving target whose programs come and go or transform themselves over multiple generations (e.g., ERCs [[Lynn Preston](#)] going back to 1984 and LSAMPs [[Albert Bridgewater](#)] going back to 1990) as it welcomes the exploration of new models of research and education.

With this in mind, the new solicitation for [Gen-4 Engineering Research Centers \(ERC\) Convergent Research and Innovation through Inclusive Partnerships and Workforce Development](#) foretells what will characterize a successful future NSF proposal. For faculty and research offices that *maintain a continuously updated strategic plan for funding success* at specific federal research agencies, this new ERC solicitation provides another piece in that strategic plan. Moreover, it clearly reveals the continuously evolving NSF ecosystem of funding solicitations, agency reports, and overarching program goals and objectives that will guide the agency in the future (See last month's article on [Dear Colleague Letter: Seeking Community Input for Topic Ideas for Emerging Frontiers in Research and Innovation \[EFRI\] Program \[NSF 18-105\]](#).)

As noted in the new solicitation (with key words **bolded** for emphasis): "The ERC program supports **convergent research** that will lead to strong **societal impact**. Each ERC has **interacting foundational components** that go **beyond the research project**, including engineering **workforce development** at all participant stages, a **culture of diversity and inclusion** where all participants gain mutual benefit, and **value creation within an innovation ecosystem** that will outlast the lifetime of the ERC. The **logical reasoning that links the proposed activities to the identified goals for each ERC should be clear**.

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The cautionary note here is the need to do a deep dive, **not a superficial dip**, into the meaning of this brief synopsis of the new ERC program to gain a ***nuanced understanding of the terms, NSF's uses of them in solicitations, and NSF's views on the interconnectedness of these terms in proposed project activities.*** Think of it in terms of Richard Feynman's observations on [The Difference Between Knowing the Name of Something and Knowing Something](#).

Consider, as an exercise, answering the following question **using specific examples** to illuminate your definitions: *“What does NSF mean by the term [fill in the blank: convergent research; societal impact; interactive foundation components that go beyond the research project; workforce development; culture of diversity and inclusion; value creation within an innovation ecosystem; and the logical reasoning that links proposed activities to project goals”*.

Researchers participating in the development of an ERC project will need to do the background research necessary on the NSF website, in referenced reports from the National Academies, and in current abstracts of funded projects, etc., where these terms come into play, to gain a robust answer to the above. **But more importantly**, even if you will not be participating in an ERC, an understanding of how NSF is coming to view research and education in the future, as modeled in this ERC solicitation, will play a major long-term role in your success at that agency and/or your success in advising faculty how to compete at that agency. There is a whole lot more to learn here than meets the eye when first considering this Gen-4 solicitation.

The Revision Notes of the Gen-4 solicitation are a good starting point for a deep dive into what research and education solicitations will look like at NSF over the coming years. As noted in the solicitation:

- **“The ERC program has placed greater emphasis on convergence.** Convergent research approaches require the deep integration of knowledge, tools, and ways of thinking beyond engineering (for example, from the physical, mathematical, life/health sciences, computational sciences, and social sciences, among others). Purposeful **team formation** is needed for the convergent approach, supported by diversity and a **culture of inclusion** where all participants are recognized and derive mutual benefits. The convergent approach supports the strong societal impact expected of each ERC.
- **The ERC program has been re-envisioned to emphasize positive societal impact.** ERCs will strive to enable society to have a better quality of life, and be more resilient, productive, and/or safe.
- **The ERC program has strengthened the requirement for demonstrable integration of foundational components.** A strong strategic plan for each ERC outlines the interplay between the four foundational components of the ERC, including the convergent research project, engineering workforce development, the development of a culture of diversity and inclusion, and a focus on value creation within the innovation ecosystem. All these foundational components should together support the ultimate impact on society.
- **The ERC program calls for societal value creation:** Value Creation has often been defined in relation to the business environment, commonly referring to the increase in revenue from products and services or growth in company worth (e.g., stock price). In the context of this solicitation, it is defined as the creation of societal value from

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innovations (e.g., inventions, goods, services, businesses) that benefit society in a sustainable fashion.

- **The ERC program and this solicitation provide opportunities for effective leadership, management and infrastructure approaches.** Teams are encouraged to be strategic and creative.
- **The ERC program has updated the PI requirements to support the focus on convergence.**
- **The review criteria have been updated to reflect the new ERC emphases.”**

Those who master and deepen their understanding of the above concepts woven through NSF solicitations will certainly live long and prosper at NSF.

Questions to Keep in Mind When Writing the Project Management Section

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By Mike Cronan, co-publisher

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When writing a project management plan, ask yourself whether the plan has been well integrated with other sections and components of the proposal, particularly sections related to the project's research goals and objectives, plan of operations, evaluation plan, dissemination plan, and sustainability plan. Also consider other key components of the proposal, such as the project milestone chart, logic model, and budget justification.

Bottom line: a siloed management section is a telltale sign of a siloed project, but the yellow brick road leading to a funded project is one of synergy not silos, convergence not divergence. Management plans too often read like overly generalized boilerplate lacking the specificity and detail needed to convince reviewers that a funded project will be well managed and successful. Overly generalized management sections read as if they were interchangeable across projects and agencies and are too often the product of neglect in the hurried final days prior to proposal submission.

By contrast, **a well crafted management plan thoughtfully visualizes a stepwise process of coordinated project activities that together result in the successful research and/or educational outcomes expected by the funder.** You can think of the management plan as a detailed explanation of the fiduciary duty of the PIs to the funding agency. The person with a fiduciary duty is called the fiduciary, or, in this analogy, the PI, and the person to whom they owe the duty, in this case the funding agency, is referred to as the principal or the beneficiary. Fiduciaries (PIs) act solely in the client's interest (funding agency) for whose funds (award) they are responsible, with the exclusive purpose of providing benefits to the client, i.e., value-added benefits to the funding agency mission.

In short, a substantive and convincing management section does not merely list the project PIs with their academic and research titles, alongside a similar list of other key project personnel, such as a project coordinator, project evaluator, and senior personnel. Such rote and non-specific narrative text will appear to have been copied from multiple institutional websites. In practice, management plans unfortunately often read like "off the shelf" resurrections of a prior management plan used in another proposal and then sufficiently generalized to suit the current proposal.

Keep in mind this fundamental axiom of successful proposals: **the larger the dollar award the more important it is to have a compelling management section that convinces the funding agency that the project award will be managed in a way that ensures successful outcomes.**

This leads to another key question when drafting the management plan. Does it reveal a leadership team with the capacity and expertise to manage project integration that **will result in synergies gained at the intersections of the project's research and/or educational goals, objectives, and activities?** If it does, this section will give reviewers confidence that the project will achieve its desired outcomes or deliverables. Moreover, in the new environment wherein

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federal research agencies prioritize funding research that is transformative, transdisciplinary, and convergent, ***writing an integrated management plan is as essential as it is challenging.***

In terms of the increasing importance NSF now places on convergence research (see [Convergence Research at NSF](#)) in funding solicitations, a cautionary note is in order to warn against the use of the term convergence research in the management section, or any section of the proposal for that matter, ***as a superficial buzz word uninformed by a more substantive and nuanced understanding of what NSF means by this term.*** Any successful proposal responding to an NSF solicitation emphasizing research outcomes based upon convergence research will require a management plan that explains clearly and in a detailed and stepwise fashion how all the project's component parts work together to this end.

Finally, if you are writing a proposal in response to a solicitation emphasizing the importance of convergence research, then be prepared as a proposal team to put as much time into thinking about how the project will be managed to achieve that convergence as you do about the multiple research goals and objectives that must first meld and converge for success.

NSF Gen-4 ERC Webinar Overview

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In all honesty, watching funding agency webinars can resemble being force fed cold oatmeal as if you were a goose being prepared for a foie gras feast. If you are inclined to irritability on the day of the webinar, it may take some effort to avoid snarky comments as you listen to a program officer give a verbatim reading of the solicitation. Questions raised in the Q&A session by those who failed to read the solicitation result in more verbatim readings by program officers. That said, it's only fair to note that verbatim readings ensure that everyone will base their proposal on the same information. **Bottom line:** You get no privileged information by participating in a webinar that you could not get merely by reading the solicitation and referenced documents, of which there are several for this particular Gen-4 ERC.

Moreover, keep in mind that a 1.5 hour [ERC Gen-4 webinar](#) can't possibly cover all the information in the solicitation and referenced documents; therefore, in choosing what to and what not to present, program officers create an implied hierarchy of information. This hierarchy points prospective applicants to the most critical sections of the solicitation. Additionally, while Q&A sessions appear to highlight the unprepared questioner, a number of prepared questioners (i.e., those who read the solicitation before asking a question) ask excellent questions that give a deeper insight into the solicitation.

For example, several good questions during the Q&A prompted the program officers to elaborate on the importance of having a robust strategy for ERC team formation; the importance of participating in a Time Trade discussion with an NSF program officer specific to a proposed ERC (see three graphics end of text); the role of the ERC's iconic 3-plane diagram; and how to develop a center concept that makes sense for the applicant's research vision in her research context, etc.

The webinar's takeaway is that successful applicants must understand **convergent research** and how it applies to their own proposed ERC inside out and six ways for Sunday. Moreover, applicants must both understand convergent research and develop a **convincing strategic plan for achieving** convergence research. These must be spelled out in the project description along with **strategic plans for workforce development, diversity and inclusion, and innovation ecosystem**. Of course, when asked to characterize convergence research, NSF program officers refer you to such documents as the March 23 [Dear Colleague Letter: Growing Convergence Research](#), [Characteristics of Convergence Projects](#), and [Convergence Research at NSF](#). As one participant commented, likely channeling Supreme Court Justice Potter Stewart's description of his threshold test for obscenity, "I know it when I see it."

As NSF noted in the webinar, successful proposals must demonstrate "strong synergies and a value-added rationale to justify the center approach." **The strategy for team formation and the team process was repeatedly stressed during the webinar**. Centers must create social value and address possible unintended consequences of the proposed research. The proposal must clearly identify the stakeholders, i.e., those who will be impacted by the project.

The webinar stressed another important theme: do what makes sense in the context of the proposed research. Structure the proposed team in a way that makes sense for the project.

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Show a **thoughtfully structured center to achieve the vision being proposed**. For example, the workforce component does not have to be “K to Gray,” but it must show impact, particularly at the undergraduate, graduate, and faculty levels. So NSF recommends that applicants “focus on the problem you are trying to solve first and then apply the resources and best practices that are a fit.”

The most compelling takeaway from the webinar is the importance of scheduling a consultation with ERC program directors, as described in below graphics from the webinar. These will be posted also at [Gen-4 Engineering Research Centers \(ERC\) Solicitation Webinar](#) when available. Three likely topics for an NSF consultation include convergence research in your topic areas, strategic plans, and discussion of team formation and team communication protocols.

Consultation with ERC Program Directors (PD)

- After the webinar, PDs will establish office hours where PIs may sign-up for a one time only 30 minute teleconference to discuss specific ideas and ask questions.
- Place your request through the TimeTrade link <https://my.timetrade.com/book/NQLCH>
- The consulting Program Director will send an email confirming the requested timeslot.
- In advance of the teleconference, you **must** email the consulting Program Director:
 1. An ERC 3-Plane Strategic Planning Chart for your proposed engineered system concept;
 2. A short description (less than two pages) of the proposed ERC in response to the solicitation requirements.
- Only one timeslot per preliminary proposal will be allowed

Program Director Office Hours (EST)

Available timeslots from November 13, 2018 to December 17, 2018

MONDAYS	TUESDAYS	WEDNESDAYS	THURSDAYS	FRIDAYS
1:00 PM to 1:30 PM		1:00 PM to 1:30 PM	1:00 PM to 1:30 PM	
1:30 PM to 2:00 PM		1:30 PM to 2:00 PM	1:30 PM to 2:00 PM	
2:00 PM to 2:30 PM	2:00 PM to 2:30 PM	2:00 PM to 2:30 PM	2:00 PM to 2:30 PM	2:00 PM to 2:30 PM
2:30 PM to 3:00 PM	2:30 PM to 3:00 PM	2:30 PM to 3:00 PM	2:30 PM to 3:00 PM	2:30 PM to 3:00 PM
3:00 PM to 3:30 PM	3:00 PM to 3:30 PM	3:00 PM to 3:30 PM	3:00 PM to 3:30 PM	3:00 PM to 3:30 PM
3:30 PM to 4:00 PM	3:30 PM to 4:00 PM	3:30 PM to 4:00 PM	3:30 PM to 4:00 PM	3:30 PM to 4:00 PM
4:00 PM to 4:30 PM	4:00 PM to 4:30 PM	4:00 PM to 4:30 PM	4:00 PM to 4:30 PM	4:00 PM to 4:30 PM
4:30 PM to 5:00 PM	4:30 PM to 5:00 PM	4:30 PM to 5:00 PM	4:30 PM to 5:00 PM	4:30 PM to 5:00 PM
	5:00 PM to 5:30 PM			5:00 PM to 5:30 PM
	5:30 PM to 6:00 PM			5:30 PM to 6:00 PM

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Resources

- This full slide set will be posted on the Gen-4 ERC Program landing page following the webinar.
- Gen-4 ERC Program landing page: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505599
- ERC Association Website: <http://erc-assoc.org/>
- *A New Vision for Center-Based Engineering Research*: <https://www.nap.edu/catalog/24767>
- *Convergence*: <https://www.nap.edu/catalog/18722>
- *Enhancing the Effectiveness of Team Science*: <https://www.nap.edu/catalog/19007>

Again, and finally, the thoughtfulness of the project narrative was emphasized throughout the webinar, so take advantage of the opportunity for a consultation and review the above recommended resources carefully. Read and reread the solicitation and review criteria throughout the proposal development process.

Remember to Revisit the NSF Merit Review Process

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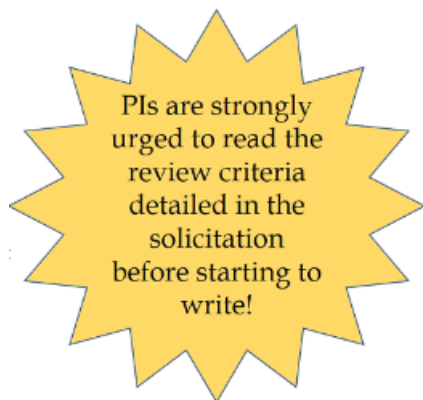
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Through its merit review process, the National Science Foundation ensures that proposals submitted are reviewed in a fair, competitive, transparent, and thorough manner. The merit review process is fully described in Part I of the NSF [Proposal & Award Policies & Procedures Guide \(PAPPG\)](#), which provides guidance for preparing and submitting proposals to NSF. The [Merit Review Process](#) is also addressed at regional grants conferences, such as the recent Fall Grants Conference November 8-9 in New Orleans ([NSF Fall 2018 Grants Conference Webcast](#)). Note two important communications on the PAPPG from NSF last week: [Proposal & Award Policies & Procedures Guide \(PAPPG\), January 2019](#) and [Webinar - Updates to the NSF Proposal & Award Policies & Procedures Guide \(PAPPG\)](#). These are **must reads for research offices**, along with the webinar description of PAPPG updates and revisions. These critical notices must be communicated to faculty.

Unfortunately, however, these key details are often buried deeply in the PAPPG and at the end of funding solicitations, where they are typically differentiated as overarching (agency-wide) review criteria and project-specific review criteria. As such, they get short shrift during the writing of the project description, slipping into the netherworld of “**out of sight, out of mind.**” However, inadequately addressing the details in these documents seriously undermines a proposal’s chances for acceptance.

It is notable, in fact, that in the recent webinar for the Gen-4 ERC, **NSF felt compelled to remind PIs in a not-so-subtle fashion to read the review criteria before starting to write the proposal.** That is somewhat akin to reminding skydivers to secure a parachute prior to jumping out of the airplane. You would think it goes without saying, but...



Bottom line: Successful proposals go through **multiple narrative iterations**, a key part of which is to ensure that **each draft of the project description is continuously calibrated to the review criteria** governing the funding decision. While the solicitation includes a listing of the review criteria, they typically don’t appear in a narrative format that addresses them in order. Therefore, the project description must do so, but in a manner that integrates them into the

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research narrative, explaining what you want to do, why you want to do it, how you plan to do it, how you will know if you succeeded in doing it, and the benefits that will accrue if the project is successful. Of course, at NSF, per the [PAPPG](#), the descriptions of the overarching review criteria of **Intellectual Merit** and **Broader Impacts** are required agency-wide statements in the project summary, and are specifically called out with separate section headings in the project description.

The distinction here is that, throughout the project narrative, you will address the review criteria, especially the *project/solicitation-specific review criteria*, in ways that are *implied in the discussion of your project goals and objectives*; however, the PAPPG's sections for IM and BI are specifically identified, in the project summary and project description, where the *text should be explicit, direct, and brief*. For example, *"The Broader Impacts of the proposed project include a national assessment of workforce training needs for technicians; work with employers to address their current and future needs for technicians in new technologies; wide dissemination of project results to similar institutions for adoption and adaptation; and development of an institutional partnership model for diversity and inclusion in the technical workforce."*

The main takeaway here is precisely emphasized in NSF's November 7 webinar on Gen-4 ERCs: *"PIs are strongly encouraged to read the review criteria detailed in the solicitation before starting to write!"* It is one of the mysteries of the world of grant writing why this admonition is so frequently ignored or forgotten.

Echo but Don't Parrot Agency Language

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Researchers benefit from becoming fluent in the language used by federal agencies and foundations to describe their overall research and educational investment priorities. Researchers also benefit from understanding the agency language, or dialect, used at the specific program level. This fluency can easily be gained ***in your disciplinary area of interest*** by reading solicitations, reviewing agency reports and program roadmaps, linking to agency webinars, reviewing reports of agency sponsored workshops on emerging research areas, and talking to program officers, among others.

For example, such terms as “sustainability, innovation, research ecosystems, transformative research partnerships,” and countless others may be used by one or more federal research agencies, but the meaning of these terms will often have an agency-specific “flavor.” Moreover, in many cases, research units within a large agency such as NSF, DOE, NIH, use a language unique to that unit. The differences in language and definitions of research terms can be subtle and nuanced across agencies or clearly distinct, but it is important to be aware of them. It is also worth noting that the language and definitions of terms used by agencies evolves over time. For example, the umbrella term “broader impacts” at NSF has evolved and expanded significantly over the past decade and continues to do so.

Following these changes in meaning becomes particularly important as proposal solicitations become more multifaceted and transdisciplinary. While fluency in agency dialect is especially critical when working on center and center-level proposals, it has become necessary at all scales of the research enterprise. For example, many smaller research and education solicitations are often linked to an agency’s entire research portfolio that addresses overarching research themes through large integrative center structures as well as through smaller, more narrowly focused programs. Specially defined terms may occur at either or both the narrow or the broad end of an agency’s research spectrum.

Understanding agency language becomes critical at transitional points in a researcher’s career. Principal investigators transitioning from highly focused, single PI research grants to larger multi- or transdisciplinary research proposals need to be able to use agency language to describe and define their new, overarching research agenda, ***particularly the integration of multifaceted components from intellectually distinct research and/or educational domains***. In the area of research and educational grants, PIs who have included small-scale educational components in past grants but who wish to steer their efforts towards center-level grants will need to gain a level of fluency in the language of educational programs of various types as they navigate that change.

Gaining fluency in funding agency language becomes particularly important for principal investigators seeking to compete for the premier research solicitations funded by federal agencies, e.g., NSF’s Engineering Research Centers (ERC) Program and the Science and Technology Centers (STC), Integrative Partnerships, or NSF’s new flagship programs like I-Corp and INSPIRE (*Integrated NSF Support Promoting Interdisciplinary Research and Education*).

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The researcher gains fluency in funding agency language to ensure that she will write the proposal narrative using the same concepts and the same understanding by which the funder describes the research and/or educational objectives it considers worth funding. Moreover, a common language becomes especially critical on multidisciplinary efforts to ensure that the leaders of the discipline-specific research strands that form an integrated whole can write an internally consistent research narrative that speaks to the entire research team, and thus communicates a common understanding to the reviewers and agency program officers. Without a common language, it becomes all too easy to write a disassociated research narrative or a stove-piped collection of sections.

Let's take as an example of special language the use of the term "sustainability research." Its meaning will differ by funding agency, as well as by programmatic areas within agencies. If you direct your proposal to NSF, however, the language and terms you use to discuss the sustainability topic in the research narrative must reflect NSF's view of sustainability, generally captured by the following: "A number of general concepts underlie the science of sustainability, including complexity, emergent behavior, multiscale processes, and adaptability and resiliency in coupled, human-environment systems." In this example, your fluency in the use of agency language and terms would involve an understanding, likely by further investigative reading of NSF materials, of the full scope and scale of NSF's use of these terms and their interrelatedness. Once you have completed this investigation, you will become better able to map your research expertise to the agency's research objectives by ensuring that you use language in the project description that reflects or echoes the agency's (review panelists, program officers) use of the same language.

While it is important to achieve fluency in funding agency language, it is equally important to avoid parroting that language. A faint echo of agency language ***in the appropriate context*** will ensure that agency review panels and program officers recognize that the applicant shares with them a common understanding of central concepts and assumptions. Unfortunately, some programs and solicitations within agencies occasionally use descriptive language insufficiently grounded in examples or specificity and hence read more like a series of superlatives, or a train of slogans. But since superlatives, or slogans, are not ideas, their use should be avoided at all costs in grant writing, as well as program solicitations. To paraphrase Shakespeare's Macbeth, superlatives are "full of sound and fury, signifying nothing."

Vague, superlative laced language can occasionally appear in new program solicitations that seek to weave together new disciplinary partnerships or explore new areas of research. Unfortunately, agency program officers may occasionally craft poorly written solicitations, or substitute superlatives and slogans for insightful specificity, or fail to know exactly what they seek as fundable research in a specific program area. ***In many cases, grant writing, like life, can be awash in ambiguities, and this uncertainty can creep into the language and terms used by both writers of proposals and writers of solicitations.*** Guard against this ambiguity in your proposals. You can prevent this by becoming sufficiently fluent in the language and terms used by funding agencies to describe a specific research domain. Achieving fluency should not prove to be particularly onerous or time consuming, ***but it will pay great dividends by increasing the clarity of your research narrative, thereby making it accessible to reviewers and program officers.***

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Research Grant Writing Web Resources

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[Your Grant Application Questions Answered in New NIH Center for Scientific Review Videos](#)

[New NIH Grant Application Submission Tips for Success Videos](#)

[NIH Grant Guidelines Infographic](#)

NEW GRANT GUIDELINES
what you need to know

WHY UPDATE THE GUIDELINES?
The updates focus on four areas deemed important for enhancing rigor and transparency:

- 1 PREMISE**
The scientific premise forming the basis of the proposed research
- 2 DESIGN**
Rigorous experimental design for robust and unbiased results
- 3 VARIABLES**
Consideration of relevant biological variables
- 4 AUTHENTICATION**
Authentication of key biological and/or chemical resources

Send inquiries to reproducibility@nih.gov
See also NIH Notice NOT-OD-16-011
<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-16-011.html>

WHAT ARE THE UPDATES?

1 UPDATES TO RESEARCH STRATEGY GUIDANCE
The research strategy is where you discuss the significance, innovation, and approach of your research plan. Let's look at an R01, for example:

The new **research strategy** guidelines require that you:

- State the strengths and weakness of published research or preliminary data crucial to the support of your application
- Describe how your experimental design and methods will achieve robust and unbiased results
- Explain how biological variables, such as sex, are factored into research design and provide justification if only one sex is used

Introduction to resubmission and revision applications | Specific aims | Research strategy | Commercialization plan | Biographical sketch

2 NEW ATTACHMENT FOR AUTHENTICATION OF KEY BIOLOGICAL AND/OR CHEMICAL RESOURCES
From now on, you must briefly describe methods to ensure the identity and validity of key biological and/or chemical resources used in the proposed studies.

These include, but are not limited to:

CELL LINES | ANTIBODIES | SPECIALTY CHEMICALS | OTHER BIOLOGICS

Standard laboratory reagents that are not expected to vary do not need to be included in the plan. Examples are buffers and other common biologicals or chemicals.

DO NOT put experimental methods or preliminary data in this section
 DO focus on authentication and validation of key resources

3 NEW REVIEWER GUIDELINES
Here are the additional criteria the reviewers will be asked to use:

- ➔ Is there a **strong scientific premise** for the project?
- ➔ Have the investigators presented adequate plans to address **relevant biological variables**, such as sex, for studies in vertebrate animals or human subjects?
- ➔ Have the investigators presented strategies to ensure a **robust and unbiased approach**, as appropriate for the work proposed?

Reviewers will also be asked to comment on that new attachment (see Update 2!)

[NSF Fall 2018 Grants Conference Webcast](#)

[Introduction and Overview Fall 2018 Grants Conference](#)

[Funding Types](#)

[Proposal Preparation](#)

[What Contributes to the Success of Early Career Scientists? – A NIAID Look](#)

[New "All About Grants" Podcast on Preparing for Private Investment](#)

Educational Grant Writing Web Resources

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[How to Make Education Research Relevant to Teachers](#)

[Jefferson Education Exchange](#)

[Science and Engineering for Grades 6-12: Investigation and Design at the Center](#)

Science and Engineering for Grades 6-12: Investigation and Design at the Center revisits America's Lab Report: Investigations in High School Science in order to consider its discussion of laboratory experiences and teacher and school readiness in an updated context. It considers how to engage today's middle and high school students in doing science and engineering through an analysis of evidence and examples. This report provides guidance for teachers, administrators, creators of instructional resources, and leaders in teacher professional learning on how to support students as they make sense of phenomena, gather and analyze data/information, construct explanations and design solutions, and communicate reasoning to self and others during science investigation and engineering design. It also provides guidance to help educators get started with designing, implementing, and assessing investigation and design.

[A Framework for K-12 Science Education](#)

[Essential Practices for K-12 Science Classrooms](#)

[Investigation and Design Can Improve Student Learning in Science and Engineering; Changes to Instructional Approaches Will Require Significant Effort](#)

CIRCL (The Center for Innovative Research in CyberLearning) Webinar: [Rapid Community Reports](#)

[Designing Educational Systems to Support Enactment of the Next Generation Science Standards](#)

IES Announces New Career and Technical Education Research Network Lead

The Institute of Education Sciences (IES), with funding from the Office of Career, Technical, and Adult Education (OCTAE), has awarded a 5-year grant to the American Institutes for Research (AIR) and its partners, Vanderbilt University, the Association for Career and Technical Education (ACTE) and Jobs for the Future (JFF), to lead a Career and Technical Education (CTE) Network: [Expanding the Evidence Base for Career and Technical Education](#).

[The Network Lead](#) will be responsible for CTE Network administration and coordination and will carry out research, training, and dissemination activities designed to increase the

Research Development & Grant Writing News

number and quality of CTE impact evaluations and strengthen the capacity of the field to conduct future CTE research and evaluation.

IES has established the CTE Network to increase (1) the number of impact studies examining the effects of CTE policies, programs, and practices on students' academic, career and technical, and employment outcomes and (2) the capacity of researchers and practitioners to conduct rigorous research in CTE. The network structure is meant to improve coherence and coordination among CTE research projects, develop and share strategies to overcome challenges in conducting CTE research, and identify new CTE research priorities.

Three IES-funded CTE research projects with causal impact designs will join the Network this year; the Network will eventually include up to six member projects.

Agency Research News

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[Behavioral and Social Scientists Lead Scientific Replication Efforts](#)

Behavioral and Social Scientists Lead Scientific Replication Efforts. Last month, a group of researchers representing labs from five institutions and the [Center for Open Science](#) published [findings on the replication of 21 studies](#) previously published in Nature and Science. Prior research had shown that only about half of social science studies were able to be replicated, and the authors sought additional evidence for reproducibility among highly prestigious journals that could have higher (or lower) replication rates. The authors found that 13 of the 21 studies (62%) produced a significant effect in the same direction as the original study.

[Request for Information \(RFI\) on Proposed Provisions for a Draft Data Management and Sharing Policy for NIH Funded or Supported Research](#)

The purpose of this Notice is to solicit public input on proposed key provisions that could serve as a foundation for a future NIH policy for data management and sharing. Stakeholder feedback is essential to inform the development of a new NIH policy on the management and sharing of scientific data. This Notice aims to solicit public comment on proposed key policy provisions. Feedback obtained through this Notice and other outreach efforts will help to inform the development of a draft NIH policy for data management and sharing, which is expected to be released for an additional public comment period upon its development. Comments on this Notice must be received no later than **December 10, 2018**.

The National Science Foundation (NSF) made major changes last March to the way the research community registers for NSF accounts and maintains account and user profile information in FastLane and Research.gov. Please be advised that NSF introduced an enhancement on October 22, 2018, which allows organization Administrators to remove users from their organizations who have not migrated to the new account management system, including those users who have left the organization. Unmigrated users are indicated by the “Invite to Update Profile” link in the View My Users Administrator Dashboard Action column. Note that removing a user from the organization does not in any way impact the user’s NSF account or that user’s ability to become affiliated with any other organization. Here are the steps to remove an unmigrated user from the organization:

- Open [Research.gov](#);
- Click “Sign In” located at the top right of the screen;
- Enter your NSF ID and password and click “Sign In;”
- Click “My Profile” located at the top right of the screen;
- Click “View My Users” from the left navigation bar;
- Identify a user who has not migrated to the new account management system by locating both the “Invite to Update Profile” link and the “Remove User” link in the Action column; and

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- Click the “Remove User” link in the Action column for the specified user to remove that individual from the organization and View My Users Administrator Dashboard.

For more information about removing unmigrated users from an organization, please see page 34 of the [Account Management Guide](#). Additional resources including Frequently Asked Questions (FAQs) and instructional videos are available on the Research.gov [About Account Management](#) page. For IT system-related questions, please contact the NSF Help Desk at 1-800-381-1532 or rgov@nsf.gov. Policy-related questions should be directed to policy@nsf.gov.

[Dear Colleague Letter: Fairness, Ethics, Accountability, and Transparency: Enabling Breakthrough Research to Expand Inclusivity in Computer and Information Science and Engineering Research](#)

With this Dear Colleague Letter (DCL), CISE invites principal investigators (PIs) to submit proposals to its core programs [spanning the [Computer and Network Systems \(CNS\)](#), [Computing and Communication Foundations \(CCF\)](#), and [Information and Intelligent Systems \(IIS\)](#) divisions and the [Office of Advanced Cyberinfrastructure \(OAC\)](#)] that contribute to discovery in research and practice related to fairness, ethics, accountability, and transparency (FEAT) in computer and information science and engineering. Specifically, CISE is interested in receiving, through these programs:

- Proposals pertaining to *general* topics in computer and information science and engineering while also integrating or applying approaches to advance FEAT; and
- Proposals whose *primary* foci are on methods, techniques, tools, and evaluation practices as means to explore implications for FEAT.

In explorations and use of FEAT, PIs are strongly encouraged to select and articulate their own disciplinary or interdisciplinary definitions consistent or aligned with these concepts. Please note that exploration and use of FEAT is not intended to replace Broadening Participation in Computing (BPC) plans, which are also strongly valued in CISE (see <https://www.nsf.gov/cise/bpc/> for details about our BPC effort).

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Agency Reports, Workshops & Research Roadmaps

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[Understanding the Long-Term Evolution of the Coupled Natural-Human Coastal System](#)

The Future of the U.S. Gulf Coast (2018)

The U.S. Gulf Coast provides a valuable setting to study deeply connected natural and human interactions and feedbacks that have led to a complex, interconnected coastal system. The physical landscape in the region has changed significantly due to broad-scale, long-term processes such as coastal subsidence and river sediment deposition as well as short-term episodic events such as hurricanes. Modifications from human activities, including building levees and canals and constructing buildings and roads, have left their own imprint on the natural landscape. This coupled natural-human coastal system and the individual aspects within it (physical, ecological, and human) are under increased pressure from accelerating environmental stressors such as sea level rise, intensifying hurricanes, and continued population increase with its accompanying coastal development. Promoting the resilience and maintaining the habitability of the Gulf Coast into the future will need improved understanding of the coupled natural-human coastal system, as well as effective sharing of this understanding in support of decision-making and policies.

Understanding the Long-term Evolution of the Coupled Natural-Human Coastal System presents a research agenda meant to enable a better understanding of the multiple and interconnected factors that influence long-term processes along the Gulf Coast. This report identifies scientific and technical gaps in understanding the interactions and feedbacks between human and natural processes, defines essential components of a research and development program in response to the identified gaps, and develops priorities for critical areas of research.

[The Science of Science Communication III: Inspiring Novel Collaborations and Building Capacity: Proceedings of a Colloquium](#)

Successful scientists must be effective communicators within their professions. Without those skills, they could not write papers and funding proposals, give talks and field questions, or teach classes and mentor students. However, communicating with audiences outside their profession - people who may not share scientists' interests, technical background, cultural assumptions, and modes of expression - presents different challenges and requires additional skills. Communication about science in political or social settings differs from discourse within a scientific discipline. Not only are scientists just one of many stakeholders vying for access to the public agenda, but the political debates surrounding science and its applications may sometimes confront scientists with unfamiliar and uncomfortable discussions involving religious values, partisan interests, and even the trustworthiness of science.

The Science of Science Communication III: Inspiring Novel Collaborations and Building Capacity summarizes the presentations and discussions from a Sackler Colloquium convened in November 2017. This event used Communicating Science Effectively as a framework for examining how one might apply its lessons to research and practice. It considered opportunities for creating and applying the science along with the barriers to doing so, such as the incentive

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systems in academic institutions and the perils of communicating science in polarized environments. Special attention was given to the organization and infrastructure necessary for building capacity in science communication.

Data Science for Undergraduates: Opportunities and Options

As our economy, society, and daily life become increasingly dependent on data, work across nearly all fields is becoming more data driven, affecting both the jobs that are available and the skills that are required. At the request of the National Science Foundation, the National Academies of Sciences, Engineering, and Medicine were asked to set forth a vision for the emerging discipline of data science at the undergraduate level. The study committee considered the core principles and skills undergraduates should learn and discussed the pedagogical issues that must be addressed to build effective data science education programs. *Data Science for Undergraduates: Opportunities and Options* underscores the importance of preparing undergraduates for a data-enabled world and recommends that academic institutions and other stakeholders take steps to meet the evolving data science needs of students.

The Global Competitiveness Report 2018

In the midst of rapid technological change, political polarization and a fragile economic recovery, it is critical that we define, assess and implement new pathways to growth and prosperity. The 2018 edition of the Global Competitiveness Report represents a milestone in the four-decade history of the series, with the introduction of the new Global Competitiveness Index 4.0. The new index sheds light on an emerging set of drivers of productivity and long-term growth in the era of the Fourth Industrial Revolution. It provides a much-needed compass for policy-makers and other stakeholders to help shape economic strategies and monitor progress.

New Funding Opportunities

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Content Order

New Funding Posted Since October 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 work as well.]

New Funding Solicitations Posted October 15 Newsletter

National Science Foundation Research Traineeship (NRT) Program

The NSF Research Traineeship (NRT) program is designed to encourage the development and implementation of bold, new, and potentially transformative models for science, technology, engineering and mathematics (STEM) graduate education training. The NRT program seeks proposals that explore ways for graduate students in research-based master's and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers.

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

The NRT program addresses workforce development, emphasizing broad participation, and institutional capacity building needs in graduate education. Strategic collaborations with the private sector, non-governmental organizations (NGOs), government agencies, national laboratories, field stations, teaching and learning centers, informal science centers, and academic partners are encouraged. NRT especially welcomes proposals that will pair well with the efforts of NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) to develop STEM talent from all sectors and groups in our society (https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp). Collaborations are encouraged between NRT proposals and existing NSF INCLUDES projects,

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provided the collaboration strengthens both projects. **LOI November 25, 2018 - December 6, 2018**

[Gen-4 Engineering Research Centers \(ERC\) Convergent Research and Innovation through Inclusive Partnerships and Workforce Development](#)

REVISION NOTES

- **The ERC program has placed greater emphasis on convergence.** Convergent research approaches require the deep integration of knowledge, tools, and ways of thinking beyond engineering (for example, from the physical, mathematical, life/health sciences, computational sciences, and social sciences, among others). Purposeful **team formation** is needed for the convergent approach, supported by diversity and a **culture of inclusion** where all participants are recognized and derive mutual benefits. The convergent approach supports the strong societal impact expected of each ERC.
- **The ERC program has been re-envisioned to emphasize positive societal impact.** ERCs will strive to enable society to have a better quality of life, and be more resilient, productive, and/or safe.
- **The ERC program has strengthened the requirement for demonstrable integration of foundational components.** A strong strategic plan for each ERC outlines the interplay between the four foundational components of the ERC, including the convergent research project, engineering workforce development, the development of a culture of diversity and inclusion, and a focus on value creation within the innovation ecosystem. All these foundational components should together support the ultimate impact on society.
- **The ERC program calls for societal value creation:** Value Creation has often been defined in relation to the business environment, commonly referring to the increase in revenue from products and services or growth in company worth (e.g., stock price). In the context of this solicitation, it is defined as the creation of societal value from innovations (e.g., inventions, goods, services, businesses) that benefit society in a sustainable fashion.
- **The ERC program and this solicitation provide opportunities for effective leadership, management and infrastructure approaches.** Teams are encouraged to be strategic and creative.
- **The ERC program has updated the PI requirements to support the focus on convergence.**
- **The review criteria have been updated to reflect the new ERC emphases.**

The ERC program supports convergent research that will lead to strong societal impact. Each ERC has interacting foundational components that go beyond the research project, including engineering workforce development at all participant stages, a culture of diversity and inclusion where all participants gain mutual benefit, and value creation within an innovation ecosystem that will outlast the lifetime of the ERC. The logical reasoning that links the proposed activities to the identified goals for each ERC should be clear. **LOI Nov. 30; Prelim Jan. 16; full July 12.**

[19-508 EHR Core Research National Science Foundation](#)

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The EHR Core Research program (ECR) invites proposals for fundamental research (basic research or use-inspired basic research) that advances knowledge in one or more of the three Research Tracks: Research on STEM Learning and Learning Environments, Research on Broadening Participation in STEM fields, and Research on STEM Workforce Development. The ECR program places emphasis on the rigorous development of theory and accumulation of knowledge to inform efforts to address challenges in STEM interest, learning, and participation, for all groups and all ages in formal and informal settings. This emphasis includes research on advancing evaluative methodologies to support research efforts funded through ECR. ECR supports a wide range of research activities. ECR seeks to fund fundamental research that could involve the collection of new qualitative or quantitative data, secondary analyses using extant datasets, or meta-analyses. In addition, ECR supports research to develop innovative research methods, metrics, and conceptual models to measure existing and emerging phenomena, and to test theories that inform core scientific questions about STEM education and learning. The three levels of funding should align with the maturity of the proposed work, the size and scope of the empirical effort, and the capacity of the team to conduct the proposed research: (1) Level I proposals: have a maximum award size of \$500,000 and a maximum duration of 3 years; (2) Level II proposals have a maximum award size of \$1,500,000 and a maximum duration of 4 years; (3) Level III proposals have a maximum award size of \$2,500,000 and a maximum duration of 5 years. **Open to January 24.**

[IUUSE / Professional Formation of Engineers: Revolutionizing Engineering Departments \(IUUSE/PFE: RED\)](#)

The name of the program has been changed back to its original title. Revised descriptions are provided that highlight the focus on the middle two years of undergraduate engineering curricula as well as emphasize the attention to cultural, organizational, structural and pedagogical changes that is necessary to reinforce and sustain desired transformations of engineering departments. An Adaptation & Implementation (A&I) track was added to foster the propagation of proven change strategies to new contexts. An award size for the A&I track was included with a maximum budget of \$1,000,000 for a duration of up to 5 years. The requirement for proposers to submit a Letter of Intent was removed. The deadline was changed to January 24, 2019.

Revolutionizing Engineering Departments (hereinafter referred to as RED) is designed to build upon previous efforts in engineering education research. Specifically, previous and ongoing evaluations of the NSF Engineering Education and Centers Division program and its predecessors, as well as those related programs in the Directorate of Education and Human Resources, have shown that prior investments have significantly improved the first year of engineering students' experiences, incorporating engineering material, active learning approaches, design instruction, and a broad introduction to professional skills and a sense of professional practice – giving students an idea of what it means to become an engineer. Similarly, the senior year has seen notable change through capstone design experiences, which ask students to synthesize the technical knowledge, skills, and abilities they have gained with professional capacities, using reflective judgment to make decisions and communicate these effectively. However, this ideal of the senior year has not yet been fully realized, because many of the competencies required in capstone design, or required of professional engineers, are

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only partially introduced in the first year and not carried forward with significant emphasis through the sophomore and junior years. **Due January 24.**

Harnessing the Data Revolution (HDR): Data Science Corps (DSC) Building Capacity for HDR

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

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

Submission Window January 28, 2019 - February 04, 2019.

Materials Innovation Platforms (MIP)

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

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materials and novel materials phenomena/properties, as well as fostering their eventual deployment. The scientific focus of the MIP program is subject to change from competition to competition. The first MIP competition in 2015 focused on developing new bulk and thin-film crystalline hard materials. **The second MIP competition, in 2019, focuses on the convergence of materials research with biological sciences for developing new materials. Due February 4.**

[Training-based Workforce Development for Advanced Cyberinfrastructure \(CyberTraining\)](#)

The revisions are as follows:

- Three project classes have been defined: Pilot, Implementation (Small or Medium), and Large-scale Project Conceptualization.
- The two solicitation goals have been clarified, and Pilot and Implementation projects may target one or both of the solicitation goals. Large-scale Project Conceptualization projects must address both goals.
- Separate submission tracks for Cyberinfrastructure Contributors, Users, and Professionals have been eliminated. However, there remains a focus on these scientific communities, and projects should target one or more of these communities.
- The limit on number of proposals per PI or co-PI has been updated to indicate an individual may serve as PI or co-PI on only one Pilot or Implementation proposal to the CyberTraining program per competition. The Large-scale Project Conceptualization projects are not included in this limit.
- The programmatic areas of interest have been updated with the current priorities of the participating directorates and divisions, with one additional directorate participating: the Directorate for Social, Behavioral and Economic Sciences (SBE).
- The list of additional solicitation specific review criteria has been updated. Proposals should address a subset of these criteria according to the project class and one or both chosen goal(s) of the solicitation.

This program seeks to prepare, nurture, and grow the national scientific research workforce for creating, utilizing, and supporting advanced cyberinfrastructure (CI) to enable and potentially transform fundamental science and engineering research and contribute to the Nation's overall economic competitiveness and security. The goals of this solicitation are to (i) ensure broad adoption of CI tools, methods, and resources by the research community in order to catalyze major research advances and to enhance researchers' abilities to lead the development of new CI; and (ii) integrate core literacy and discipline-appropriate advanced skills in advanced CI as well as computational and data-driven science and engineering into the Nation's educational curriculum/instructional material fabric spanning undergraduate and graduate courses for advancing fundamental research. Pilot and Implementation projects may target one or both of the solicitation goals, while Large-scale Project Conceptualization projects must address both goals. For the purpose of this solicitation, advanced CI is broadly defined as the set of resources, tools, methods, and services for advanced computation, large-scale data handling and analytics, and networking and security for large-scale systems that collectively enable potentially transformative fundamental research. **Due February 6.**

[Enabling Discovery through GENomic Tools National Science Foundation](#)

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The Division of Integrative Organismal Systems (IOS) recognizes that a lack of methods for analysis of gene function represents an obstacle to progress in a range of diverse non-model organisms. These organisms are important for understanding numerous basic science questions in organismal biology as funded through the Division's core programs. Enabling Discovery through Genomic Tools (EDGE) is designed to provide support for development of tools, approaches and infrastructure necessary for direct tests of cause and effect hypotheses between gene function and phenotypes in diverse plants, animals, microbes, viruses and fungi for which these methods are presently unavailable. Such approaches are essential to advance understanding of the genomes-to-phenomes relationship, an area relevant to [Understanding the Rules of Life: Predicting Phenotype](#), one of the [10 Big Ideas](#) for future NSF investment. To meet the goal of catalyzing communities to enable direct tests of cause-and-effect hypotheses about genes and phenotypes in organisms for which such tools and infrastructure are presently lacking, EDGE proposals must include training and rapid dissemination plans enabling larger communities of investigators to utilize the newly-developed tools quickly, thereby catalyzing an increase in the capacity of research communities to test cause-and-effect hypotheses about genes and phenotypes in organisms for which such tools and infrastructure are presently lacking. **Due February 12.**

[Materials Research Science and Engineering Centers \(MRSEC\)](#)

There are a few minor differences between this and the previous ([NSF 16-545](#)) solicitation. These include:

1. Interdisciplinary Research Groups topics focusing on the NSF Big Ideas are included as suggested research topics;
2. For both preliminary and full proposals, MRSEC participant definitions are clarified and made uniform: it changed from using senior investigator, senior participants and others to clearer definitions for supported and unsupported Participants including Primary and Secondary Participants and more (see text);
3. For Preliminary proposals, only biographical sketches for those individuals listed in the NSF Proposal Cover Sheet (up to five) are required; other biographical sketches will not be accepted;
4. For both Preliminary and Full Proposal, Results from Prior NSF Support can only be reported for individuals, up to five, that appear on the NSF Cover Sheet; results for other participants must not be included;
5. Proposers are encouraged to contact the Program Director(s) prior to submission to ascertain that the Interdisciplinary Research Group (IRG) proposed research fits the Division of Materials Research (DMR) portfolio.

The Materials Research Science and Engineering Centers (MRSECs) program provides sustained support of interdisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. Each MRSEC addresses research of a scope and complexity requiring the scale, synergy, and multidisciplinary provided by a campus-based research center. The MRSECs support materials research infrastructure in the United States, promote active collaboration between universities and other sectors, including

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industry and international organizations, and contribute to the development of a national network of university-based centers in materials research, education, and facilities. A MRSEC may be located at a single institution, or may involve multiple institutions in partnership, and is composed of up to three Interdisciplinary Research Groups, IRGs, each addressing a fundamental materials science topic aligned with the Division of Materials Research, DMR.

Preliminary due June 24; full by invitation November 26.

URL Links to New & Open Funding Solicitations

Links verified June 8, 2018

- [SAMHSA FY 2017 Grant Announcements and Awards](#)
- [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](#)
- [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 \(BAA\)](#)
- [NASA Open Solicitations](#)
- [CDMRP FY 2018 Funding Announcements](#)
- [DOE/EERE Funding Opportunity Exchange](#)
- [New Funding Opportunities at NIEHS \(NIH\)](#)
- [National Human Genome Research Institute Funding Opportunities](#)
- [Office of Naval Research Currently Active BAAs](#)
- [HRSA Health Professions Open Opportunities](#)
- [Foundation Center RFP Weekly Funding Bulletin](#)

Solicitations Remaining Open from Prior Issues of the Newsletter

Long Term Research in Environmental Biology (LTREB)

The Long Term Research in Environmental Biology (LTREB) Program supports the generation of extended time series of data to address important questions in evolutionary biology, ecology, and ecosystem science. Research areas include, but are not limited to, the effects of natural selection or other evolutionary processes on populations, communities, or ecosystems; the effects of interspecific interactions that vary over time and space; population or community dynamics for organisms that have extended life spans and long turnover times; feedbacks between ecological and evolutionary processes; pools of materials such as nutrients in soils that turn over at intermediate to longer time scales; and external forcing functions such as climatic cycles that operate over long return intervals. **Proposals accepted at any time.**

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[NOAA-NWS-NWSPO-2019-2005754 Collaborative Science, Technology, and Applied Research \(CSTAR\) Program](#)

Through the Collaborative Science, Technology, and Applied Research (CSTAR) Program, the NWS Office of Science and Technology Integration is soliciting proposals to conduct research and development activities. NOAA/NWS believes its warning and forecast mission will benefit significantly from a strong partnership with outside investigators in the broad academic community. The CSTAR Program represents a NWS effort to create a cost-effective transition from basic and applied research to operations and services through collaborative research between operational forecasters and academic institutions which have expertise in the environmental sciences. These activities will engage university researchers and students in applied research of interest to the operational meteorological community for the provision of improving the accuracy of forecasts and warnings of environmental hazards. This announcement is for research and development topics identified as priorities by the NWS to support field forecasting operations. There is one grant competition under this announcement valued at \$700,000 for approximately four to seven new projects. NOAA's Office of Oceanic and Atmospheric Research (OAR) has announced a Fiscal Year (FY) 2019 federal funding opportunity with eight separate grant competitions reflecting multiple science objectives. Please search for funding opportunity number NOAA-OAR-OWAQ-2019-2005820 in <https://www.grants.gov> to learn more about this NOAA/OAR funding announcement. **Due December 14.**

[Big Data Regional Innovation Hubs](#)

NSF's Directorate for Computer and Information Science and Engineering (CISE) initiated the National Network of Big Data Regional Innovation Hubs (BD Hubs) program in FY 2015 ([NSF 15-562](#)). Four Big Data Hubs (BD Hubs)—*Midwest, Northeast, South, and West*—were established, one in each of the four Census Regions of the United States^[1]. The BD Hubs provide the ability to engage local or regional stakeholders, e.g., city, county, and state governments, local industry and non-profits, and regional academic institutions, in big data research, and permit a focus on regional issues. These collaborative activities and partnerships play a critical role in building and sustaining a successful national big data innovation ecosystem.

This solicitation continues the operation of a national network of BD Hubs. It builds on demonstrated strengths of the program, which has grown to include a set of BD Spokes affiliated with the BD Hubs, and is responsive to the recent developments in data science. For instance, the recently released report on [Data Science for Undergraduates: Opportunities and Options](#) from the National Academies of Sciences, Engineering, and Medicine exemplifies the urgency of multi-faceted education and training in data science. The BD Hubs will continue to nucleate regional collaborations and multi-sector projects, while fostering innovation in data science.

The NSF BD Hubs program is aligned with NSF's [Harnessing the Data Revolution](#) (HDR) Big Idea, one of [NSF's 10 Big Ideas for Future Investment](#). HDR is a visionary, national-scale activity to enable new modes of data-driven discovery, allowing fundamentally new questions to be asked and answered in science and engineering frontiers, generating new knowledge and understanding, and accelerating discovery and innovation. The HDR vision is realized via a

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coordinated set of program solicitations resulting in an ecosystem of interrelated activities enabling (i) research in the foundations of data science; frameworks, algorithms, and systems for data science; and data-driven research in science and engineering; (ii) advanced cyberinfrastructure; and (iii) education and workforce development—all of which are designed to amplify the intrinsically multidisciplinary nature of the data science challenge. The HDR Big Idea will establish theoretical, technical, and ethical data science frameworks, and apply them to practical problems in science and engineering, and in society more generally. **Due December 18.**

[N00014-18-S-B007 National Oceanographic Partnership Program \(NOPP\)](#)

In this BAA, NOPP participants have identified seven ocean research and technology topics of mutual and emerging interest. Selected projects will be awarded and funded by individual agencies after the NOPP office, ONR and panels of experts conduct an evaluation of the full proposals under each topic. All successful offerors will be notified and the NOPP office will provide the 2019 NOPP project announcement on their website. Up to \$27.3 million over three (3) years may be available for this solicitation, subject to appropriation, availability of funds and final approval by the participating NOPP agencies. NOPP funding will be dependent on proposal topic availability and individual agency policies, procedures, and regulations. There will be no classified work funded under this solicitation. **Closes December 21.**

[Joint DMS/NLM Initiative on Generalizable Data Science Methods for Biomedical Research \(DMS/NLM\)](#)

The Division of Mathematical Sciences (DMS) in the Directorate for Mathematical and Physical Sciences (MPS) at the National Science Foundation (NSF) and the National Library of Medicine (NLM) at the National Institutes of Health (NIH) plan to support the development of innovative and transformative mathematical and statistical approaches to address important data-driven biomedical and health challenges. The rationale for this interagency collaboration is that significant advances may be expected as the result of continued NSF investments in foundational research in mathematics and statistics as well as inter- and multi-disciplinary research and training at the intersection of the quantitative/computational sciences and domain sciences, while NIH benefits from the enhancement of biomedical data science with new approaches that strengthen the reproducibility of biomedical research and support open science. **Due January 1.**

[18-596 Formal Methods in the Field National Science Foundation](#)

The Formal Methods in the Field (FMitF) program ([NSF Publication 18-596](#)) aims to bring together researchers in formal methods with researchers in other areas of computer and information science and engineering to jointly develop rigorous and reproducible methodologies for designing and implementing correct-by-construction systems and applications with provable guarantees. FMitF encourages close collaboration between two groups of researchers. The first group consists of researchers in the area of formal methods, which, for the purposes of this solicitation, is broadly defined as principled approaches based on mathematics and logic, including modeling, specification, design, program analysis, verification, synthesis, and programming language-based approaches. The second group

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consists of researchers in the “field,” which, for the purposes of this solicitation, is defined as a subset of areas within computer and information science and engineering that currently do not benefit from having established communities already developing and applying formal methods in their research. This solicitation limits the field to the following areas that stand to directly benefit from a grounding in formal methods: computer networks, cyber-human systems, distributed /operating systems, hybrid/dynamical systems, and machine learning. Other field(s) may emerge as priority areas for the program in future years, subject to the availability of funds. **Due January 15.**

[NOAA-OAR-OWAQ-2019-2005820 FY2019 Office of Weather and Air Quality Research Programs](#)

There will be eight grant competitions from this notification valued at approximately \$16,200,000 as follows: 1) High Impact Weather Testbeds, 2) Joint Technology Transfer Initiative (JTTI), 3) Air Quality Research and Forecasting, 4) Verification of the Origins of Rotation in Tornadoes Experiment - Southeast U.S. (VORTEX-SE), 5) Infrasound Detection of Tornadoes and High Impact Weather, 6) Next Generation of Mesoscale Weather Observing Platforms, 7) Snowpack and Soil Moisture Observations and Data Assimilation to Improve the National Water Model (NWM), and 8) Subseasonal to Seasonal (S2S).

These eight competitions in this notification of funding opportunity reflect multiple science objectives spanning time scales from the very short-term (hours) to seasonal and from weather and water observations and modeling to social and behavioral science. It is focused on improving NOAA’s understanding and ultimately its weather and water forecasting services through engagement with the external scientific community on key science gaps of mutual interest through funded grant opportunities.

One of the key themes is supporting applied research and development that leads to the demonstration in NOAA’s testbeds during the project period of new high impact weather, water, and air quality observing and forecasting applications, including new data or products, improved analysis techniques, better statistical or dynamic forecast models and techniques, and communication of that information to better inform the public. It is expected that NOAA’s support of these new capabilities will speed the transition of this new research into operations in order to improve NOAA weather and water services for the public. **Due March 20.**

[DE-FOA-0001913 Fiscal Year 2019 Consolidated Innovative Nuclear Research](#)

This FOA is open to U.S. universities, national laboratories, and industry. Research consortiums may be composed of diverse institutions including academia, national laboratories, non-profit research institutes, industry/utilities, and international partners. Research teams should strive to achieve the synergies that arise when individuals with forefront expertise in different methodologies, technologies, disciplines, and areas of content knowledge approach a problem together, overcoming impasses by considering the issue from fresh angles and discovering novel solutions. DOE-NE strongly encourages diversifying its research portfolio through effective partnerships with industry, underrepresented groups, and MSI, which may receive funding support from the project. International partners are encouraged to participate, however no U.S. government funding will be provided to entities incorporated outside of the United States. DOE-NE will evaluate the benefit and contribution of any such proposed

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partnerships as part of its program relevancy evaluation and scoring. See eligibility requirements in the body of the FOA document to be sure you can apply. **Due Feb. 12.**

[HR001118S0057 DARPA Information Innovation Office \(I2O\) Office-wide](#)

This Broad Agency Announcement (BAA) seeks revolutionary research ideas for topics not being addressed by ongoing I2O programs or other published solicitations. Potential proposers are highly encouraged to review the current I2O programs (<http://www.darpa.mil/about-us/offices/i2o>) and solicitations (<http://www.darpa.mil/work-with-us/opportunities>) to avoid proposing efforts that duplicate existing activities or that are responsive to other published I2O solicitations. **Closes August 30.**

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.]

[FA9550-18-S-0003 Research Interests of the Air Force Office of Scientific Research](#)

AFOSR plans, coordinates, and executes the Air Force Research Laboratory's (AFRL) basic research program in response to technical guidance from AFRL and requirements of the Air Force. Additionally, the office fosters, supports, and conducts research within Air Force, university, and industry laboratories; and ensures transition of research results to support U.S. Air Force needs. The focus of AFOSR is on research areas that offer significant and comprehensive benefits to our national war fighting and peacekeeping capabilities. These areas are organized and managed in two scientific Departments: Engineering and Information Science (RTA) and Physical and Biological Sciences (RTB). The research activities managed within each Department are summarized in this section. **Open Until Superseded.**

[National Geospatial-Intelligence Agency Academic Research Program \(NARP\)](#)

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

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(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 Dec. 31, 2018.**

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

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

[BAA-RQKD-2014-0001 Open Innovation and Collaboration Department of Defense Air Force -- Research Lab](#)

Open innovation is a methodology to capitalize on diverse, often non-traditional talents and insights, wherever they reside, to solve problems. Commercial industry has proven open innovation to be an effective and efficient mechanism to overcome seemingly impossible technology and/or new product barriers. AFRL has actively and successfully participated in collaborative open innovation efforts. While these experiences have demonstrated the power of open innovation in the research world, existing mechanisms do not allow AFRL to rapidly enter into contractual relationships to further refine or develop solutions that were identified. This BAA will capitalize on commercial industry experience in open innovation and the benefits already achieved by AFRL using this approach. This BAA will provide AFRL an acquisition tool with the flexibility to rapidly solicit proposals through Calls for Proposals and make awards to deliver innovative technical solutions to meet present and future compelling Air Force needs as ever-changing operational issues become known. The requirements, terms and specific deliverables of each Call for Proposals will vary depending on the nature of the challenge being addressed. It is anticipated that Call(s) for Proposals will address challenges in (or the intersection between) such as the following technology areas: Materials: - Exploiting material properties to meet unique needs - Material analysis, concept / prototype development, and

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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 for airmen. The approaches relate to competency definition and requirements analysis, training and rehearsal strategies, and models and environments that support learning and proficiency achievement and sustainment during non-practice of under novel contexts. This effort focuses on measuring, diagnosing, and modeling airman expertise and performance, rapid development of models of airman cognition and specifying and validating, both empirically and practically, new classes of synthetic, computer-generated agents and teammates. An Industry Day was held in November 2014. Presentation materials from the Industry Day and Q&A's are attached. If you would like a list of Industry Day attendees, send an email request to helen.williams@us.af.mil **Open until November 17, 2019.**

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

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

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[Army Research Office Broad Agency Announcement for Basic and Applied Scientific Research](#)

This BAA sets forth research areas of interest to the ARO. This BAA is issued under FAR 6.102(d)(2), which provides for the competitive selection of basic and applied research proposals, and 10 U.S.C. 2358, 10 U.S.C. 2371, and 10 U.S.C. 2371b, which provide the authorities for issuing awards under this announcement for basic and applied research. The definitions of basic and applied research may be found at 32 CFR 22.105. 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 to April 30, 2022.**

[FA9453-17-S-0005 Research Options for Space Enterprise Technologies \(ROSET\)](#)

The Air Force Research Laboratory (AFRL) Space Vehicle Directorate (RV) is interested in receiving proposals from all offerors to advance state of the art technology and scientific knowledge supporting all aspects of space systems including payload adapters, on-orbit systems, communications links, ground systems, and user equipment. Efforts will include basic and advanced research, advanced component and technology development, prototyping, and system development and demonstration and will span the range from concept and laboratory experimentation to testing/demonstration in a relevant environment. Specific tasks include design, development, analysis, fabrication, integration, characterization, testing/experimentation, and demonstration of hardware and software products. **Open to September 22, 2022.**

[Broad Agency Announcement for the Army Rapid Capabilities Office](#)

This Broad Agency Announcement (BAA), W56JSR-18-S-0001, is sponsored by the Army Rapid Capabilities Office (RCO). The RCO serves to expedite critical capabilities to the field to meet Combatant Commanders' needs. The Office enables the Army to experiment, evolve, and deliver technologies in real time to address both urgent and emerging threats while supporting acquisition reform efforts. The RCO executes rapid prototyping and initial equipping of capabilities, particularly in the areas of cyber, electronic warfare, survivability and positioning, navigation and timing (PNT), as well as other priority projects that will enable Soldiers to operate and win in contested environments decisively. This BAA is an expression of interest only and does not commit the Government to make an award or pay proposal preparation costs generated in response to this announcement.

Questions concerning the receipt of your submission should be directed:

<http://rapidcapabilitiesoffice.army.mil/eto/>

Technical questions will be sent to the appropriate Technical Points of Contact (TPOC), topic authors, and/or Subject Matter Experts (SMEs) to request clarification of their areas of interest. No discussions are to be held with offerors by the technical staff after proposal submission without permission of the Army Contracting Command-Aberdeen Proving Ground (ACC-APG) Contracting Officer. **Open to March 23, 2023.**

[W911NF-18-S-0005 U.S. Army Research Institute for the Behavioral and Social Sciences Broad Agency Announcement for Basic, Applied, and Advanced Research \(Fiscal Years 2018-2023\)](#)

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The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) announces the ARI FY18-23 Broad Agency Announcement for Basic, Applied, and Advanced Scientific Research. This Broad Agency Announcement, 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 U.S. 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.

Those contemplating submission of a proposal are encouraged to contact the ARI Technical Point of Contact (TPOC) for the respective topic area cited in the BAA. If the R&D warrants further inquiry and funding is available, submission of a proposal will be entertained. The recommended three-step sequence is (1) telephone call to the ARI TPOC or responsible ARI Manager, (2) white paper submission, (3) full proposal submission. Awards may be made in the form of contracts, grants, or cooperative agreements. Proposals are sought from educational institutions, non-profit/not-for-profit organizations, and commercial organizations, domestic or foreign, for research and development (R&D) in those areas specified in the BAA. The U.S. Army Research Institute for the Behavioral and Social Sciences encourages Historically Black Colleges and Universities/Minority Serving Institutions (HBCU/MSI) and small businesses to submit proposals for consideration. Foreign owned, controlled, or influenced organizations are advised that security restrictions may apply that could preclude their participation in these efforts. Government laboratories, Federal Funded Research and Development Centers (FFRDCs), and US Service Academies are not eligible to participate as prime contractors or recipients. However, they may be able to participate as subcontractors or Subrecipients (eligibility will be determined on a case by case basis). **Open to April 29, 2023.**

FA8650-17-S-6001 Science and Technology for Autonomous Teammates (STAT)

The objective of Science and Technology for Autonomous Teammates (STAT) program is to develop and demonstrate autonomy technologies that will enable various AF mission sets. This research will be part of Experimentation Campaigns in: 1 -Multi-domain Command and Control; 2-Intelligence, Surveillance, Recognizance (ISR) Processing Exploitation and Dissemination (PED); and 3- Manned-Unmanned combat Teaming to demonstrate autonomy capabilities to develop and demonstrate autonomy technologies that will improve Air Force operations through human-machine teaming and autonomous decision-making. The technology demonstrations that result from this BAA will substantially improve the Air Force's capability to conduct missions in a variety of environments while minimizing the risks to Airmen. The overall impact of integration of autonomous systems into the mission space will enable the Air Force to operate inside of the enemy's decision loop.

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STAT will develop and apply autonomy technologies to enhance the full mission cycle, including mission planning, mission execution, and post-mission analysis. Particular areas of interest include multi-domain command and control, manned-unmanned teaming, and information analytics. The technology demonstrations that result from this BAA will substantially improve the Air Force's capability to conduct missions in a variety of environments while minimizing the risks to Airmen. The overall impact of integration of autonomous systems into the mission space will enable the Air Force to operate inside of the enemy's decision loop. This effort plans to demonstrate modular, transferable, open system architectures, and deliver autonomy technologies applicable to a spectrum of multi-domain applications. Development efforts will mature a set of technologies that enable airmen to plan, command, control, and execute missions with manageable workloads. The software algorithms and supporting architectures shall:

- Ingest and understand mission taskings and commander's intent
- Respond appropriately to human direction and orders
- Respond intelligently to dynamic threats and unplanned events

Chosen technologies will be open, reusable, adaptable, platform agnostic, secure, credible, affordable, enduring, and able to be integrated into autonomous systems. The program will be comprised of various technologies developed by AFRL and Industry, integrated into technology demonstrations and deliverables with all the necessary software, hardware, and documentation to support AFRL-owned modeling and simulation environments for future capability developments. Thus, all technology development efforts must adhere to interface designs and standards. **Open to July 23, 2023.**

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Academic Research Funding Strategies, LLC ([Page 1](#))

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