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## Research Development & Grant Writing News ©

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## Convergence, Like Spring, is Breaking Out All Over, Including at NSF and USDA

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By Mike Cronan, co-publisher

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If you have been tracking NSF's future funding directions signaled by recent funding solicitations, Dear Colleague Letters, Webinars, and other publications, it would be hard to ignore the fact that the future lies in convergence research. A contemporary remake of the movie, *The Graduate* (1967), would advise Dustin Hoffman "**Big Data convergence is the future!**" This direction became clear at NSF even before the agency started using the overarching descriptor "convergence" with the funding of Big Data HUBS and SPOKES and an agency focus on one of NSF's Ten Big Ideas: [Harnessing the Data Revolution](#).

Moreover, it has long been noted that NSF is a research "influencer" among federal research agencies, much like an Instagram Influencer but without the Twitter Drama of Cardi B and Nicki Minaj. Nonetheless, NSF's role as a major research "influencer" makes it important that faculty and research offices alike track who NSF influences and how, and the future funding opportunities likely to come from that influence.

A good example of this is the recent NSF [Dear Colleague Letter: Supporting Research at the Intersection of Agricultural Science, Big Data, Informatics, and Smart Communities, a joint effort between the National Science Foundation \(NSF\) and the U.S. Department of Agriculture's National Institute of Food and Agriculture \(USDA/NIFA\)](#). If you were to apply data analytics to NSF publications over the past year, it would become clear quickly that convergence research is joined to Big Data and Data Informatics at the intersection of an array of research disciplines under the convergence umbrella, somewhat like the old joke that goes, "You can't spell 'geek' without a double EE."

NSF has given the key to decoding this recent DCL and positioning for funding in this emerging area in the following (emphasis added): "Building on NSF's history of investments in data and computational sciences and USDA/NIFA's history of investments in agricultural science, NSF and USDA/NIFA wish to notify the community of our intention to **jointly fund convergent research that combines methods in agricultural, biological, and computer and information science and engineering to address pressing challenges and opportunities in digital agriculture**. . . . Motivated by the increasing volumes of data, faster computation, and algorithmic advances, there is an opportunity to apply transformative, data-driven research methods to the agriculture sector that are responsive to and will yield meaningful insights for farmers, other stakeholders, and society at large. **Of interest for this DCL are applications focused on economically important plants, animals, and their environments---in particular food, fuel, feed, and health---and where research outcomes in a particular application area may be transferable to, or informative for, other agricultural application areas.**"

Of course none of this is new and shouldn't surprise anyone who has witnessed over the past few years the NSF integration of complex physical systems, e.g., the smart grid, microgrids, energy, etc. with Big Data [HUBS/SPOKES](#) or agency partnerships, such as USDA/NIFA/NSF on *Innovations at the Nexus of Food, Energy and Water Systems* ([INFEWS](#)). The real difference

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here is that NSF clearly explains this integration in its recent DCL. This DCL clarifies, for example, that siloed research is largely a thing of the past and lays out a clear pathway to future funding success, specifically noting (emphasis added), “Our intention to jointly fund **convergent research that combines methods in agricultural, biological, and computer and information science and engineering to address pressing challenges and opportunities in digital agriculture.**”

Keep in mind that NSF typically characterizes convergent research as providing societal benefits together with a means for addressing major societal problems. As NSF notes in the [ERC webinar slides](#), “*Societal Impact represents opportunities and challenges that may be addressed through advances in engineering research and innovation for the benefit of society at large. Potential societal impact should be relevant and complex, and not limited to any specific schema of grand challenges.*”

**Bottom line here:** if you are in engineering and have Big Data funding or related funding from NSF (e.g., HUB or SPOKE which are essentially far-flung convergent partnerships) and haven’t explored possible convergent funding partnerships with researchers in the agricultural sciences, **now is the time to consider doing so**. Alternatively, if you are in the agricultural and biological sciences and have not explored partnerships with faculty in electrical and computer engineering and computer sciences with NSF, DOE, and DoD funding, **now is the time to consider doing so**.

Recent articles in this newsletter have addressed convergence research from several perspectives (see National Academies [Convergence: Facilitating Transdisciplinary Integration of Life Sciences, Physical Sciences, Engineering, and Beyond](#)), **but the key takeaway is that those seeking funding under the convergent umbrella must know and understand the expectations it places on those claiming to work within its principles**.

This understanding has become particularly important in a time of projected reduced FY2020 research budgets at most federal agencies, given **that fewer research dollars means much stiffer competition for available dollars**. As noted in a companion article in this newsletter, NSF is increasing funding in the Big Ideas domain, including Harnessing the Data Revolution which informs this DCL; therefore, while some NSF funding areas may take a budget hit, this will not be one of them.

Nonetheless, success in this new “funding ecosystem” will **benefit from strategic partnerships between faculty and research offices** to ensure that proposals submitted under this DCL to the below three programs are very competitive for funding:

- [Cyber-Physical Systems \(CPS\)](#) program;
- [Information and Intelligent Systems \(IIS\): Core Programs](#) --- Information Integration and Informatics (III) program; and
- [Smart and Connected Communities \(S&CC\)](#) program.

Positioning for a submission under this DCL will require a thorough and **strategic understanding of what NSF means by convergent research** and the **ability to explain why and how** a proposed project meets the NSF definition of convergent research in the research narrative. **This is not a trivial task**. The PI of such an effort will have to assemble a team fully committed to convergent research and able to describe it in the project description. Of course, this direction at NSF will not be a surprise to many research offices and their assistance can add

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another competitive margin to the overall process of planning, developing, and writing a proposal based on this DCL, particularly assisting in developing two key parts of a convergent research proposal—the Management Plan and Broader Impacts. In the former, applicants will explain how convergence works on the proposed project and how it will be managed. **You will need to nail this to secure funding.**

## NSF FY2020 Budget:

### Hoping for Better News, Planning for Good News

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By Mike Cronan, co-publisher

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There is no shame in being a Pollyanna in the face of grim news as long as that optimism rides on a realistic assessment of how to reach a better future. The President's proposed budget for FY2020 cuts almost all research funding, ranging from Draconian on steroids to somewhat less Draconian. But those cuts amount to the opening gambit in a back and forth negotiation with Congress over the coming months (see [Federal Science Budget Tracker](#)).

Once again, for example, the [President's budget](#) proposes eliminating ARPA-E, but when considering the President's Budget cuts, keep in mind the cable Mark Twain sent from London to the US press after his obituary had been mistakenly published: "The reports of my death are greatly exaggerated." This turned out to be the case for ARPA-E under the President's past budgets, and will likely be an outcome in this budget as **Congress makes its priorities known**. See AAAS [R&D in the FY 2020 White House Budget: An Overview](#) and [AAAS R&D Budget and Policy Program](#).

Moreover, even with cuts, AAAS notes that the White House has identified some research priorities for funding increases that **represent opportunities for university strategic research plans positioning for success** in future domains and new directions, as AAAS has noted (emphasis added):

**"AI.** The White House reports an **\$850 million investment in R&D on artificial intelligence in FY 2020** among civilian agencies, divided across the Department of Energy, NIH, NIST, and the National Science Foundation, **in addition to \$927 million for AI research from the Pentagon.**

**"Quantum Information Science.** The White House is seeking **\$430 million for their quantum science initiative**. This includes \$168.5 million for the Office of Science, **a \$63.5 million increase from last year's requested level**. NSF would devote \$106 million to the initiative per its request, with about half funded via the Mathematical and Physical Sciences directorate.

**"Lunar Exploration.** The Administration continues to prioritize funding for lunar activities at NASA. **The core Lunar Gateway budget would grow from \$450 million in FY 2019 to \$821 million in FY 2020.** The Advanced Cis-lunar and Surface Capabilities account, which funds robotic lunar missions to the surface of the moon, would more than triple from last year's appropriation to \$363 million total. **The budget would also establish a new Lunar Surface Innovation Initiative to spur creation of novel technologies for exploration.**

**"Competitive Agricultural Research and Infrastructure.** While certain other USDA research programs would be trimmed or relocated, the competitive Agriculture and Food Research Initiative (AFRI) would **receive \$500 million, a 20.5 percent boost from FY 2019 appropriations**. The budget also establishes a **competitive \$50 million program aimed at facility modernization** at land-grant universities.

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**“Exascale Computing.** The Department of Energy’s **exascale budget would rise to \$809 million**, including \$500 million for the Office of Science and \$309 million for National Nuclear Security Administration activities. **Both figures represent a rough doubling from FY 2019 appropriations.**

**“Cybersecurity.** The budget requests **\$17.4 billion in unclassified cybersecurity funding** (not all R&D), with more than half funded through DOD. R&D components include \$37 million for the Department of Homeland Security—**mostly funded via the new [Cybersecurity and Infrastructure Security Agency](#)**—and \$36 million for the Energy Department’s new cybersecurity office.”

Lists like the above provide research offices and faculty with information about where funding will likely be in the future and ***therefore can help them plan how best to compete for it***. This is particularly true when it comes to research office support for competitive and newer faculty wanting to succeed in these domains. For example, while DOD funding ([FY20 Budget Request: DOD Science and Technology](#)) will increase by \$9 billion over the current budget of \$104 billion for Research, Development, Test, and Evaluation, according to the American Institute of Physics, “funding for earlier-stage R&D activities that comprise DOD’s Science and Technology program — Basic Research, Applied Research, and Advanced Technology Development — would **drop 12 percent** to \$14.1 billion. Programs that fund basic research would **decrease 8 percent** overall to \$2.3 billion under the administration’s proposal, just above their fiscal year 2017 level. These include Defense Research Sciences, which supports both in-house and extramural research; University Research Initiatives, which funds the Multidisciplinary University Research Initiative (MURI) and the Defense University Research Instrumentation Program (DURIP), among other activities; and the National Defense Education Program, which supports STEM outreach and scholarship programs” (emphasis added). The administration’s proposals for key basic research sub-accounts are also detailed in the [Budget Tracker](#). These latter programs, especially the MURI and DURIP, are long-standing programs of importance to university faculty across numerous disciplines, departments, and colleges.

In the case of NSF, the agency is currently looking at a 12.5% budget cut in the [FY2020 Summary Budget Request to Congress](#) as taken from the full [FY 2020 Budget Request to Congress](#). While many NSF programs lose under this budget, according to [Science Magazine](#), “There would also be a few winners. A long-running program at the nation’s community colleges to train more technical workers—another Trump administration priority—would grow by 14%, to \$75 million. And the Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science program to foster diversity across all levels of science, a signature effort by the director, would receive an 11% bump, to \$20 million.” In addition, the AAAS priority areas enumerated above are also reflected in increased funding at NSF, even as the overall budget is reduced. Moreover, this budget has \$357 million funding for the Big Ideas program, up \$75 million over last year.

**Of course this is cold comfort in the aggregate.** As noted by [Science Magazine](#), “If adopted, the 2020 budget would be NSF’s smallest since 2013. NSF officials estimate that the foundation would make 1000 fewer new awards (the figure was 9000 in 2018) and that the success rate for grant applicants will dip by 1%, to 21%. The proposed cuts stretch across all six research directorates, as well as its education directorate.” **But there is room for optimism**

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**here.** In last two NSF budgets, the Congress has balked at the President's cuts and increased the budgets each year over prior years.

Moreover, while a reduction in NSF awards will result in a corresponding decrease in the funding success rate, ***it also points to the role research offices can play in increasing the overall institutional funding success rate across federal agencies.*** Bottom line: ***When budgetary times get tough, the tough write better proposals,*** particularly when assisted by university research offices. Or, consider the old joke about the campers and the bear: A couple are camping when a bear suddenly comes out of the trees and growls. One starts putting on running shoes. The other says, "What are you doing? You can't outrun a bear!" To which the one in running shoes replies, ***"I don't have to outrun the bear—I just have to outrun you!"*** This is good advice by analogy for those writing proposals to federal agencies facing steep budget cuts, as well as those supporting them—focus on writing better proposals to make sure the budget bear doesn't catch you, and if the bear must catch someone, make sure you are wearing running shoes and your peer competitor is not.

Finally, in the end, it is always best to ***spend effort planning and implementing research strategies based on what you know rather than spending too much effort going down the rabbit hole of what you don't know.*** At his point, the FY2020 research agency budgets are still a very big rabbit hole of uncertainty. ***But NSF sets a good example in all of this budgetary chaos by focusing on what they can control and not becoming unglued thinking about what they cannot control.*** The NSF Big Ideas program is a prime example of this, especially in remaining constant in both its vision and goals for future research directions in times of budgetary cuts.

Moreover, while research offices play a role in helping faculty write more competitive proposals, they can also play an important role in times of budgetary cuts by staying abreast of ongoing budgetary negotiations and ***preparing for where funding agencies may cut programs and where funding will be increased for existing or new programs across the federal agencies.*** In the aggregate, long-term strategic funding strategies and well-written proposals ***will result in the lion's share of research awards,*** in both bull and bear budget markets.

## NIH SCORE: a funding mechanism for PIs at MSIs

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By Lucy Deckard, co-publisher

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If you're a researcher at a Minority Serving Institution, HBCU, or Hispanic Serving Institution and you're interested in pursuing NIH funding, you may qualify to apply for an NIH Support of Competitive Research (SCORE) grant. The SCORE program is a capacity-building grant that focuses on funding "under-resourced institutions with **limited NIH R01 funding** (<\$6M per year) that have **explicitly stated historical missions or historical track records** focused on training and graduating students from groups nationally underrepresented in biomedical research with B.S./B.A., M.A., M.S. or Ph.D. degrees in biomedically-related sciences." These grants are for investigator-initiated projects; i.e., the PI proposes a topic rather than the topic being specified by the funding opportunity announcement (FOA). However, as with other investigator-initiated proposals, the topic must be something of interest to NIH. Importantly, **an institution can't have more than 20 SCORE grants at one time.**

Interestingly, even though the only participating institute/center is the National Institute of General Medical Sciences (NIGMS), in this case that doesn't mean that applicants must propose a topic that is specifically of interest to NIGMS. Instead, if you propose a topic that's of interest to another NIH institute/center (for example, the National Cancer Institute), and the proposal is recommended for funding, NIGMS will oversee the award, but they will assign a program officer from the interested institute/center. This means that if you're eligible for a SCORE grant, you don't have to restrict yourself to topics of interest to NIGMS. However, clinical trials are not allowed.

There are three types of SCORE grants.:

- SC1 - **Research Advancement Award** (current funding opportunity announcement [PAR-16-439](#))
- SC2 - **Pilot Project Award** (current funding opportunity announcement [PAR-16-438](#))
- SC3 - **Research Continuance Award** (current funding opportunity announcement [PAR-16-437](#))

The associated funding opportunity announcements (FOAs) officially expire in September, but these FOAs will be reissued soon. See the FOAs for details, but below is a quick summary of the differences between the grants.

**SC2** is for PIs at the beginning stages of their independent research careers who need support to generate preliminary data or to explore a new research idea. To be eligible for this one, you must be an early-stage researcher with a full-time faculty appointment, but they don't explicitly define what that means in terms of years since your terminal degree. This must be your first independent research award. Also, a significant time commitment is required (see the "Eligible Individuals" section in the FOA). **The SC2 is not renewable.** (Up to \$100K per year for up to 3 years)

**SC1** is for researchers who have established a track record of research activity and want to increase their research productivity in order to move to other types of NIH grants (e.g., an R01). The PI can't have already received an R01, though. This grant can support postdocs on the

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budget (see detailed restrictions in the FOA). **The SC1 can be renewed once.** (Up to \$250K direct costs per year for 4 years)

**SC3** is for PIs who have been productive but want to continue to use SCORE funding to help them produce more publications before transitioning to non-SCORE support. **The SC3 can be renewed multiple times.** (Up to \$75K direct costs per year for up to 4 years)

So if you're a newly independent researcher at a Minority Serving Institution with limited NIH R01 funding, you might first pursue an SC2 and then decide whether you need to continue building your track record through the SC3 mechanism, or you're ready to jump to larger grants after finishing an SC1.

While the SCORE grants are single-PI grants, remember that NIH defines the PI as, in essence, the project leader. You can still have funded collaborators, who could be co-investigators (in NIH parlance, "co-Is"), which is similar to a co-PI in NSF terminology. In fact, NIH strongly encourages SCORE PIs to develop collaborations with well-established NIH-funded investigators. This makes sense since the SCORE grants are capacity-building grants, and one of the best ways to build your capacity and competitiveness is to collaborate with well-funded investigators who are experts in your field. It's also important to be aware that there are restrictions on other capacity-building grants (including [K awards](#)) that you can have at the same time as the SCORE. Check the "Eligible Individuals" section of the FOA.

Remember that there are also a number of other capacity-building grants, including:

- [R15 \(AREA\)](#) - Note that there are both parent announcements (i.e., for investigator-initiated proposals), IC-specific announcements (i.e., NIGMS R15 FOA), and more topic-specific FOAs.
- [Institutional Development Awards \(IDeA\)](#) – for eligible states (23 states and Puerto Rico)
  - [Centers of Biomedical Research Excellence \(COBRE\)](#)
  - [IDeA Networks of Biomedical Research Excellence \(INBRE\)](#)
  - [IDeA Program Infrastructure for Clinical and Translational Research \(IDeA-CTR\)](#)
  - [IDeA Co-funding](#)
  - [STTR Regional Technology Transfer Accelerator Hubs for IDeA States](#)
- [Native American Research Centers for Health](#)
- [Science Education Partnership Awards \(SEPA\)](#)

Some of these are institutional or regional grants. Be sure to check the eligibility requirements carefully.

### **More Resources for SCORE**

[NIGMS SCORE Program Page](#)

[List of SCORE-funded institutions](#)

[SCORE FAQ](#)

## How-to Tips on Editing a Research Narrative

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By Mike Cronan, co-publisher

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Any successful proposal, regardless of funding agency or discipline, requires a well-edited research narrative. Research offices that assist faculty by editing proposals, preliminary proposals, white papers, and related research documents perform an important service for those seeking support in the planning, development, and writing of a project description. Poor writing and poor organization number among the most common reasons why federal research agencies, foundations, and other funders reject requests for funding. ***But this situation can change if applicants put in place a plan for reviewing and editing proposal drafts at major narrative waypoints.***

A well-written proposal doesn't appear all at once but evolves over a period of weeks and months through numerous narrative draft iterations. ***Along this path from an unfundable early draft to a final fundable proposal research offices can play a very valuable role in an institution's overall success in external funding.*** While there is no such thing as a perfect first draft of a proposal, there is such a thing as a ***series of better drafts, each better than the prior draft, until the document converges on a well-written, highly competitive narrative.*** In an analogy to NSF's oft repeated advice about questions for program officers "ask early and often," proposal advice is "***edit early and often.***"

There are, typically, ***multiple roles to be played in editing a proposal:*** (1) from a ***scientific content review and edit*** by principal investigators and other research personnel, (2) to a review and edit to ***ensure the narrative responds fully to the solicitation and guidelines,*** (3) to an ***organizational edit to ensure information is provided hierarchically in terms of relative importance and significance,*** (4) to an ***edit for grammar and usage,*** (5) to an ***edit and rewrite for clarity,*** and (6) to an ***edit for responsiveness to review criteria.***

Moreover, to ensure success, these edits should not occur only once or twice in proposal preparation but ***need to be scheduled early on in the process as part of a proposal narrative production plan; they should then occur with sufficient frequency to ensure the submitted proposal has converged on perfection through numerous review and edit iterations.*** For example, several parts of a thorough edit are best reviewed and addressed in early proposal drafts, such as the organization and structure of the research narrative, rather than in later draft stages, where any required restructuring of the project description can be difficult, time consuming, and stressful as a due date nears.

Or, for instance, early proposal edits must identify narrative sections that overemphasize less important information and underemphasize more important information. A common narrative failure in this regard will begin with a project description containing ***too much generalized background information*** and an overly long description of ***what*** you propose to do, but providing insufficient information on ***how*** you propose to do it and ***why*** completing the work described will advance the research field. The ***"too much what and not enough how"*** narrative mistake typically ***flags a reviewer's attention*** by providing insufficient information upon which to base a positive funding recommendation.

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In the most common mistake made while planning reviews and edits of proposal drafts, the requester fails to provide the would-be editor ***with a copy of the funding solicitation and guidelines***. The editor, therefore, cannot review the draft proposal with the thoroughness and attention required to improve the draft. ***The first substantive and critical review of a proposal should not occur as part of the funding agency's review but rather should occur during proposal preparation*** by project participants and research offices.

Keep in mind that ***proposals that fail to respond to any part of the funding solicitation will be declined for funding***. A successful editorial review of any proposal recommending changes to the document requires that the reviewer(s) calibrate the research narrative to the narrative guidelines. Only in this way can the author(s) be certain that what they are proposing responds fully to the agency's research mission, goals, and objectives, as well as to its overarching review criteria and the specific programmatic review criteria. For this reason, a calibrating proposal review is among the most important components of a well reviewed proposal.

The **Bottom Line** here is that a proposal team must create a plan to edit and review proposal drafts repeatedly to ensure that each subsequent draft genuinely improves upon earlier versions. This is how a proposal team can ensure that the final submitted proposal has incorporated every possible suggestion for improving upon a proposal's competitiveness.

## Do You Have Your NSF STC Endgame in Place?

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By Mike Cronan, co-publisher

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There are nearly as many gates to pass through for winning an [NSF STC](#) as there are starting gates at the Kentucky Derby at Churchill Downs. Unfortunately, the STC gates are linear rather than parallel; consequently, the competition more closely resembles the single elimination of March Madness whereby only one of the 64 teams in play will win it all. For both the STC and ERC competitions, NSF has historically received several hundred preliminary proposals that are winnowed down to a few awards, perhaps 4 or 5, over an 18-month competition. The timeline resembles the one below for this FY 2019 to FY 2021 STC, which includes the following gates:

- Preliminary proposals due June 25, 2019
- Invited list informed, late October, 2019
- Invited full proposals due January 27, 2020
- Notification of invitation for site visit, late June, 2020
- Site visits, September 1-October 30, 2020
- Declined proposers informed, and recommended awards announced, early February, 2021
- Anticipated start date of awards, June 1, 2021

Of course, “being in play” for an STC is defined broadly. In actuality, of the several hundred who enter the STC competition gauntlet, a much smaller number go the distance and win. By analogy with March Madness, the betting line favors the top seeds not the bottom seeds, but recall the headlines of a year ago, “*UMBC stuns Virginia to make NCAA tournament history as first No. 16 seed beat No. 1 seed.*” There is always a chance to “catch lightning in a bottle,” thereby making the decision to pursue an STC, regardless of the betting line, a reasonable one. Or, as Wayne Gretzky famously noted, “You miss 100% of the shots you don’t take.” Persistence is key to STC success. After all Virginia went from heartbreak last year to triumph this year.

Moreover, there are some strategic reasons for pursuing an STC in terms of institutional capacity building and “learning the ropes” of submitting large team proposals such as an STC or ERC. Large center grants at NSF and elsewhere are all about years of strategic pre-positioning so that when your dream solicitation is posted you are set to go. In practice, you don’t get to compete in the championship round unless you have trained sufficiently to make it through the preliminary round. There is a lot of trial and error in the process of submitting large grants, ***and much of what is learned to be successful in the future comes from being unsuccessful in the past.*** However, winning an STC is an endurance contest that grinds down most unprepared competitors at the preliminary proposal stage and then gets more challenging at each successive gate, even for the well prepared.

Fortunately, research offices can play a major role in helping PIs submit a competitive STC proposal, particularly by assisting in organizing and planning, reviewing and editing drafts,

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narrative strategies, setting up red team reviews, familiarizing the PI with documents referenced in the solicitation, etc. Of course, the first step in winning an STC is always to ***have a great idea that fits the goals and objectives of the funding solicitation***, something entirely in the purview of the PI and the research team. But research offices can add another dimension to the discussions of whether or not a proposed idea responds fully to the solicitation based on familiarity with the funding agency and whether a core team needs to expand to become competitive, a likely recommendation given the emphasis on convergent research.

Clearly, however, given NSF's current mantra, ***your great idea for an STC better be a great convergent idea for an STC***. Since convergence is a more recent characterization of research at NSF, all will benefit from discussing it in various ways, including ***what it actually is and how to best describe it in the research narrative, particularly in the project management plan***.

Proposals for an STC can often feature a cast of researchers as numerous as actors in a Cecil B. DeMille movie. Organizing, planning, and writing an STC can push even the most experienced PI to the limit over an 18-month period. A commitment to pursue an STC requires not only a committed PI and research team ***but a committed and supporting institution as well, which includes research office support for PIs***. Given this, the track record on submitted STCs is typically a path of multiple rejections and learning by mistakes before eventual funding success. Proposals that eventually win an STC are always led by a committed and engaged ***PI able to manage large research team dynamics and communicate a compelling research vision*** to both the research team and to agency program officers and reviewers. Essentially, STCs are a reward for a compelling scientific vision and the capacity to achieve it.

However, the start of the STC process is the 12-page preliminary proposal due June 25. But it is important not to get out ahead of your skis on this. Applicants should fully understand NSF's guiding concept for an STC, NSF's objectives for the STC program, NSF's characterization of a successful STC, and NSF's expectation for leadership and management of STCs. These issues need to be fully grasped before finally conceptualizing an STC idea, so that they are woven into the fabric of the research narrative. Ignore these issues at your peril.

***A common mistake when writing an STC preliminary proposal is to forget that it is only the start of a much longer and more detailed process***. For example, preliminary proposal authors often become overly focused on its required elements, e.g., center rationale, center plan, team description, integrative strategies, etc., and ***fail to keep in mind that the preliminary proposal is not an end in itself but a transitional document. If successful, it will be followed--by invitation only--by a 25-page project description*** for an STC. This project description will ask the applicant to address the rationale for the center's approach, research objectives, education and human resource development objectives, broadening participation objectives, knowledge transfer objectives, management plan for the research, education, and broadening participation, knowledge transfer activities, etc.

The key point here is ***not to silo the preliminary proposal from the full proposal*** but to read the section descriptions required for a 12-page preliminary proposal together with those of the 25-page full ***proposal in concert to ensure that the arguments made in the preliminary proposal will be aligned with and capable of becoming integrated seamlessly into those of the full proposal***, which needs to be ***conceived as including a site visit***. Moreover, all of these stages--from preliminary to full to site visit--required for a successful STC need to be

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understood in the context of the extensive additional review criteria, i.e., in addition to overarching intellectual merit and broader impacts, specific to the preliminary, full, and site visit. Here again, the specific review criteria for each of the three key stages need to be understood through the lens of convergence rather than isolation.

While additional review criteria are specific to preliminary, full, and site visit, they must be understood and presented, as in the case with the section elements, as integrated—hence the title of the funding opportunity: *Science and Technology Centers: **Integrative Partnerships***. Conceptualizing the process in this way and letting that inform the research narratives for both the preliminary and full proposal will make a significant difference in the chance of being recommended for an STC.

So the bottom line on successfully making it through the STC award gates is to have a ***unifying endgame plan in place from the get-go that will prevent silos from occurring at each step of the process and will ensure that an integrated STC plan emerges over the next 18 months of effort.***

## Strategies for Preparing for a Site Visit

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By [Mike Cronan](#), co-publisher

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Site visits are part of a continuum that typically runs from preliminary proposal to full proposal to site visit to funded project and from there on to rigorous annual reviews and periodic on-site reviews during a 5 or 10-year project performance period. At any given point along this continuum, it is always beneficial to be mindful of the next waypoint. For example, you would not write a preliminary proposal, say, for the currently open NSF Science and Technology Centers, by focusing solely on the requirements of the 8-page preliminary proposal without looking ahead in the solicitation to determine the requirements of the 25-page full proposal. Nor would you write a full proposal for an STC without anticipating the questions likely to be raised in a site visit, thereby laying the groundwork for a successful site visit for the full proposal, and, from there, successful annual reviews.

When writing center proposals, you are always scanning the horizon for what will come next in the process and strategically positioning for it by anticipating the probing questions reviewers might ask based on what you have written—or **failed to write**—in the research narrative, the latter a too common (and fatal) flaw of many declined proposals, and certainly the kiss of death to your chances of a site visit for a center proposal. ***Failure to anticipate the likely critical perspective of reviewers reading your research narrative is a common strategic weakness in grant writing.*** In fact, grant writers would do well to rephrase Chinese military general and philosopher Sun Tzu's (circa 544-496 BC) observation, "To know your Enemy, you must become your Enemy" as follows: "To know your Reviewer, you must become your Reviewer." For, as Tzu states, "If you know the enemy and know yourself, you need not fear the result of a hundred battles."

In this regard, you are somewhat like the sailor on watch in the crow's nest of an old sailing ship—ever vigilant for the unexpected event that could throw you off course towards your final destination, i.e., a funded center. Any augmentations you make to a preliminary proposal must provide a seamless transition to the full proposal where your core arguments will be expanded upon with more detail, specificity, and elaboration. ***Furthermore, your full proposal needs to be framed in a way that anticipates a seamless transition to a site visit.***

With this in mind, when you are planning ahead for a site visit, typically a very scripted event framed on the funding agency's objectives for the site visit team, keep in mind that following a successful site visit, i.e., a funded project, the next likely waypoint will be an annual performance review, either on site by an agency review team, or perhaps virtual, but regardless of the venue, a very rigorous and probing process. So anticipating an annual performance review can help you better frame the site visit just as anticipating the full proposal helps you write a more competitive preliminary proposal. ***Here, as in the research narrative itself, think in terms of synergistic and integrated rather than siloed waypoints.***

How, you may ask, can you anticipate what your annual performance review might entail before you even have a site visit? This is where the technique of "***generic estimation***" or "***generic approximation***" comes into play as a strategy to enhance your competitiveness. Both

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site visits and annual performance reviews by any given agency share many common features regardless of the specific program being reviewed. For example, the site visit for an NSF ERC and the site visit for an NSF STC are much more similar than dissimilar.

By and large, agencies use a template for site team reviews and annual performance reviews that are refined over time, but are more similar than dissimilar and can be planned for by the strategically prepared. So, for example, a site visit or annual performance review for the ADVANCE program at NSF can share common characteristics with a site visit for an NSF STC or ERC, and an annual performance review for an ERC can help you anticipate what might be asked in an NSF site visit on that program or other programs.

Just as in real estate the mantra is “*location, location, location,*” in grant writing the mantra is “*generic common denominators, generic common denominators, generic common denominators.*” Your capacity to know and understand the generic common denominators of grant writing, irrespective of discipline, agency, or specific solicitation, gives you a powerful tool to increase your chances of success, just as the Conservation of Energy Principle gives us a powerful “generic tool” for understanding the physical world.

When it comes to preparing for site visits by anticipating your team’s preparation objectives, keep in mind Mark Twain’s observation that “*History doesn’t repeat itself, but it does rhyme.*” Two excellent sources of “generic information” that can help you better plan for and anticipate what you might expect from a site visit are downloadable pdf files from the [BEACON Center for the Study of Evolution in Action](#), an NSF Science and Technology Center led by Michigan State University. Specifically, note the [BEACON 2014 Annual Report](#) and the [BEACON 2013 Strategic Plan](#).

Many NSF-funded centers such as the ERC and the STC have program websites, but the BEACON website is among the very best of them, if not the best, largely because it contains annual reports, a strategic plan, and other component information on the center that effectively represent an implicit and very collegial “how to” for transiting all of the many waypoints of a successful center. BEACON reflects the NSF cultural expectation that, once you have center funding, you are expected to communicate the steps you’ve taken to conduct your center’s operations. If you are invited to submit a full proposal under the current STC program and you have not yet read the above documents at the BEACON website, you would be well advised to do so before proceeding further.

So what, you may ask, will I learn about preparing for a site visit from reading the [BEACON 2014 Annual Report](#) and the [BEACON 2013 Strategic Plan](#)? Well, beginning with the BEACON 2013 Strategic Plan, the first take-away message is that this strategic plan for a funded STC successfully transited all the waypoints, including the site visit, to a funded center. In this 19-page document, the multiple operational goals, objectives, and **outcomes** of the STC (from research to Broader Impacts to Education, to the **key sections related to student engagement in center activities and the Management Plan**, etc.) are stated, described (with rationale), and integrated **along with clearly defined and measurable metric frameworks and outcomes that will be used to evaluate the center**.

Structuring your site visit presentations in this way is very important, and it lays the groundwork for successful annual performance reviews that are metrics enabled. If you are currently writing an STC full proposal, reading this strategic plan will give great insight into what you must accomplish in your 25-page narrative. Moreover, a core question asked by the review

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team in any site visit has to do with what might be described as the “***unit of change.***” That is, after a five or ten year performance period of a funded center being in operation ***what has changed, what is different, and what does a successful center look like?***

Next, fast forward to the [BEACON 2014 Annual Report](#). The annual report is the first key waypoint after a successful site visit, and, in this case, it’s a 120-page document. The Report addresses the BEACON’s “Strategic Implementation Plan (which) sets goals in six areas: Education, Human Resources & Diversity; Leadership and Management; Knowledge Transfer; Integrative Research, Ethical Research; and **Research Output.**” Each of these six strategic areas (is) presented in a tabular fashion with descriptions under three key headings : ***Goal, Metrics, and Progress.***

You can think of the site visit as prologue to the first annual report, just as you should consider the preliminary proposal as prologue to the full, and the full as prologue to the site visit. However, in reading through these BEACON documents, consider ***what are the generic common denominators?*** By and large, they are exactly what is presented in the BEACON annual report: “***Goal, Metrics, and Progress.***” This characterizes the *unit of change* question and allows you to answer it with great specificity for a site visit team. So, while much of the structure of the site visit is determined by the funding agency, how you structure your presentations to map to those requirements will be important as well. BEACON’s strategic plan and annual report will help you get a sense in a very practical way of how to prepare for a site team visit.

Of course, there are other issues to be considered when preparing for a site visit, particularly taking note of the diversity of the team participating in the proposed center activities, and, in the case of an NSF STC or ERC, the engagement of students in center activities. For example, depending on the site review team, it is not uncommon for members of the site team to want to meet privately with students who will be engaged in and benefit from center activities. A good example of an STC site visit schedule from Purdue can be seen [here](#).

## Understanding the Site Visit Process

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By [Mike Cronan](#), co-publisher

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A few days ago several hundred hopefuls submitted preliminary proposals (December 11) to NSF in hopes of ultimately being awarded an NSF Science and Technology Center. However, at this preliminary stage several major gates remain as part of the multi-phase review process typical of large center grants, most importantly being among those invited to submit a full STC proposal and, among those, being among the perhaps eight or ten given a site visit that will determine the final four (or fewer) awards announced April 15, 2016.

The difference between the research narrative of a successful full proposal and the dramatic staged production of a successful site visit is akin to the difference between reading a play's script in solitary and seeing it performed on Broadway. Moreover, the site visit "production" typically requires the dynamic integration of two key scripts—the research narrative of the successful full proposal and the review comments of all prior stages of the competition, along any new or outstanding issues raised by the sponsor in the review process (e.g., typically special consideration is given to unresolved issues identified earlier in the review process), particularly as they relate to exploring the capacity and hence having confidence in the ability of the center management team to implement the vision, goals, and objectives of the center.

**Bottom line:** *A successful site visit requires a PI with a demonstrated capacity to lead and manage large, interdisciplinary research projects and a research and management team with the capacity to implement a center strategic research and management plan in a way that demonstrates the value of the proposed center structure in achieving research outcomes not possible under other configurations.*

The site visit review production, by analogy to a Broadway play, is akin to staging a play not for the general theater going audience but for an audience comprised entirely of theater critics who are free to interrupt the play at any time with probing questions, perhaps critical of the staging of the play (management), weakness of some of the actors (research partners), or concern that the actors (research partners) have not performed together sufficiently in the past to render a novel and exciting performance (achieving the proposed research vision).

Keep in mind that while a principal focus of the PI and research team is on the questions asked both in advance and during the site visit, and how best to respond, there are organizational tasks to site visits that can take on the production complexity of a Cecil B. DeMille movie. His Academy Award winning "The Greatest Show on Earth" as best picture in 1952 seems an appropriate analogy for what a site visit organizational manager must aspire to when supporting the PI in this effort. Clearly, someone needs to play the role of organizing "Site Visit Staging Manager" so the PI and research team can focus their energies on the research issues and not the production planning, logistics, materials, etc. to ensure everything on the site visit agenda runs smoothly and on time.

This is particularly important since a site visit production must seamlessly meld multiple scopes and scales at the specific request from members of the site review team. This may

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include questions asking you to describe the significance of the center from the so-called “30,000 foot level” to probing questions that get into the operational and management weeds of the center, or to describe how research synergies are achieved among the proposed research strands, among countless others, some, perhaps, seeming almost mundane.

For example, maybe a president or provost is required to address an issue of institutional commitment to the center at the start of the site visit. Who makes this happen? Who briefs administrators who have a role in the site visit and brings them current on the proposed center? Maybe a proposed center research vision is dependent on very cutting edge facilities, equipment, and instrumentation. Who makes a site team tour of the facilities happen? Who guides the tour? Who explains how the facilities enable the research? There are often seemingly mundane issues that if not performed well can adversely affect the site visit, particularly if it causes disruptions and perturbations in the agenda, or if the venue, IT support, accommodations, dining (e.g., are you hosting herbivores, carnivores, omnivores, vegetarians, ovo-vegetarians, ovo-lacto vegetarians, vegans, fruitarians, glucose intolerant, flexitarians, pescetarians, raw foodists, neo-macrobioticists, etc.) and other niceties are poorly managed. Basically, who plays the role of air traffic controller and makes sure all planes (site review participants) are in their designated airspace at the designated time, altitude, direction and **fully briefed on the game plan for the center?**

**Bottom line:** *It is often noted that no amount of grantsmanship can transform a research narrative with a modest idea into one with a great and compelling idea, but there are many ways poor grantsmanship can disguise a great idea and make it inaccessible to the reviewers through a poorly organized, poorly argued, and poorly written research narrative. The same is true for the site visit, **but in spades**. Success is predicated on a well organized, well managed and logistically flawless site visit production. After all, if you cannot manage the complexity of a well managed and synergistic site visit how can a site visit review team have any confidence whatsoever in your capacity to manage the enormous investment an agency will make in a funded center. Having the right PI is critical, and so is finding the right person to serve as the Site Visit Staging Manager.*

Moreover, as an aside, understanding the site visit process is important not only to those submitting proposals whose final review gate is a site visit, but also to those submitting smaller team grants whose review process does not include a site visit but nonetheless the research narrative would benefit from a red team review prior to submittal that incorporates many of the generic questions typically asked during the typical site visit. The site visit process is scalable in the way it forces a close and critical examination of your research plan and how to best present that plan to the sponsor in a convincing way.

For example, one of the key components of any site visit is a very intense focus by the review team on the capacity of the management team, management plan, and research strategic plan to convincingly demonstrate the value of the particular center management structure in achieving the vision, goals, and objectives of the center. However, this is a key issue to address in any team proposal, not just those on the scale of a center proposal where the review process includes a site visit.

Also, keep in mind that in some cases there can be a final review gate after the submission of a full proposal but short of a full blown site visit on your campus. Some agencies may use a **reverse site visit** process whereby the PI and selected team members travel to the

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funding agency and go through a similar process as they would with a site visit but in a more abbreviated time frame reflecting a less ambitious agenda needed for the funding agency to make a final decision. In other cases **virtual reverse site visits** may be conducted via videoconference. The important point is that regardless of the venue in which these “inquisitions” occur, your preparation is largely generic to what others prepare for across different agencies and programs.

Typically, the site visit structure and agenda reflects a melding of agency objectives for the site visit and your plans to present your proposed center in the best possible light. So while there are generic components common to site visits there are also components, processes, and agenda topics that will be unique to your effort based on the sponsor’s wishes. But most often the success of your proposed site visit will be grounded on some core generic review criteria related, for example, to the proposed vision for the center, the potential national impact and legacy of the proposed center’s activity, and the sustainability of the center after the funding period, or, as in the case of the last STC competition at NSF, why after a 10 year funding period the center’s research vision will have been fully achieved and so sustaining the center structure beyond that time is not required.

**Bottom line:** *The center research vision is paramount and all other components of the center derive from that vision during the site visit. In one form or another, a key generic question asked by the site review team during the visit is to describe the **vision for the center** and what might be called the center’s “**unit of change**” over a five year or ten year funding period. By analogy, the “unit of change” is not unlike the free body diagram of resolved forces acting on a differential element presented on the first day of class in many undergraduate engineering classes such as fluids, dynamics, statics, circuits, physics, etc., **all setting up the solution which is always integration.***

Integration as the solution is also a good point to keep in mind for a site visit, perhaps by noting that the NSF program title for the STC includes **Integrative Partnerships**, a common goal essential to **all** center structures capable of achieving the center vision. **Some generic version of the “unit of change” question is always asked at site visits.** Essentially, the question asks that you compare and contrast the current state of the research field that will be acted upon by your proposed center “**forces**” such as the research vision, goals, objectives, synergy, rationale, management, outcomes, innovation, commercialization, educational training, etc. to that of the envisioned transformation in the research field and its legacy impact on that research field at the end of the center funding period.

**Bottom line:** ***Successful centers always make a compelling and convincing case during the site visit that their proposed unit of change will act as a transformational agent on the research field in some detailed and very specific ways. Moreover, those successful in site visits understand the overwhelming importance of always being able to explain the rationale for all proposed center activities and interactions among the center forces at all scales and scopes.***

## **Research Grant Writing Web Resources**

*a focus on humanities funding in this issue*

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### **Humanities Funding and Research**

This part of the Humanities Indicators begins by describing public funding for humanities agencies and higher education and then goes on to estimate the extent of private investment in the humanities. The final section seeks to give some indication of the funding and other resources dedicated to supporting scholarly research in the humanities, as well as providing some gauge of the extent of scholarly publication in this field.

### **H-Net Funding Announcements**

### **National Endowment for the Humanities**

Grant programs offered by the National Endowment for the Humanities are administered by divisions and offices that work with prospective applicants, recruit and oversee peer-review panels, provide analysis of panel results to members of the National Council on the Humanities and the agency's senior staff, conduct site visits of projects that have received NEH support, and represent NEH at regional, national, and international conferences in the humanities.

### **American Council of Learned Societies**

Since 1957 more than 12,000 scholars have held ACLS fellowships and grants. ACLS fellowships and grants are awarded to individual scholars for excellence in research in the humanities and related social sciences. The peer-review process used to select ACLS fellows enables distinguished scholars to reach broad consensus on standards of excellence in humanities research.

### **American Academy of Arts and Sciences**

The Academy's [Visiting Scholars Program](#) provides residential fellowships to postdoctoral scholars in the humanities and social sciences. The fellowship program offers a collaborative work environment and the opportunity to interact with Academy members. Applications for the cycle of fellowships to begin in Fall 2020 will be accepted in October 2019. Information about Visiting Scholars in prior years and their projects is online in the Academy [archives](#).

### **John Simon Guggenheim Memorial Foundation**

Guggenheim Fellowships are grants to selected individuals made for a minimum of six months and a maximum of twelve months. Since the purpose of the Guggenheim Fellowship program is to help provide Fellows with blocks of time in which they can work with as much creative freedom as possible, grants are made freely. No special conditions attach to them, and Fellows may spend their grant funds in any manner they deem necessary to their work.

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## **[Fulbright Scholar Program \(Council for the International Exchange of Scholars\)](#)**

This core program sends 800 U.S. faculty and professionals abroad each year; grantees lecture and conduct research in a wide variety of academic and professional fields.

## **[Harry Ransom Center at the University of Texas at Austin](#)**

Fellowships support scholarly research projects in all areas of the humanities, including literature, photography, film, art, the performing arts, music, and cultural history.

## **[American Philosophical Society](#)**

In 2017–2018 the Society awarded over \$1.2 million to nearly 200 scholars, and we expect to continue this level of support in 2018–2019. We maintain nine grant or fellowship programs in a wide range of fields. Our Franklin, Lewis and Clark, Lewis and Clark Astrobiology, Library Digital Humanities Fellowship, Library Fellowship, and Phillips programs award small grants (\$1,000–\$6,000) for modest research purposes. Our Daland, Library Long-Term Pre-Doctoral Fellowship, and Mellon Post-Doctoral Fellowship programs award much larger amounts (\$25,000–\$45,000) in highly selective competitions.

## **[American Philological Association](#)**

Various awards, prizes, and fellowships for the study of ancient Greek and Roman languages, literatures, and civilizations.

## **[Rockefeller Foundation Bellagio Center](#)**

Since 1959 The Rockefeller Foundation Bellagio Center has hosted thousands of artists, policymakers, scholars, authors, practitioners, and scientists from all over the world enabling them time and space to work, to learn from each other, and to turn ideas into action that change the world. The Bellagio Center has a record of major impact, from meetings that led to the Green Revolution and the Global AIDS vaccine initiative, to residencies that have furthered the work of some of the world's leading thinkers and creators.

## **[The John W. Kluge Center at the Library of Congress](#)**

To conduct research in the in the humanities and social sciences in the John W. Kluge Center using the Library of Congress collections and resources, especially research that is interdisciplinary, cross-cultural or multilingual. Scholars who have received a terminal advanced degree within the past seven years in the humanities, social sciences or in a professional field such as architecture or law are eligible.

## **[AAS-National Endowment for the Humanities Long-Term Fellowships](#)**

The American Antiquarian Society offers three broad categories of visiting research fellowships, with tenures ranging from one to twelve months. All of the fellowships are designed to enable academic and independent scholars and advanced graduate students to spend an uninterrupted block of time doing research in the AAS library.

## **[American Association of University Women](#)**

One of the world's largest sources of funding for graduate women, AAUW is providing \$3.9 million in funding for fellowships and grants to 250 outstanding women and nonprofit

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organizations in the 2018–19 academic year. Due to the longstanding, generous contributions of AAUW members, a broader community of women continues to gain access to educational and economic opportunities — breaking through barriers so that all women have a fair chance. Fellowship and grant recipients perform research in a wide range of disciplines and work to improve their schools and communities. Their intellect, dedication, imagination, and effort promise to forge new paths in scholarship, improve the quality of life for all, and tackle the educational and social barriers facing women worldwide. AAUW seeks a diverse applicant pool.

### **[Mellon Fellowships for Dissertation Research in Original Sources](#)**

The Council on Library and Information Resources (CLIR) offers fellowships funded by The Andrew W. Mellon Foundation for dissertation research in the humanities in original sources.

### **[Ford Foundation Fellowship Program](#)**

Seeks to increase the diversity of the nation's college and university faculties by increasing their ethnic and racial diversity, maximize the educational benefits of diversity, and increase the number of professors who can and will use diversity as a resource for enriching the education of all students. Awards are offered at the Predoctoral, Dissertation and Postdoctoral levels.

### **[Smithsonian Institution](#)**

Fellowships at the Smithsonian provide graduate students and postdoctoral scholars with opportunities to pursue independent research projects in association with members of the Smithsonian professional research staff. Fellows are expected to spend most of their tenure in residence at the Smithsonian except when arrangements are made for periods of field work or research travel.

### **[National Humanities Center](#)**

The [National Humanities Center](#) is a residential institute for advanced study in history, languages and literature, philosophy, and other fields of the humanities. Each year the Center awards fellowships to scholars of demonstrated achievement and to promising younger scholars. Fellows are expected to work at the Center.

### **[American Academy in Rome](#)**

Six or eleven month fellowships in Rome. Humanities includes projects in Ancient Studies (through the sixth century), Medieval Studies (sixth through 14th centuries), Renaissance and Early Modern Studies (14th through 18th centuries), Modern Italian Studies (18th century to the present).

### **[Center for Hellenic Studies](#)**

The Center for Hellenic Studies at Harvard University offers fellowships to scholars working on the ancient Greek world in all its varieties. The most eligible fields of research include archaeology, art history, epigraphy, history, literary criticism, philology, philosophy, pedagogical applications, reception, and interdisciplinary studies.

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## **[Robert Penn Warren Center for the Humanities at Vanderbilt University](#)**

William S. Vaughn Visiting Fellowship; The Robert Penn Warren Center for the Humanities promotes interdisciplinary research and study in the humanities and social sciences and, when appropriate, the natural sciences.

## **[Stanford Humanities Center](#)**

External faculty residential research fellowships in the humanities and humanistic social sciences. Applicants must have held a PhD for at least three years by the start of the fellowship term.

## **[Woodrow Wilson Center](#)**

Residential fellowships are awarded to individuals with outstanding project proposals in a broad range of the social sciences and humanities on national and/or international issues.

## **[Newberry Library](#)**

The Newberry's long-standing fellowship program provides outstanding scholars with the time, space, and community required to pursue innovative and ground-breaking scholarship. Fellows have access to the Newberry's wide-ranging and rare archival materials as well as to a lively, interdisciplinary community of researchers, curators, and librarians. We expect recipients to advance scholarship in various fields, develop new interpretations, and expand our understandings of the past.

## **[Folger Shakespeare Library](#)**

The Folger is a world-renowned research center on Shakespeare and on the early modern age in the West. Its conservation lab is a leading innovator in the preservation of rare materials. It is home to the world's largest and finest collection of Shakespeare materials and to major collections of other rare Renaissance books, manuscripts, and works of art.

## **[MacDowell Colony](#)**

The MacDowell Colony nurtures the arts by offering creative individuals of the highest talent an inspiring environment in which to produce enduring works of the imagination. It supports a resident fellowship program.

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## ***Educational Grant Writing Web Resources***

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[\*\*Proposed Priorities for the Institute of Education Sciences and Request for Comment\*\*](#)

[\*\*A look at how educational attainment relates to various measures of labor underutilization\*\*](#)

[\*\*Study Examines What It Takes for Early-Stage Grantmakers to Succeed\*\*](#)

[\*\*Next Generation Science Standards: For States, By States\*\*](#)

*Next Generation Science Standards* identifies the science all K-12 students should know. These new standards are based on the National Research Council's *A Framework for K-12 Science Education*. The National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve have partnered to create standards through a collaborative state-led process. The standards are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education.

The print version of *Next Generation Science Standards* complements the [nextgenscience.org](http://nextgenscience.org) website and:

- Provides an authoritative offline reference to the standards when creating lesson plans
- Arranged by grade level and by core discipline, making information quick and easy to find
- Printed in full color with a lay-flat spiral binding
- Allows for bookmarking, highlighting, and annotating

[\*\*A Look at High School Career and Technical Education \(CTE\) Coursetaking as of 2013\*\*](#)

This section provides tabulated statistics on CTE at the high school level (grades 9-12). Most statistics focus on public high schools and public high school graduates. Statistics in the “Student Participation in CTE” sections use the 2018 Secondary School Course Taxonomy to define CTE. Statistics in the “Education and Work After High School” section and in the Table Archive use the 2007 revision to the Secondary School Taxonomy to define CTE. The “Student Participation in CTE” sections and these other sections are not comparable because of this change in taxonomy. This page organizes the secondary/high school tables by topic. In addition, all NCES tables can be searched with words or phrases, using the Tables and Figures search. See the CTE Statistics Table Archive for tables from previous data collections.

**Hello NABI community,**

This is a friendly reminder that my office and Kate Spohr at UC Berkeley support a listserv to advertise STEM education and outreach jobs. As of today, there are over 650 members. Subscribers receive a weekly listing with typically 5-10 job postings (mostly full-time). About one-third are in the SF Bay Area, the rest are all over the US, from entry-level to faculty positions.

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To subscribe, visit

<https://mailman.stanford.edu/mailman/listinfo/outreachjobannouncements> You can unsubscribe at any time. To post a position, send me a brief description with a working link to the full job description and application instructions.

Cheers!

Kaye Storm

Director, Office of Science Outreach

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## Agency Research News

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### [Dear Colleague Letter: Models for Uncovering Rules and Unexpected Phenomena in Biological Systems \(MODULUS\)](#)

The National Science Foundation (NSF) Division of Mathematical Sciences (DMS), in collaboration with the Division of Molecular and Cellular Biosciences (MCB), seeks to promote interdisciplinary research that enables novel mathematical and computational approaches that capture and explore the full range of mechanisms and biological variability needed to better understand biological systems behavior across multiple scales. The development of replicative or descriptive models for complex biological systems remains challenging. Models that move beyond replication into the realm of prediction and ultimately becoming indispensable tools for discovery-driven biology are severely lacking. A paradigm shift in the current, oftentimes conservative approach to interdisciplinary mathematical biology is needed to promote the realization of modeling platforms that facilitate discovery of novel biological phenomena, rules, and theories. As part of the effort, funding opportunities are available in fiscal years FY2019 and FY2020 to provide support for proposals from interdisciplinary teams comprised of mathematical, computational, and biological scientists to develop **MODELS for Uncovering Rules and Unexpected Phenomena in Biological Systems (MODULUS)**. This Dear Colleague Letter (DCL) is to encourage researchers involved in the biosciences and the mathematical sciences to collaborate formatively in biological investigations using novel mechanistic mathematical models to guide biological exploration and discovery of new rules in living systems.

#### **BACKGROUND**

The development of new research tools has revolutionized the ability to interrogate, manipulate and engineer biological systems at the molecular scale and to measure their multiscale response to changing environments. The ability to generate data across molecular and cellular scales has far outpaced the capacity for multiscale data integration and development of mechanistic mathematical models capable of discovering emergent phenomena and novel biological principles. Simultaneously, there is a need for innovative mathematical approaches that capture the full range of mechanisms and biological variability needed to recapitulate biological systems behavior across scales. The current biological modeling challenge is assimilation of burgeoning multi-omics information into causal, predictive models capable not only of replicating observed phenomena but also guiding further exploration and driving discovery in areas such as systems and synthetic biology, cellular dynamics and function, and genetic mechanisms. As an example, forming a systems-scale understanding of the interplay between chromatin structure, epigenetics, environment and genetic regulation may require novel combinations of mathematical methods that enable exploration of these interactions across interdependent scales. Similarly, connecting myriad environmental, biomechanical, and biochemical cues to formulate systems-based rules modulating embryogenesis requires innovation in multiscale mathematics to enable complex spatiotemporal simulation and visualization.

With an emphasis on deep integration across disciplines and inspired by challenging biological questions and pressing societal needs, the DMS and MCB Divisions at NSF are

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interested in proposals that jump-start community thinking and development of integrated mathematical approaches and novel modeling platforms for complex biological systems at the molecular and cellular scales. Such platforms should be a tool for discovery-driven science that addresses compelling systems-scale biological questions. The expectation is that innovative mathematics will emerge from confronting the need to elegantly incorporate the full range of pertinent biological variability and variety of length and time scales into mechanistic models capable of generating new biological understanding.

### **DESCRIPTION OF THE OPPORTUNITY**

Proposals funded through this DCL are anticipated to cultivate innovative modes of collaboration among researchers working at the interface of mathematics and molecular and cellular biology, with an emphasis on systems-scale integration. Each proposal submitted in response to this DCL should address a current state-of-the-research challenge and describe a strategy for formative integration of mathematical and biological understanding to address the challenge. In addition, the proposal should describe the unique interdisciplinary training opportunity for graduate students and postdoctoral researchers working on the project.

Competitive proposals are expected to address clearly stated biological questions or hypotheses, make a case for and develop innovative mathematical methods or integrate disparate mathematical fields, and articulate a well-defined plan for the mathematics to drive biological discovery within the funded period. The most competitive proposals will outline a strategy to use causal, principled models as a central tool to guide further experimental exploration and new discovery on rules of life. It is expected that many proposals will be high-risk/high-reward; successful projects will demonstrate a capacity to adapt to and make progress, with possibly unexpected outcomes resulting in novel discoveries. This DCL specifically encourages proposals from nascent collaborative teams that include expertise from both the mathematical and biological sciences focused on the development of highly innovative approaches that address the challenges outlined in this DCL.

Opportunities for participation, co-mentoring and/or exchange of graduate students and postdoctoral fellows between participating labs to facilitate integrated projects are welcomed. Projects that include efforts to broaden participation of underrepresented groups in science are encouraged.

Proposals in response to this DCL should be submitted to either DMS via the [Mathematical Biology Program Description](#) or the MCB solicitation, [NSF 18-585](#), directed to the Systems and Synthetic Biology program (8011). The proposal title should be prefaced with "MODULUS:". The MCB solicitation accepts proposals to core programs or to a Rules of Life (RoL) track. Submission to either track is permissible given that the guidance as detailed in the solicitation ([NSF 18-585](#)) for each is followed. For proposals submitted to MCB and targeted for the RoL track, a second program in another BIO Division **must** also be identified. Neither Division puts limits on proposal budgets and expects budgets to be appropriate for the scope of the project proposed.

The MCB solicitation accepts proposals without deadline. In order to ensure adequate time for review of proposals, proposals should be received prior to June 1, 2019 to be considered for FY 2019 funding and be received prior to April 1, 2020 to be considered for FY 2020 funding. Proposals submitted to DMS via the Mathematical Biology Program must be submitted during the normal submission window for the program.

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### [Dear Colleague Letter: Supporting Research at the Intersection of Agricultural Science, Big Data, Informatics, and Smart Communities, a joint effort between the National Science Foundation \(NSF\) and the U.S. Department of Agriculture's National Institute of Food and Agriculture \(USDA/NIFA\)](#)

Building on NSF's history of investments in data and computational sciences and USDA/NIFA's history of investments in agricultural science, NSF and USDA/NIFA wish to notify the community of our intention to jointly fund convergent research that combines methods in agricultural, biological, and computer and information science and engineering to address pressing challenges and opportunities in digital agriculture. This Dear Colleague Letter (DCL) is aligned with NSF's Harnessing the Data Revolution Big Idea, and aims to build capacity across disciplinary boundaries, in preparation for larger scale investments at the intersection of computational, agricultural, and biological sciences.

Motivated by the increasing volumes of data, faster computation, and algorithmic advances, there is an opportunity to apply transformative, data-driven research methods to the agriculture sector that are responsive to and will yield meaningful insights for farmers, other stakeholders, and society at large. Of interest for this DCL are applications focused on economically important plants, animals, and their environments---in particular food, fuel, feed, and health---and where research outcomes in a particular application area may be transferable to, or informative for, other agricultural application areas. Relevant stakeholders can be integrated into the proposed research activities, including as partners in the project, if appropriate for the project.

Specific topics of interest include, but are not limited to, the following:

- Methods for analyzing existing, large datasets, such as artificial intelligence, machine learning, and computer vision, for example, leveraging environmental, imaging, and genomic data;
- Models for genetic x environment x management x socioeconomic interactions (G x E x M x S) in order to predict livestock, aquaculture, and plant phenotypic outcomes and sustainability---such as yield, survivability, resistance to environmental stressors, pest resistance, drought resistance, and nutritional value;
- Data storage, management, and integration across a range of data types to enable a systems-level approach, including integration of big data in real-time systems;
- Wired and wireless networking challenges in rural settings, including computation at the edge;
- Security, privacy, and management for access and sharing of farm and community data; and
- Learning science innovations, which may include development of computational skills for biological and agricultural science majors, and communities of agricultural practice for a diverse and innovative future workforce.

Principal Investigators may also consider the design of instructional materials or workforce development pathways, combining computational and agricultural expertise, in the broader impacts of proposals. The intention is to encourage students in biological, agricultural and engineering programs in two- or four-year colleges and universities, across all education levels, to acquire data and/or computational science skills and, vice versa, to expose students in data

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and/or computational science to agricultural challenges. Additionally, activities could aim to improve retention and capabilities of a region's agricultural workforce.

Proposals pursuant to this DCL may be submitted to one of the three programs listed below:

- [Cyber-Physical Systems \(CPS\)](#) program;
- [Information and Intelligent Systems \(IIS\): Core Programs](#) --- Information Integration and Informatics (III) program; and
- [Smart and Connected Communities \(S&CC\)](#) program.

Proposals must follow the guidance contained in NSF's [Proposal and Award Policies and Procedures Guide \(PAPPG\)](#), the corresponding solicitation and that is described here. All proposals pursuant to this DCL must include the prefix "DATAg:" following the title prefixes required in each solicitation, where appropriate.

Additionally, researchers are encouraged to leverage existing agriculture data sets. Data and code resulting from funded work is expected to be adequately characterized, readily accessible and usable, and stored in a safe environment with adequate measures taken for long-term preservation in specific repositories and catalogs, as appropriate, as well as with consideration for protection of confidentiality, personal privacy, and proprietary interests.

For more information, including questions about this DCL, please contact:

- Sylvia Spengler, NSF/CISE, (703) 292-8930, [sspengle@nsf.gov](mailto:sspengle@nsf.gov);
- David Corman, NSF/CISE, (703) 292-8754, [dcorman@nsf.gov](mailto:dcorman@nsf.gov);
- Cliff Weil, NSF/BIO, (703) 292-8712, [cweil@nsf.gov](mailto:cweil@nsf.gov); and
- Charlotte Kirk Baer, USDA/NIFA, (202) 445-3426, [cbaer@nifa.usda.gov](mailto:cbaer@nifa.usda.gov)

### **Dear Colleague Letter: NSF Convergence Accelerator Pilot (NSF C-Accel)**

The National Science Foundation invites interested parties to participate in a new endeavor, the NSF Convergence Accelerator (NSF C-Accel) Pilot. With this DCL, NSF's goals are to: (i) pilot a new NSF capability (the NSF Convergence Accelerator) to accelerate use-inspired convergence research in areas of national importance, and (ii) initiate convergence team-building capacity around exploratory, potentially high-risk proposals in three convergence topics (tracks).

As a funder of research and education across all fields of science and engineering and with relationships with universities and funding agencies around the world, NSF is uniquely positioned to pilot this approach to accelerate discovery and innovation. NSF C-Accel brings teams together to focus on grand challenges of national importance that require a convergence approach. The teams are multidisciplinary *and* leverage partnerships; the tracks relate to a grand challenge problem *and* have a high probability of resulting in deliverables that will benefit society within a fixed term. NSF C-Accel is modeled on acceleration and innovation activities from the most forward-looking companies and universities.

The NSF C-Accel Pilot intends to support fundamental research while encouraging rapid advances through partnerships that include, or will include, multiple stakeholders (e.g., industry, academic, not-for-profits, government entities, and others). The NSF C-Accel Pilot will bring teams together in a cohort that are all focused on a common research goal of national importance but which may be pursuing many different approaches.

NSF is planning to fund approximately 50 Phase 1 awards (up to 9 months and up to \$1 million each). Additional funds will be available for a smaller number of Phase 2 awards. The first-step to become part of the NSF C-Accel Pilot is to submit a 2-page Research Concept

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Outline (RCO), aligned with one of the tracks described below, with a target submission date of April 15, 2019. [Frequently Asked Questions \(FAQ\) for the NSF Convergence Accelerator \(NSF 19-050\)](#)

## **GAO Deepens Science and Technology Capabilities**

The U.S. Government Accountability Office recently launched a new Science, Technology Assessment, and Analytics Team to better meet Congress' growing need for information on science and technology issues. The congressional watchdog agency is combining and enhancing its technology assessment functions and its science and technology evaluation into a single, more prominent office that will expand GAO's support to lawmakers on cutting-edge topics, such as artificial intelligence, regenerative medicine, 5G wireless communication, and quantum computing.

"I'm very proud of GAO's efforts to keep policymakers abreast of emerging opportunities, as well as challenges, in the science and technology fields," said Gene L. Dodaro, Comptroller General of the United States and head of the GAO. "The work of our science, technology assessment, and analytics team is designed to help Congress oversee the substantial federal investment in science and technology, enhance U.S. innovation and competitiveness, and consider the implications and potential policy options concerning emerging technologies." For some time, GAO has examined science and technology matters in connection with its reviews of federal agencies and programs. By consolidating its science and technology work in one unit and adding additional resources, the agency anticipates synergies that will enhance its work for Congress. Consistent with the 2019 Legislative Branch Appropriations Bill Conference Report, the new team will:

- Conduct technology assessments and provide technical assistance directly to Congress Review science and technology programs in the federal government
- Compile and utilize best practices in the engineering sciences, including cost, schedule, and technology readiness assessment
- Establish an audit innovation lab to explore, pilot, and deploy new advanced analytic capabilities, information assurance auditing, and emerging technologies that are expected to greatly impact auditing practices
- Chief Scientist and Managing Director Timothy Persons and Managing Director John Neumann, formerly a director on GAO's Natural Resources and Environment audit team, will jointly manage the new office. GAO plans to double the size of its current combined science and technology workforce over the next few years. GAO has prepared a video that provides more information on the team's mission and responsibilities.
- For more information, please contact Chuck Young, Managing Director of Public Affairs, at [YoungC1@gao.gov](mailto:YoungC1@gao.gov) or (202) 512-4800.

## **Dear Colleague Letter: Storm Penetrating Aircraft Capability - Concepts for Development and Operations**

This Dear Colleague Letter (DCL) requests community responses on viable concepts for a Storm Penetrating Aircraft (SPA) capability. NSF supported the operation of a highly modified T-28 aircraft from the South Dakota School of Mines and Technology for over 30 years until the aircraft was retired in 2005. The T-28 collected many excellent in-storm observations during

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that period. However, scientific questions and technologies have evolved since the T-28 was last flown and NSF is interested in exploring opportunities to provide the research community with a platform that can help to meet current and anticipated future scientific needs in convective storm research.

Community consultations have indicated continuing interest in the capabilities offered by a Storm Penetrating Aircraft. The 2017 "Requirements for In Situ and Remote Sensing Capabilities in Convective and Turbulent Environments ([C-RITE](#)) Community Workshop" brought together over 100 community members to discuss next generation observational technologies and evolving scientific requirements. An outcome of that meeting was the development of a set of technical and operational requirements for a potential Storm Penetrating Aircraft that could be deployed as a multi-user facility for acquiring in-situ observations of key parameters associated with the evolution of severe convective storms. This DCL invites the community to submit viable ideas for the development and operation of platforms that can meet the following requirements:

- Altitude range of 35,000 to 40,000 feet
- Endurance of 5 hours or more
- 2 or more engines
- Ability to temporarily encounter and survive 2" hail
- Ability to encounter moderate icing (with de-ice or anti-ice systems)
- Ability to encounter moderate turbulence
- Science payload capacity of 1000 kg or greater
- Power availability for the science payload of 15 kW
- Ability to seat 1 or more science observers in addition to the flight crew
- Flight at speeds of 170 knots indicated airspeed (KIAS) or less at high altitudes while penetrating storms
- At least two wing hard points (one on each wing) to carry science payloads in pods

In all these categories, additional capabilities would further enhance the potential scientific missions.

NSF has the potential to access excess military aircraft, either currently flying or in storage, through interagency transfer to be operated as a public use aircraft. However, we do not want to exclude the possibility of non-military aircraft, nor do we require the SPA to be operated as an NSF-owned aircraft. NSF does not have a preconceived concept for management and operations, and we seek the community's input on ideas to proceed in this area, such as partnerships with other agencies (Federal or state) or commercial aviation organizations/companies. NSF encourages involvement by an academic or academic-related institution, but this is not a requirement. Businesses or Federal entities are welcome to respond to this DCL.

### **Request for Information**

NSF invites written responses by August 1, 2019. These should include the following:

- An overall concept for the development and operation of a Storm Penetrating Aircraft capability, including the potential airframe, expected capability, acquisition and development pathway, partnership arrangements, and operational model.
- Anticipated modifications required or upgrades for the potential airframe chosen to be capable of performing the Storm Penetrating Aircraft mission. Potential modifications

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might include hail armoring, lightning protection, turbulence handling, anti-/de-icing, communication (both voice and digital), radar support (airborne or terrestrial based), science payload to aircraft mechanical/electrical interfaces, science data storage, avionics upgrade, etc.

- A brief description of the submitting organizations' credentials for developing and managing the SPA, including ability to operate aircraft, expertise related to Federal Aviation Administration (FAA) certification if commercial aircraft is selected or operate in a public use status for non-commercial aircraft, ongoing maintenance, etc.

Responses to this request do not bind NSF to any further or specific actions related to this topic. This DCL is not a formal solicitation for proposals, and conveys neither a financial commitment nor a reflection of a final decision of the plans for an SPA. To the extent that the sender plans to provide any information that it considers proprietary, such status must be communicated unambiguously and clearly marked.

### **[Dear Colleague Letter: Research on Sexual Harassment and Other Forms of Harassment in Science, Technology, Engineering and Mathematics \(STEM\) Contexts](#)**

The National Science Foundation (NSF) has publicly communicated its commitment to promoting safe, productive research and education environments for current and future scientists and engineers, including efforts to help reduce sexual harassment and other forms of harassment in STEM contexts.

Recently, to learn about the challenges related to sexual harassment in STEM settings, [NSF and other organizations](#) funded the National Academies of Sciences, Engineering, and Medicine (NASEM) to conduct a study on the prevalence and impact of sexual harassment in science and engineering departments and programs. The results of the study are available in the report, [Sexual Harassment of Women: Climate, Culture and Consequences in Academic Science, Engineering, and Medicine](#). As the most comprehensive examination to date of sexual harassment in academic science, engineering, and medicine, the report brings together behavioral and social research on types of sexual harassment and prevalence, data on legal and policy mechanisms, and new approaches for changing the climate and culture in higher education to prevent and effectively respond to sexual harassment.

One of the NASEM report's recommendations is to "conduct necessary research" (pp. [186-187](#)) on a number of topics related to sexual harassment. This Dear Colleague Letter (DCL) is intended to highlight for the research community that NSF, as a primary federal funder of basic science and engineering research in the United States, continues to welcome and support competitive, peer-reviewed research that advances fundamental knowledge about the nature and underlying dynamics of sexual and other forms of harassment, and mechanisms for evaluating harassment prevalence, prevention, and responses, in a range of STEM education, research, and workplace settings.

A number of programs across the Foundation may be appropriate for proposals that have clear, theoretically-driven research orientations and advance generalizable knowledge about sexual or other forms of harassment in STEM contexts. Examples of potential research foci include: the nature and dynamics of harassment, including underlying social and behavioral processes; mechanisms for assessing and evaluating harassment prevalence, prevention, and responses across a range of organizational levels; and harassment dynamics with respect to

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ethics, diversity, and inclusivity in science. Additionally, NSF programs in any research area may elect to support basic research or conferences about sexual or other forms of harassment in a specific research field, group, or context. Proposals involving international collaboration, in which NSF supports the U.S. component of the collaborative activities, may also be considered. To determine whether a research idea is within the scope of this DCL and appropriate for a particular program, prospective principal investigators are strongly encouraged to contact, prior to submitting proposals, the directorate/office Liaison(s) for Harassment Research most closely aligned with the research activities to be proposed. Proposals will be submitted to existing NSF funding opportunities and should follow the guidance and requirements of the relevant program(s) and the Proposal & Award Policies & Procedures Guide (PAPPG).

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## ***Agency Reports, Workshops & Research Roadmaps***

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### **[Retaking the Field Science Breakthroughs for Thriving Farms and a Healthier Nation](#)**

This is a collaborative report from 20 FedByScience universities and the SoAR Foundation. The report highlights research projects in the five Science Breakthroughs areas identified as the most important fields to advance in agriculture by the year 2030: genomics, microbiomes, sensors, data and informatics, and transdisciplinary research. The [report](#) shows how scientists funded by USDA's National Institute of Food and Agriculture (NIFA) are leveraging federal resources to advance the five breakthroughs areas. From changing how wheat pollinates to using drones and sensors that optimize farming methods, "*Retaking the Field*" tells stories about exciting advances and innovative research in agricultural sciences.

### **[Science Breakthroughs to Advance Food and Agricultural Research by 2030](#)**

For nearly a century, scientific advances have fueled progress in U.S. agriculture to enable American producers to deliver safe and abundant food domestically and provide a trade surplus in bulk and high-value agricultural commodities and foods. Today, the U.S. food and agricultural enterprise faces formidable challenges that will test its long-term sustainability, competitiveness, and resilience. On its current path, future productivity in the U.S. agricultural system is likely to come with trade-offs. The success of agriculture is tied to natural systems, and these systems are showing signs of stress, even more so with the change in climate.

More than a third of the food produced is unconsumed, an unacceptable loss of food and nutrients at a time of heightened global food demand. Increased food animal production to meet greater demand will generate more greenhouse gas emissions and excess animal waste. The U.S. food supply is generally secure, but is not immune to the costly and deadly shocks of continuing outbreaks of food-borne illness or to the constant threat of pests and pathogens to crops, livestock, and poultry. U.S. farmers and producers are at the front lines and will need more tools to manage the pressures they face.

Science Breakthroughs to Advance Food and Agricultural Research by 2030 identifies innovative, emerging scientific advances for making the U.S. food and agricultural system more efficient, resilient, and sustainable. This report explores the availability of relatively new scientific developments across all disciplines that could accelerate progress toward these goals. It identifies the most promising scientific breakthroughs that could have the greatest positive impact on food and agriculture, and that are possible to achieve in the next decade (by 2030).

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## *New Funding Opportunities*

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### **Content Order**

New Funding Posted Since March 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 Since March 15 Newsletter**

### **Sustained Availability of Biological Infrastructure (SABI) Core Program**

The Sustained Availability of Biological Infrastructure program (SABI) supports the continued operation of extant infrastructure that will advance basic biological research. Infrastructure supported under this program may include cyberinfrastructure, instrumentation, experimental or observational facilities, biological living stocks which have ongoing costs of operation and maintenance that exceed the reasonable capacity of the host institution. Proposals must make a compelling case that sustained availability of the proposed infrastructure will advance or transform research in biological sciences as supported by the National Science Foundation.

While other programs in the Division of Biological Infrastructure focus on research leading to future infrastructure or on the development or implementation of shared infrastructure, this program focuses on awards that ensure the continued availability of mature infrastructure resources critical to sustain the ability of today's scientific community to conduct leading edge research. Awards made through this program are expected to lead to novel, impactful, and transformative science outcomes through research activities enabled by their use. Infrastructure that demonstrates substantial impact on research supported by the Directorate for Biological Sciences and its collaborating organizations is eligible for support under this program. **Proposals Submitted at Any Time**

### **NEH: Infrastructure and Capacity Building Challenge Grants**

The mission of this Challenge Grants program is to strengthen the institutional base of the humanities by enabling infrastructure development and capacity building. Awards aim to help institutions secure long-term support for their core activities and expand efforts to preserve and create access to outstanding humanities materials. Applications are welcome from colleges and universities, museums, public libraries, research institutions, historical societies and historic sites, scholarly associations, state humanities councils, and other public and nonprofit humanities entities. Programs that involve collaboration among multiple institutions are eligible

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as well, but one institution must serve as the lead applicant of record that will be legally, programmatically, and fiscally responsible for the award.

Through these awards organizations can increase their humanities capacity through capital expenditures to support the design, purchase, construction, restoration, or renovation of facilities for humanities activities and the purchase of equipment and software. Such expenditures bring long-term benefits to the institution and to the humanities more broadly.

Challenge grants may also support long-term humanities projects with funds invested in a restricted, short-term endowment or other investment fund (or spend-down fund) that generate expendable earnings to support and enhance ongoing humanities activities. Eligible activities include the preservation and conservation of humanities materials, and the sustaining of digital infrastructure for the humanities. **Due May 15.**

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

This competitive grants program is intended to promote and strengthen the ability of Hispanic-Serving Institutions to carry out higher education programs in the food and agricultural sciences. Programs aim to attract outstanding students and produce graduates capable of enhancing the Nation's food and agricultural scientific and professional work force.

Who is eligible to apply: Hispanic-Serving Institutions

[Request for Applications](#)

[Apply for Grant](#)

Closing Dates:

- **Regular Grants: Wednesday, May 15, 2019**
- **Collaboration Grants: Thursday, May 16, 2019**
- **Conference Grants: Thursday, May 16, 2019**

Funding Opportunity Number: USDA-NIFA-HSI-006731

Estimated Total Program Funding: \$8,800,000

### [Organic Transitions \(ORG\)](#)

The overall goal of the Organic Transitions Program (ORG) is to support the development and implementation of research, extension and higher education programs to improve the competitiveness of organic livestock and crop producers, as well as those who are adopting organic practices. NIFA administers the ORG program by determining priorities in U.S. agriculture through Agency stakeholder input processes in consultation with the NAREEEAB. ORG will continue to prioritize environmental services provided by organic farming systems in the area of soil conservation, pollinator health, and climate change mitigation, including greenhouse gases (GHG), as well as the development of educational tools for Cooperative Extension personnel and other agricultural professionals who advise producers on organic practices, and development of cultural practices and other allowable alternatives to substances recommended for removal from the National Organic Program's National List of Allowed and Prohibited Substances. It is expected that all projects will integrate research, education and extension activities, as appropriate to project goals, although some projects may be weighted more heavily than others in one or more of these areas. However, all proposals should have activities and impact in research and at least one of the other areas: education and extension. Who is eligible to apply: 1862 Land-Grant Institutions, 1890 Land-Grant Institutions, 1994 Land-

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Grant Institutions, Hispanic-Serving Institutions, Other or Additional Information (See below), Private Institutions of Higher Ed, State Controlled Institutions of Higher Ed. More Information on Eligibility: Applications may only be submitted by colleges and universities as defined in section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (NARETPA, 7 U.S.C. 3103). [Request for Applications](#); [Apply for Grant](#). **Closing Date: Thursday, May 16, 2019 (FY 2019 funding cycle). Other Due Date: Thursday February 27, 2020 (FY 2020 funding cycle)**

### Potato Breeding Research

The purpose of this grant program is to support potato (*Solanum tuberosum* L.) research programs that focus on varietal development and testing and potato varieties for commercial production. As used herein, varietal development and testing is research using conventional breeding and/or biotechnological genetics to develop improved potato varieties. Aspects of evaluation, screening and testing must support variety development.

Who is eligible to apply: 1862 Land-Grant Institutions, 1890 Land-Grant Institutions, 1994 Land-Grant Institutions, Other or Additional Information (See below), State Agricultural Experiment Stations. More Information on Eligibility: Applications may only be submitted by state agricultural experiment stations, land-grant colleges and universities, research foundations established by land-grant colleges and universities, colleges and universities receiving funds under the Act of October 10, 1962, as amended (16 USC 582a et seq.), and accredited schools or colleges of veterinary medicine.

[Request for Applications](#)

[Apply for Grant](#)

**Closing Date: Tuesday, May 21, 2019**

### Special Research Grants Program Aquaculture Research

The purpose of the Aquaculture Research program is to support the development of an environmentally and economically sustainable aquaculture industry in the U.S. and generate new science-based information and innovation to address industry constraints. Over the long term, results of projects supported by this program may help improve the profitability of the U.S. aquaculture industry, reduce the U.S. trade deficit, increase domestic food security, provide markets for U.S.-produced grain products, increase domestic aquaculture business investment opportunities, and provide more jobs for rural and coastal America. The Aquaculture Research program will fund projects that directly address major constraints to the U.S. aquaculture industry and focus on one or more of the following program priorities: (1) genetics of commercial aquaculture species; (2) critical disease issues impacting aquaculture species; (3) design of environmentally and economically sustainable aquaculture production systems; and (4) economic research for increasing aquaculture profitability. **A Letter of Intent (LOI) by April 29 for the FY 2019 funding cycle is highly encouraged; Full Proposal due May 28.**

### Agriculture and Food Research Initiative - Sustainable Agricultural Systems

Applications to the FY 2019 Agriculture and Food Research Initiative - Sustainable Agricultural Systems (SAS) Request for Applications (RFA) must focus on approaches that promote transformational changes in the U.S. food and agriculture system within the next 25 years. NIFA

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seeks creative and visionary applications that take a systems approach, and that will significantly improve the supply of abundant, affordable, safe, nutritious, and accessible food, while providing sustainable opportunities for expansion of the bioeconomy through novel animal, crop, and forest products and supporting technologies. These approaches must demonstrate current and future social, behavioral, economic, health, and environmental impacts. Additionally, the outcomes of the work being proposed must result in societal benefits, including promotion of rural prosperity and enhancement of quality of life for those involved in food and agricultural value chains from production to utilization and consumption. See AFRI SAS RFA for details. Who is eligible to apply: 1862 Land-Grant Institutions, 1890 Land-Grant Institutions, 1994 Land-Grant Institutions, Other or Additional Information (See below), Private Institutions of Higher Ed, State Controlled Institutions of Higher Ed. More on Eligibility: This RFA invites **only integrated project** (must include research, education, and extension) applications. Please see Part III, A. of the this AFRI SAS RFA for more specific eligibility requirements for integrated projects. Applications from ineligible institutions will not be reviewed. [Request for Applications](#) [Apply for Grant](#) **Letter of Intent Due: Tuesday, June 4, 2019**; Closing Dates: Thursday, September 26, 2019

### **Science and Technology Centers: Integrative Partnerships**

The Science and Technology Centers (STC): Integrative Partnerships program supports exceptionally innovative, complex research and education projects that require large-scale, long-term awards. STCs focus on creating new scientific paradigms, establishing entirely new scientific disciplines and developing transformative technologies which have the potential for broad scientific or societal impact. STCs conduct world-class research through partnerships among institutions of higher education, national laboratories, industrial organizations, other public or private entities, and via international collaborations, as appropriate. They provide a means to undertake potentially groundbreaking investigations at the interfaces of disciplines and/or highly innovative approaches within disciplines. STCs may involve any area of science and engineering that NSF supports. STC investments support the NSF vision of creating and exploiting new concepts in science and engineering and providing global leadership in research and education.

Centers provide a rich environment for encouraging future scientists, engineers, and educators to take risks in pursuing discoveries and new knowledge. STCs foster excellence in education by integrating education and research, and by creating bonds between learning and inquiry so that discovery and creativity fully support the learning process.

NSF expects STCs to demonstrate leadership in the involvement of groups traditionally underrepresented in science and engineering at all levels (faculty, students, and postdoctoral researchers) within the Center. Centers use either proven or innovative mechanisms to address issues such as recruitment, retention and mentorship of participants from underrepresented groups.

Centers must undertake activities that facilitate knowledge transfer, i.e., the exchange of scientific and technical information with the objective of disseminating and utilizing knowledge broadly in multiple sectors. Examples of knowledge transfer include technology transfer, providing key information to public policy-makers, or dissemination of knowledge from one field of science to another.

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- **Preliminary proposals due June 25, 2019**
- Invited list informed, late October, 2019
- Invited full proposals due January 27, 2020
- Notification of invitation for site visit, late June, 2020
- Site visits, September 1-October 30, 2020
- Declined proposers informed, and recommended awards announced, early February, 2021

### **W81XWH-19-TBDRP-CDA DOD [Tick-Borne Disease, Career Development Award](#) Department of Defense Dept. of the Army -- USAMRAA**

The FY19 TBDRP Career Development Award supports independent, early-career investigators in their efforts to conduct impactful research with the mentorship of an experienced tick-borne diseases researcher (i.e., the Mentor), thus providing an opportunity to obtain the funding, guidance, and experience necessary for productive, independent careers at the forefront of tick-borne diseases research. This award supports impactful research projects with an emphasis on discovery that may be translational in nature, but are not clinical trials. Under this award mechanism, the early-career investigator is considered the Principal Investigator (PI), and the application should focus on the PI's research and career development. It should be clear that the proposed research is intellectually designed by the PI and not a product of the Mentor. Preliminary data are not required. However, logical reasoning and a sound scientific rationale for the proposed research must be demonstrated. **Due August 22.**

### **[DOD Tick-Borne Disease, Investigator-Initiated Research Award](#)**

The FY19 TBDRP Investigator-Initiated Research Award (IIRA) intends to support highly rigorous, high-impact studies that have the potential to make important contributions to Lyme disease and other tick-borne diseases research, patient care, and/or quality of life. This award mechanism promotes a wide range of research from basic through translational, including preclinical studies in animal models or human subjects, as well as correlative studies associated with an existing clinical trial to establish proof-of-principle for further development in future studies. Applications should include a well-formulated, testable hypothesis based on strong scientific rationale that is established through logical reasoning, preliminary data, and critical review and analysis of the literature. Applications should articulate both the short- and long-term impact of the proposed research. High-impact research will, if successful, significantly advance Lyme disease and/or other tick-borne diseases research, patient care, and/or quality of life. **Due August 22.**

### **[DOD Tick-Borne Disease, Idea Award](#)**

The FY19 TBDRP Idea Award intends to support conceptually innovative, high-risk/potentially high-reward research in the early stages of development that could lead to critical discoveries or major advancements that will accelerate progress in improving outcomes for individuals affected by Lyme disease and/or other tick-borne illnesses. This award mechanism promotes new ideas that represent innovative approaches to Lyme disease and other tick-borne diseases research and have the potential to make an important contribution

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toward the TBDRP mission. Applications should include a well-formulated, testable hypothesis based on strong scientific rationale that is established through inferential reasoning and/or critical review and analysis of the literature. Innovative research may introduce a new paradigm, challenge existing paradigms, look at existing problems from new perspectives, or exhibit other uniquely creative qualities that may include high-risk/potentially high-gain approaches to Lyme disease and other tick-borne diseases research. Research that is merely an incremental advance (the next logical step) is not considered innovative. **Due August 22.**

### **Agriculture and Food Research Initiative Competitive Grants Program**

Applications to the FY 2019 Agriculture and Food Research Initiative - Sustainable Agricultural Systems (SAS) [Request for Applications](#) (RFA) must focus on approaches that promote transformational changes in the U.S. food and agriculture system within the next 25 years. NIFA seeks creative and visionary applications that take a systems approach, and that will significantly improve the supply of abundant, affordable, safe, nutritious, and accessible food, while providing sustainable opportunities for expansion of the bioeconomy through novel animal, crop, and forest products and supporting technologies. These approaches must demonstrate current and future social, behavioral, economic, health, and environmental impacts. Additionally, the outcomes of the work being proposed must result in societal benefits, including promotion of rural prosperity and enhancement of quality of life for those involved in food and agricultural value chains from production to utilization and consumption. **Due September 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](#)

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- [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**

### **Signals in the Soil (SitS)**

The National Science Foundation (NSF) Directorates for Engineering (ENG) and Geosciences (GEO), the Division of Integrative Organismal Systems in the Directorate for Biological Sciences (BIO/IOS), and the Division of Computer and Network Systems in the Directorate Computer and Information Science and Engineering (CISE/CNS), in collaboration with the US Department of Agriculture National Institute of Food and Agriculture (USDA NIFA) and the Natural Environment Research Council (NERC), the Engineering and Physical Sciences Research Council (EPSRC), the Biotechnology and Biological Sciences Research Council (BBSRC), and the Science and Technology Facilities Council (STFC) of United Kingdom Research and Innovation (UKRI) encourage convergent research that transforms existing capabilities in understanding dynamic, near-surface soil processes through advances in sensor systems and modeling. To accomplish this research, multiple disciplines must converge to produce novel sensors and/or sensing systems of multiple modalities that are adaptable to different environments and collect data and report on a wide range of chemical, biological and physical parameters. This type of approach will also be necessary to develop next generation soil models, wireless communication and cyber systems capabilities, and to grow a scientific community that is able to address complex problems through education and outreach. This program fosters collaboration among the partner agencies and the researchers they support by combining resources and funding for the most innovative and high-impact projects that address their respective missions. **Due May 15.**

### **Faculty Development in the Space Sciences**

The Geospace Section of the Division of Atmospheric and Geospace Sciences is pleased to offer awards for the creation of new tenure-track faculty positions within the intellectual disciplines which comprise the space sciences to ensure the health and vitality of solar and space sciences on university teaching faculties. The aim of these awards is to integrate research topics in solar and space physics into basic physics, astronomy, electrical engineering, geoscience, meteorology, computer science, and applied mathematics programs, and to develop space physics graduate programs capable of training the next generation of leaders in this field. Space Science is interdisciplinary in nature and the Faculty Development in the Space Sciences awardees will be expected to establish partnerships within the university community. NSF funding will support the entire academic year salary and benefits of the newly recruited tenure-track faculty member for a duration of up to five years with a total award amount not to exceed \$1,500,000. **Due May 24.**

### **Multidisciplinary Research Program of the University Research Initiative (FY20 ARMY SUBMISSION)**

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The MURI program supports basic research in science and engineering at U.S. institutions of higher education (hereafter referred to as "universities") that is of potential interest to DoD. The program is focused on multidisciplinary research efforts where more than one traditional discipline interacts to provide rapid advances in scientific areas of interest to the DoD. As defined in the DoD Financial Management Regulation:

Basic research is systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It is farsighted high payoff research that provides the basis for technological progress (DoD 7000.14-R, vol. 2B, chap. 5, para. 050201.B). DoD's basic research program invests broadly in many specific fields to ensure that it has early cognizance of new scientific knowledge.

DoD's basic research program invests broadly in many fields to ensure that it has early cognizance of new scientific knowledge. **Due September 13. White Paper Inquiries and Questions 24 May 2019 (Friday). White Papers must be received no later than 03 June 2019 (Monday) at 11:59 PM Eastern Time.**

### [NSF 19-562 Planning Grants for Engineering Research Centers \(ERC\)](#)

The ERC program is placing greater emphasis on research that leads to societal impact, including convergent approaches, engaging stakeholder communities, and strengthening team formation, in response to the NASEM study recommendations. The ERC program intends to support planning activities leading to convergent research team formation and capacity-building within the engineering community. This planning grant solicitation is designed to foster and facilitate the engineering community's thinking about how to form convergent research collaborations. To participate in a forthcoming ERC competition, one is not required to submit a planning grant proposal nor to receive a planning grant. [NSF Publication 19-562](#) **Due June 3.**

### [EHR Core Research \(ECR\): Building Capacity in STEM Education Research \(ECR: BCSER\)](#)

ECR's Building Capacity for STEM Education Research (ECR: BCSER) solicitation supports projects that build individuals' capacity to carry out high quality STEM education research that will enhance the nation's STEM education enterprise and broaden the pool of researchers that can conduct fundamental research in STEM learning and learning environments, broadening participation in STEM fields, and STEM workforce development.

Specifically, ECR: BCSER supports activities that enable early and mid-career researchers to acquire the requisite expertise and skills to conduct rigorous fundamental research in STEM education. ECR: BCSER seeks to fund research career development activities on topics that are relevant to qualitative and quantitative research methods and design, including the collection and analysis of new qualitative or quantitative data, secondary analyses using extant datasets, or meta-analyses.

This career development may be accomplished through investigator-initiated projects or through professional development institutes that enable researchers to integrate methodological strategies with theoretical and practical substantive issues in STEM education. Early and mid-career faculty new to STEM education research, particularly underrepresented

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minority faculty and faculty at minority-serving and two-year institutions, are encouraged to submit proposals.

As a special emphasis under this solicitation, ECR: BCSEER seeks proposals that will result in a single award for the development and implementation of an ECR Data Resource Hub. The hub will facilitate data sharing and analysis and provide technical assistance to advance data skills, tools, and resources across the STEM education research community. **Due June 7.**

### [Harnessing the Data Revolution \(HDR\): Institutes for Data-Intensive Research in Science and Engineering - Ideas Labs](#)

In 2016, the National Science Foundation (NSF) unveiled a set of “Big Ideas,” 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see [https://www.nsf.gov/news/special\\_reports/big\\_ideas/index.jsp](https://www.nsf.gov/news/special_reports/big_ideas/index.jsp)). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this [solicitation](#), even though proposals must be submitted to the Directorate for Computer & Information Science & Engineering/Office of Advanced Cyberinfrastructure(CISE/OAC), once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors. NSF’s [Harnessing the Data Revolution \(HDR\) Big Idea](#) is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering. Through this NSF-wide activity, HDR will generate new knowledge and understanding, and accelerate discovery and innovation. The HDR vision is realized through an interrelated set of efforts in:

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

Each of these efforts is designed to amplify the intrinsically multidisciplinary nature of the emerging field of data science. The HDR Big Idea will establish theoretical, technical, and ethical frameworks that will be applied to tackle data-intensive problems in science and engineering, contributing to data-driven decision-making that impacts society. This solicitation describes one or more Ideas Lab(s) on Data-Intensive Research in Science and Engineering (DIRSE) as part of the HDR Institutes activity. **Due June 19.**

### [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);

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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 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.**

### [FY 2020 Department of Defense Multidisciplinary Research Program of the University Research Initiative](#)

This MURI competition is open only to, and proposals are to be submitted only by, U.S. institutions of higher education (universities) with degree-granting programs in science and/or engineering, including DoD institutions of higher education. To the extent that it is a part of a U.S. institution of higher education and is not designated as a Federally Funded Research and Development Center (FFRDC), a University Affiliated Research Center (UARC) or other University Affiliated Laboratory (UAL) is eligible to submit a proposal to this MURI competition and/or receive MURI funds. Ineligible organizations (e.g., industry, DoD laboratories, FFRDCs, and foreign entities) may collaborate on the research but may not receive MURI funds directly or via subaward. When additional funding for an ineligible organization is necessary to make the proposed collaboration possible, such funds may be identified via a separate proposal from that organization. This supplemental proposal shall be attached to the primary MURI proposal and will be evaluated in accordance with the MURI review criteria by the responsible Research Topic Chief. If approved, the supplemental proposal may be funded using non-MURI or non-Government funds. **Due September 13.**

## **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

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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.**

### [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.**

### **FY 2019 Continuation of Solicitation for the Office of Science Financial Assistance Program** **Open to September 30.**

### **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](mailto: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

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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.**

### **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.**

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

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

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impact of integration of autonomous systems into the mission space will enable the Air Force to operate inside of the enemy's decision loop.

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.**

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

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### What We Do--

We provide consulting for colleges and universities on a wide range of topics related to research development and grant writing, including:

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