

NSF Crosscutting and Interdisciplinary Programs

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As described in the companion article in this month's newsletter, "*The NIH Common Fund*," the reasons NSF established crosscutting programs share many of the same reasons as its more recent NIH Common Fund counterpart. Both of these funding mechanisms allow the respective agencies to fund cutting-edge, high-risk research across broad disciplinary domains. These programs are unconstrained by the long-standing, disciplinary- or disease-focused organizational structures, such as the seven directorates at NSF and the 21 Institutes and Centers at NIH impose. For NSF, "crosscutting" "***Designates an activity in which two or more NSF directorates and/or other federal agencies participate.***" Both of these programs give the agencies a method for adapting to the rapidly changing landscape of scientific research that is defining transformational, transdisciplinary research as the future. This kind of research is characterized by the following:

- Complexity of the scientific problem
- Disciplines required to solve the problem
- Value-added benefits of interdisciplinary synergies
- High-risk, high-reward research
- Technology development and transfer
 - Innovation incubators
 - Partnerships for commercialization

Many NSF crosscutting programs are of great interest to universities because they are structured to integrate key NSF mission objectives related to research, education and training, and diversity that map perfectly to institutional missions and planned directions. Moreover, familiarity with NSF [crosscutting programs](#) (also see NSF Regional Grants Conference, [Crosscutting Programs Presentation](#), June 2014) and other interdisciplinary programs is an important part of long-term strategic planning at all scales, from the research team level to the institutional level. NSF uses these programs to push the boundaries and define new disciplinary and educational domains that will become integrated into all NSF programs and will likely find their way into other federal funding agency programs as well. Crosscutting and interdisciplinary research and education programs at NSF are, as Wayne Gretzky would say, ***where the research and education puck will be in the future***, not where that puck is today.

Moreover, familiarity with both the crosscutting and interdisciplinary programs at NSF and with the Common Fund at NIH will allow you to divine the future external funding domain at these two key federal research agencies. Your vision of the future does not have to be perfect to give you a significant competitive advantage —it just has to be better than your competition. This is much like the old tale of the two hikers who encounter a bear on the hiking trail. On spotting the bear, one hiker quickly removes her heavy hiking boots. Her companion asked, "Why are you doing that?" "So I can run faster," the now barefoot hiker explained. "You can't outrun a bear," her companion said. "I don't have to outrun the bear," the barefoot

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hiker explained, “I just have to outrun you.” This is why competitive strategic thinking and competitive positioning is so important for long-term funding success, **particularly at an institutional level, where research offices also have the capacity to align resources with the strategic research plan.**

NSF crosscutting programs are designed to promote interdisciplinarity, something NSF does in numerous ways, including such funding mechanisms as solicited interdisciplinary programs, multi-agency programs, center competitions, education and training programs, workshops, conferences and symposiums, and **unsolicited interdisciplinary proposals**. The latter submission mechanism might fly beneath the radar of many, so it is worth noting **the process for submitting unsolicited interdisciplinary programs to NSF is as follows:**

“NSF invites interdisciplinary proposals that are not targeted by a Program Solicitation. Such a proposal may be suitable for submission to and review by a single unsolicited core program, may be more appropriate for co-review by more than one program, or may extend beyond the scope of any current program (in which case it must be appropriate for NSF support; see the Grant Proposal Guide, [NSF Programs and Funding Opportunities](#)).

*“Core programs, even if managed within a single NSF division and with scope within a discipline, often handle interdisciplinary proposals by co-reviewing, and possibly co-funding, with other appropriate programs. **Thus, an interdisciplinary idea could be appropriate for submission to a core program, whether implicitly or explicitly stated in the corresponding Program Description.** Because we recognize that there might not be an obvious natural “home” for every interdisciplinary proposal, a primary purpose of this site is to assist investigators in submitting an interdisciplinary proposal when there is not an appropriate existing NSF program.*

In terms of these programs, the **NSF working definition of interdisciplinary** is as follows: *“Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or **theories from two or more disciplines or bodies of specialized knowledge** to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice.”* For more on this topic, see [Facilitating Interdisciplinary Research](#), Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, Institute of Medicine.

Whom should researchers contact at NSF before submitting an Interdisciplinary Proposal? NSF recommends the following process: “Formulate the idea for the proposal first, before thinking about where it could be submitted and reviewed. NSF has mechanisms to assure an appropriate review of the idea.”

“With the idea in hand, investigators have numerous options in deciding whom to contact at NSF about submitting an interdisciplinary proposal. The NSF contact should have a programmatic interest in the proposal idea, or a responsibility for identifying someone else at NSF who has such an interest. An investigator might typically consider these options **in the following order.**

- **Identify a Program Officer (PO) through an NSF program.** In many cases, there will be an existing solicited or unsolicited NSF program for which the proposal idea is appropriate. Read the Program Solicitation or Program Description. If the idea seems appropriate, you may contact one of the cognizant POs to confirm this and to indicate

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the interdisciplinary aspects of the idea. If you are uncertain as to whether your idea is appropriate, contact one of the cognizant POs for discussion and clarification.

- **Identify a Program Officer through other means.** *One alternative approach is to contact a PO with whom you have previously interacted. This might be someone who is managing an award you currently have, or a PO that you met at a conference. Although your idea for a proposal may be interdisciplinary, it might make sense to initially contact a PO in a particular discipline. In that case, you can use the NSF Homepage to identify a PO in a particular division. That PO may consult with other NSF staff, or recommend another PO.*
- **Contact a Point of Contact (POC) listed on this site.** *If your proposal is likely to be of particular interest to one NSF Directorate or Office, you can contact the relevant POC for that Directorate listed on this site ([HERE](#)). That individual has the responsibility to see that an appropriate PO is identified in that Directorate to discuss the proposal.*
- **Contact NSF through this site.** *If there is not an obvious point of contact from one of the above options, you can contact NSF through the contact information provided on this site (email: idr@nsf.gov, telephone: (703) 292-4840)."*

What Should I Submit? NSF recommends the following process: "If there is an existing program where your idea is appropriate, you can prepare a proposal for submission to the program in accordance with the Program Description or Program Solicitation. However, in cases where there is not an identified program, you should contact an NSF Program Officer (as indicated in 'Whom Does One Contact'). **An effective approach is to develop a one-to-two paragraph description that can be sent by email. NSF staff can then discuss the document among themselves to decide how best to advise you in proceeding.**"

In conclusion, NSF offers the following FAQs **quoted below** specific to interdisciplinarity at the agency:

"1. What is interdisciplinary research?"

There is a large body of scholarly literature about what constitutes a discipline and the meaning of interdisciplinary, multidisciplinary, and transdisciplinary research. For the purposes of this site, we are using the National Academies' definition:

Interdisciplinary research *is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice.*

2. Does an interdisciplinary proposal have to be transformative?

No. The extent to which a proposed activity explores potentially transformative concepts is just one of the considerations included in the Intellectual Merit Review criterion (see the NSF [Proposal and Award Policies and Procedures Guide](#)).

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3. Will interdisciplinary proposals be given preference when funding recommendations are made? How much weight is given in the funding decision as to whether a proposal is interdisciplinary?

If the proposal is reviewed through an existing NSF program, this depends on the criteria of that program. Some programs are specifically restricted to interdisciplinary research topics; in those programs, a great deal of weight is given to “interdisciplinary” aspects. Some other NSF programs, while not so restricted, explicitly encourage interdisciplinary research and consider it as a positive factor. In programs that do not distinguish interdisciplinary research as a priority, positive review of the proposal will be based on the combined assessment of the project according to the NSF merit review criteria as per the NSF Grant Proposal Guide (GPG), and any other special criteria that may be part of the specific Program Solicitation or Program Description. In such programs, interdisciplinary proposals that advance the program goals are encouraged and funded, and any ‘weight’ is based on the anticipated potential of the project, not whether it is interdisciplinary or single-disciplinary in nature. If the proposal is not reviewed through an existing program, it will be reviewed using only the two NSF Merit Review Criteria: Intellectual Merit and Broader Impacts (that is, there are no additional program-specific criteria to apply).

4. Has NSF set aside funds for interdisciplinary research proposals?

Collaborations of interdisciplinary teams are encouraged throughout many NSF solicitations. For example, facility and center programs may call for interdisciplinary efforts. In programs which do not have an explicit call for interdisciplinary research, funds are not set aside for these proposals. However, a Division, Office or Directorate may elect to designate funds to help support projects that have particularly noteworthy characteristics or potential, which possibly could result from an interdisciplinary approach.

5. What should I do if I have an interdisciplinary research project that seems to be beyond the scope of any single NSF program?

Contact any Program Officer who might have expertise in or near the area of the proposed research. If the first contact is not the most appropriate, they should be able to direct you to a more relevant person. A Program Officer can also decide to discuss the proposed research with other Program Directors. You can contact one of the Points of Contact identified on this site, or you can make initial contact with NSF through this site (email: idr@nsf.gov, telephone: (703) 292-4840). See “Whom Does One Contact” for more information.

6. I discussed my ideas for an interdisciplinary proposal with several Program Directors but was discouraged to submit. What are my options?

Program Officers play a critical role in providing guidance to the community on the various funding opportunities at the Foundation. The PI always retains the option to submit a proposal, which would then be subject to [merit review](#). You can contact one of the Points of Contact identified on this site, or you can make initial contact with NSF through this site (email: idr@nsf.gov, telephone: (703) 292-4840). These individuals have the responsibility to assure that a mechanism is found for appropriate review of the proposal. This assumes that the

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proposal idea is appropriate for consideration by NSF; you may have been discouraged to submit because it is outside the scope of NSF Programs and Funding Opportunities as described in the [Grant Proposal Guide](#).

7. Is the merit review process less receptive to the funding of interdisciplinary proposals?

No. Promoting and funding interdisciplinary research is a high priority for the Foundation, and in turn Program Officers are expected to seek appropriate panelists and ad hoc reviewers to ensure that the full range of interdisciplinary research is covered by the proper selection of reviewers. NSF Program Officers have the responsibility and authority to recommend awards for proposals that were not among the most highly ranked by the review panels to meet the NSF strategy to develop and maintain a balanced portfolio of investments.

8. Was my proposal declined simply because it was interdisciplinary?

No. However, it is important to remember that being interdisciplinary does not automatically make a proposal more worthy. Unfortunately, NSF must decline a high percentage of meritorious proposals for a variety of reasons.

9. If my funded interdisciplinary research project is not successful in achieving its stated goals, will this jeopardize future funding possibilities?

As with any prior NSF award, reviewers are asked to comment on the quality of the prior work. Note that the proposal may contain up to five pages to describe those results.

10. May I submit the same interdisciplinary research proposal to more than one program concurrently?

No. As indicated in the [NSF Grant Proposal Guide](#), proposers are required to select the applicable program announcement, solicitation or program description. In some instances, investigators can also select more than one of NSF's programs (or Organization Units) that they feel are appropriate to co-review their interdisciplinary research project. Even if submitted to one program, upon receipt, NSF Program Officers may elect to have the proposal reviewed by more than one program.

11. If my interdisciplinary research proposal is reviewed by more than one program, will it be subject to "double jeopardy"?

Preliminary analyses of success rates for proposals that have been assessed by more than one panel indicate that proposals that are co-reviewed by two or more programs actually have, in most cases, a slightly higher chance of being recommended for funding than do proposals reviewed in a single program.

12. May I add extra pages to the Project Description because my proposal is interdisciplinary?

No. The proposal must conform to the Grant Proposal Guide, or to the limitations specified in the Program Solicitation.

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13. How will differing program target dates, deadlines, or submission windows affect the review and processing of my interdisciplinary proposal that is reviewed by multiple programs?

This may lengthen the process somewhat, if one program's submission cycle differs substantially from another's. The Points of Contact identified on this site will be responsible to assure that an appropriate review is carried out, and that consideration for support is based on the review. Within practical programmatic bounds, Program Officers will work together to conduct the review as expeditiously as possible."