

Demystifying How to Participate in NSF Funding: Lessons Learned From NSF-Funded Resource Center Leads

Danielle Ferguson, EdD, PI, Evidence Quality and Reach (EQR) Hub, American Institute for Research (AIR)

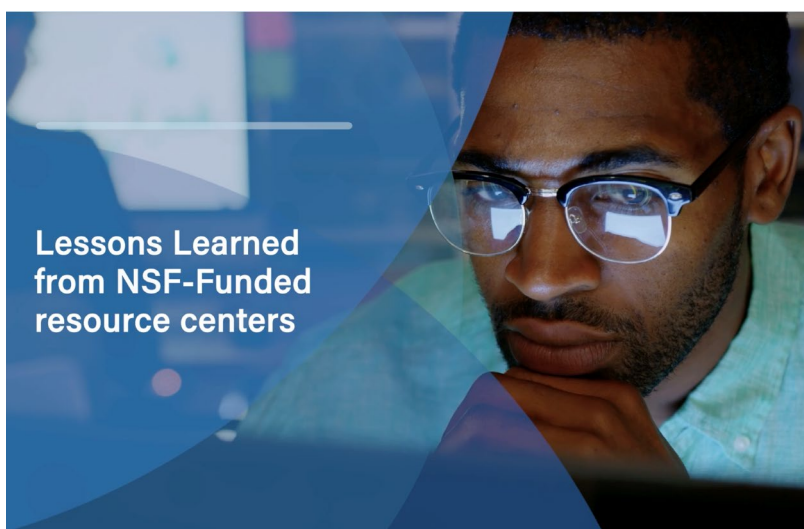
Broadening Participation in STEM

Broadening participation of underrepresented groups in STEM fields extends beyond preparing prekindergarten through Grade 12 students to enter the STEM workforce. As it relates to the work of the U.S. National Science Foundation (NSF), broadening participation includes expanding the diversity of researchers, institutions, and regions that have historically received less NSF funding.

NSF invests in resource centers to build awareness of and capacity to apply for funding and to broaden the dissemination of research findings from NSF-funded projects. Funding for each resource center typically ranges from \$5 to \$10 million over a 5-year period. These resource centers are charged with supporting a wide range of researchers from different backgrounds and lived experiences, institution types, and education levels.

This brief and [associated video](#) is a collaborative effort among five resource centers funded by NSF's Directorate for STEM Education (EDU) to share lessons learned and strategies to support broadening the pool of prospective grantees, especially from underrepresented groups and institutions, that apply for and receive NSF funding.

Leaders of the five NSF EDU-funded resource centers shared what they had learned about the challenges that prospective grantees face when applying for NSF grants. Three common challenges were described: two barriers that prospective grantees face (disparities in institutional resources and limited social capital necessary for NSF-funding success) and one challenge related to the role of the



Demystifying how to participate in NSF funding video

<https://vimeo.com/1036101517>

resource center themselves (how to develop capacity-building events and resources that honors the expertise of the community). The leaders also shared strategies they use to mitigate these challenges, many of which could be applied beyond the NSF-grant-writing context.

One challenge that prospective grantees face in applying for NSF grants relates to **disparities in institutional resources**. These disparities can be wide ranging, and include issues such as not having the infrastructure in place to support all phases of the grant development process, including the administration of the grant if won; differences in teaching loads; and the availability of graduate students and staff to support the work of the grant. Stephen Alkins, principal investigator (PI) of the [REVISE Center](#), and Danielle Ferguson, PI of the [Discovery Research K-12 \(DRK-12\) Evidence Quality and Reach Hub \(EQR\)](#) and co-PI of the [STEM Education Core Research Hub \(ECR\)](#), both discussed the fact that in many emerging research institutions, researchers must fill the resource gaps at their institutions by leading the grant writing—and if they win the grant, must manage its administration while juggling their teaching load. These types of institutional challenges can discourage prospective grantees from applying for grants and limit their competitiveness compared to their peers at research-intensive institutions, who might have access to more robust grant management infrastructure and supports.

“In thinking about minority-serving institutions or non-R1 institutions, the challenges that you might encounter at R2 doctoral university might be quite different at, say, liberal arts college or community college. In the sense of a liberal arts college or community college, you don’t necessarily have access to graduate students that can support the nature of work that you would be proposing. And so there’s different kinds of challenges at different types of places.” – David Miller, Principal Investigator, ECR Hub

Building relationships with prospective grantees is an essential approach to understanding and responding to prospective grantees’ unique needs and circumstances. All EDU-funded resource center leaders interviewed, shared that they engage individual researchers or small groups of researchers in conversation to uncover their specific needs. During these conversations, resource center leaders, or other project staff ask probing questions about the individuals’ personal and institutional capacity and use their responses to tailor the center’s recommendations. Layne Scherer, PI of the [IUSE Initiative](#), states, “The more that we can really build relationships and learn from the prospective PI community, the more robust the support mechanisms can be.” Creating this two-way communication increases resource center knowledge of institutional disparities that prospective grantees are facing and informs the development of learning events and resources that are timely and responsive to the prospective grantees’ needs. For example, one of the lessons the ECR Hub lead, David Miller, learned from listening sessions with current ECR grantees at minority-serving institutions (MSIs) is that they are more interested in meeting with researchers at institutions like theirs to discuss strategies for addressing institutional disparities than they are in having discussions or partnering with more resourced institutions. Before facilitating these discussions, the ECR Hub team assumed that it would be best to encourage researchers from less resourced institutions to partner with more resourced ones. After

learning from these researchers, the ECR Hub elected to design a session at the ECR PI meeting where researchers at MSIs could discuss common issues at their institutions and share strategies that have worked for them. Similar strategies could be used for planning events for prospective grantees.

Another challenge faced by prospective grantees is having **limited social capital necessary for winning NSF funding**. Some researchers, including resource center leads who were interviewed, refer to this specific type of capital as the hidden curriculum of NSF proposal development. The EQR Hub surveyed current DRK-12 grantees ($n=92$) about what they believed contributed to their NSF grant funding success. The top experiences they attributed to their success were serving on a review panel, followed by consulting with a program officer before submitting the proposal, and having a proposal read by a colleague before submission. Participating in these activities provides prospective grantees insight into how proposals are reviewed, whether their proposal is a good fit for the particular NSF program to which they are applying, and the opportunity to receive feedback about their proposal. While these activities are seemingly available to everyone interested in submitting an NSF proposal, the capital or “knowledge” about how to engage in these activities and access to mentors with NSF experience are a part of the hidden curriculum that prospective grantees, especially those from underrepresented groups and institutions, may not understand. As described, there are varying levels of institutional resources available to support prospective grantees in the grant writing process, which includes more than writing the grant. Such resources include having colleagues in their network with NSF grant experience to provide guidance throughout the process about how to effectively use the tools/resources that current grantees attributed their success to.

Resource center leads discussed different mechanisms that they use to support and engage prospective grantees with limited social capital, such as facilitating webinars, workshops, and office hours. A strategy shared across resource center leads was using these events to **broker connections**

between current and prospective grantees. All the resource center leads discussed the pivotal role that relationships with other researchers who have successfully won NSF grants play for prospective grantees. Dr. Ferguson, PI of the EQR Hub and co-PI of the ECR Hub, shared that the ECR Hub invited prospective grantees to participate in the ECR PI meeting so they would have opportunities to hear stories about the grant writing experience from current grantees, including stories about proposal declinations. Stories like these could help prospective grantees take declinations less personally when they realize that even seasoned grantees still receive them. Layne Scherer, PI of the IUSE Initiative, discussed hosting virtual office hours where program

“I think the opportunity for prospective PIs to get a chance to meet with people who are well versed in the language of what makes a good proposal, what makes for an interesting project, how to navigate any challenges along the way—I think that’s invaluable to prospective PIs. And I think that the opportunity to just get a chance to see sort of what the community looks like on the inside, what projects exist, what type of questions are being asked. I think that is something that I would highly encourage people to think about.” – Layne Scherer, Principal Investigator, IUSE Initiative

officers could answer questions from prospective grantees. Furthermore, Sarita Nair-Pillar, PI of the [STELAR](#) Center, shared similar strategies for helping prospective grantees increase their social capital by brokering connections through mentoring programs, and acknowledged that such work requires a long-term investment by NSF in the work of the resource centers to yield meaningful gains in broadening participation.

A challenge faced by resource center leads is **ensuring they are not reinforcing barriers to participation in their efforts to build the capacity of prospective grantees**. Resource center leads are in a unique position of facilitating events and developing resources that could serve any prospective grantee interested in the NSF program they serve. Unlike in a classroom, there are typically no pretests or prerequisites required of the prospective grantee who engages with the resource center. Resource center teams propose strategies based on their knowledge of the field, experiences, and expertise. One strategy resource centers use is grouping prospective grantees who have similar identities, interests, or challenges (e.g., methods, design, partnership, knowledge translation), and building their capacity on specific topics or aspects of proposal design. Resource centers also bring in experts to develop materials and lead events. However, it is critical for resource center leaders to recognize that identities are complex, and levels of interest and knowledge can be wide ranging. The criteria should increase the likelihood of having the greatest impact and reach of their resources while also being inclusive about who will be allowed to participate.

One approach resource center leaders use to eliminate or reduce barriers is **centering the expertise and assets of prospective PIs when facilitating events and developing materials**. Dr. Ferguson, PI of the EQR Hub and co-PI of the ECR Hub, shared that it is a misconception to believe that resource center leaders could teach prospective grantees one thing, such as how to strengthen their research methods, that could help them write winning proposals. Approaching the work from this framing implies that prospective grantees, especially from underrepresented groups, are not qualified enough to be in this (NSF) space. On the contrary, prospective grantees are experts in their field and are very knowledgeable about their communities. They benefit most from resource center leaders who honor their expertise and facilitate events focused on writing proposals that highlight their expertise in a way that allows NSF reviewers to better understand their assets, which goes back to the concept of the hidden curriculum discussed in the previous section. Layne Scherer, PI of the IUSE Initiative, shared the importance of providing opportunities for prospective grantees to lead or serve as editors of blogs produced by the resource center. This is an opportunity to uplift prospective grantees' voice within the NSF community and enable prospective grantees to participate in activities that are typically bookmarked for current grantees, providing the social capital needed for NSF success. Furthermore, Dr. Alkins, PI of the REVISE Center, emphasized the importance of co-designing events with underrepresented groups to increase the proposals that are led by the population of interest. The goal of the resource centers should be to learn about the needs of the community and assist prospective grantees in developing partnerships that do not simply address institutional disparities but are equitable and honor the expertise that they contribute to the project.

CONCLUSION

Investment in NSF-funded resource centers to build prospective grantee capacity to win NSF grants is a key lever for broadening participation of the foundation. EDU resource center leaders agree that building relationships with prospective grantees, brokering relationships between current and prospective grantees, and centering the expertise of prospective grantees in learning events and production of materials can improve the strength and diversity of the STEM education research community. And while this brief discusses these strategies in relation to a specific challenge, the work of broadening participation is much more complex, and requires not only content or methodological expertise, but also relational trust. As Dr. Alkins, PI of the REVISE Center, states, “Equity moves at the speed of relational trust.” Therefore, we recommend anyone interested in broadening participation in the field of STEM education research considers approaches that intentionally include participation of the voices of the community you are supporting.

Disclaimer

This material is based upon work supported by the National Science Foundation under Grant No.2101162. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



1400 Crystal Drive, 10th Floor
Arlington, VA 22202-3289
+1.202.403.5000 | [AIR.ORG](https://www.air.org)

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