

EARLY CAREER

The Early Career Section offers information and suggestions for graduate students, job seekers, early career academics of all types, and those who mentor them. Angela Gibney serves as the editor of this section. Next month's theme will be advice from my advisor, part 1.



Applying for Funding

Why Apply for Grants?

Martin Olsson

The obvious answer is, of course, that writing a grant proposal may result in funding for your work! But I have found that there are other benefits related to preparing proposals, and I wish to outline some of those here. In many ways, my comments below are not so much about grant proposals

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but rather the benefits of taking a more structured approach to research.

Other excellent articles deal with grant writing and proposals, including articles in this AMS Early Career series [Ber20, Etn19, Lan20]. These articles discuss, in particular, topics not covered here such as structuring of a proposal, impact on professional development, and so on. I would encourage any reader to compare my perspective with theirs and form their own point of view.

I note that while grants are often viewed in the context of mathematics research, they are not limited to that and many grants have significant components related to teaching, outreach, or other professional activities. Here I use the term “work” to reference any of these aspects of our profession. I also note that there are many funding opportunities out there, including standard personal NSF grants, larger federally funded group grants (such as NSF FRG and RTG grants), grants from foundations and various organizations, conference grants, and travel grants (for more discussion of federal funding opportunities see [MMS19]). Some are mostly focused on research while others are more focused on educational aspects of the profession or individuals at particular career stages. Many universities have internal funding opportunities with fairly modest awards, often focused on education. While most attention is focused on research, I find it helpful to keep an eye on the opportunities available and to think about whether there is any overlap or fit with my work. Usually there is nothing appropriate for me or the opportunity requires a level of engagement beyond what I can commit, but occasionally there are opportunities to consider. Also in the context of mentoring students and postdocs it is good practice to keep an eye out for opportunities they may be eligible for and offer encouragement.

It Provides Perspective

Preparing a successful grant proposal requires thinking about your work in a broader context. The importance of technical details in mathematics research makes it very easy to lose sight of the broader picture and impact. The technical progress that is part of day-to-day aspects of research may not be so interesting to someone outside the immediate area. It is important to put one's work in context. I find great value in taking a step back and looking at my work from a different perspective and ask some basic questions: What broader research areas will this work contribute to? How does it connect with the work of others? What are the next

tractable questions in the area that I should think about? What parts of these projects might be good for student projects (both graduate and undergraduate)? Thinking about such questions not only helps me in writing a grant proposal, but helps move my research forward and makes it easier to communicate with colleagues about my work. Of course, often I pursue ideas because I personally think they are interesting or simply fun—that is important and I certainly don't want to discourage such pursuits, even if they don't present the strongest case for your research to the broader community.

Putting into writing a broader vision for my present and future work also helps me coherently integrate the many questions, partially formed ideas, and connections with other work that I wish to explore. As I attend conferences, discuss ideas with colleagues, and read the literature I collect a large number of "to-do's." I try to write these down somewhere and share them with collaborators so they don't get lost. Writing a grant proposal offers a good opportunity to return to some of these ideas to think more deeply about what to pursue further.

It Facilitates Collaborations

Preparing a collaborative proposal can help structure your work with others. Countless conversations at conferences or in the hallways of my department begin with "Someone really should...." Such things typically go nowhere. On the other hand, conversations starting with "How can we..." have a chance to result in something of substance. Bringing an idea to fruition takes hard work, planning, and often collaborative effort. While smaller-scale research collaborations, such as exploring an idea that results in a single article, usually happen naturally, larger-scale collaborations often benefit from discussions among participants around the questions about the bigger picture mentioned above and aspects of the collaboration, such as the important next questions to think about, organization of seminars or topical workshops, and so on. Projects involving more complex planning (for example, organizing a conference, developing a course, or implementing departmental initiatives) require a lot of hard work. As with research, the initial idea is often the easy part—making it happen is where the substance lies. While certainly there are projects that require no funding, most do and securing that funding is an integral part of the planning process. Writing a grant proposal for the necessary funding can be a great way to think through the details of what is needed, and offers an opportunity to structure collaborations in a productive way.

You Get Feedback from Experts

Decisions on most grant proposals ordinarily include feedback on the proposal. This is especially valuable if the proposal is declined. I have found the comments of reviewers, especially those for NSF grant applications, to be insightful and helpful. It should be recognized that grant reviews are

necessarily imperfect. Different reviewers may view the same proposal differently, and one may get quite different feedback depending on the composition of a review panel. That is a reflection of the fact that the review process is not an exact science. And it is certainly true that some mathematical contributions are only properly recognized years later. Still the practice of having our colleagues in the field review proposals is the best system I know. Grant reviewers are typically leaders in the field, and in my experience put in a substantial effort to provide useful feedback to proposers. That feedback may contain all kinds of useful advice including pointing out connections with existing work that the proposer may not be aware of, comparisons with other proposals being reviewed in terms of scope and impact, aspects that need more thought (for example, talking about working on a major open problem without adequately indicating what new ideas make progress possible where others have failed, or submitting a proposal that includes organizing a conference without properly detailing what funds are needed), insufficient Broader Impacts (or misunderstanding the definition of this), and so on. Reviewers often offer advice about how the proposal might be improved, and that is an important opportunity.

In summary, thinking about funding of your work and preparing grant proposals to carry out projects can be an excellent way to move your activities forward. And, of course, you might end up getting funded!

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Credits

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