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978-0-521-83015-7 - Research Projects and Research Proposals: A Guide for Scientists

Seeking Funding

Paul G. Chapin

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Research Projects and Research Proposals

This book is a guide to writing scientific research proposals for submission to funding agencies. It approaches the topic by placing it in the larger context of planning and carrying out a research project, offering guidance on selecting a suitable research topic, organizing and planning the project, identifying a funding agency, writing the proposal, and managing the funded project. The book also discusses the ethical responsibilities of the researcher, the proposal review process, and how to deal with declination of a proposal.

The author's twenty-five years of experience as an NSF program officer lend the book a unique insider's perspective on the proposal writing and research funding process. Because of that experience, the author is able to anticipate and answer the questions that researchers most frequently ask when preparing to write a proposal, and also to explain how program officers think about proposals when they are making funding decisions.

Paul G. Chapin was director of the National Science Foundation Linguistics Program. He is a member of the Linguistic Society of America and of the American Association for the Advancement of Science.

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A Guide for Scientists Seeking Funding

PAUL G. CHAPIN

With a Foreword by Alan I. Leshner



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*This book is dedicated to Dr. Richard T. Louttit, Division Director
for Behavioral and Neural Sciences at the National Science
Foundation from 1975 to 1991.*

He has always understood what is important.

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Foreword

Leading a productive research program involves much more than simply running a bunch of experiments. It requires an overarching conceptual framework, a strategic plan for the sequence of studies to be run and, of course, financial support for your work. None of these aspects of a research program are simple, and knowing how to do them is certainly not an innate skill. Unfortunately, many mentors focus their teaching efforts only on the experimental details of doing science. They fall short on teaching their scientific offspring how to conceptualize and lead a full-blown research program. Paul Chapin's expert guide to the planning, support, and conduct of research does a splendid job of laying out both the broad and the nitty-gritty issues of running a research program.

One of the core issues, of course, is funding for your research program. Securing support has become a constant, often nagging facet of modern scientific life. It starts early and never seems to let up. You likely have to worry about how to pay for your graduate education, and you certainly need to think about how you can support your postdoctoral training. Often, you need to write detailed proposals outlining what you would do if you were accepted into the various laboratories to which you have applied. It gets more complex once you are leading your own lab, since you may well need multiple grants to sustain the efforts of a modern, typically complex scientific enterprise. The pervasiveness and persistence of these issues make

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Paul Chapin's uniquely insightful and comprehensive guide a must read for every developing scientist.

Dr. Chapin brings the perspective of a long time Federal (NSF) program director who clearly understands all three core perspectives in the proposal funding process – the principal investigator's, the grant reviewer's, and the funding agency official's. It's well worth reading those sections carefully, since to be successful, one needs to understand and respond to these different points of view. And he takes the time in this work to cover all the steps – from planning the project you are about to propose, to actually administering the grant once you get it. This is as close to a cookbook for successfully running a lab as I have ever seen. Chapin also has a nice way of empathizing with the developing scientist, understanding and providing good advice about dealing with some of the emotional, as well as the practical aspects of scientific life.

As one reads through the book, one finds many tips that may seem obvious once said, but might not be followed if left unsaid. One of my favorite quotes from Phillip Abelson, the long-time Editor-in-Chief of the journal *Science* and a codiscoverer of the element Neptunium, is "Where's the Whammy?" It is sometimes difficult to remember that the grant reviewer may not immediately see how very exciting and important your research project idea is, so you need to get his or her attention right up front and then sustain it throughout. Boring is bad. You need to send your major message in the first paragraphs.

Relatedly, Chapin emphasizes the need to be constantly aware of the audience for your proposal. There is an old saying: "Know before whom you stand!" Successful public speakers understand that they need to talk to the audience about what the audience is interested in hearing – and then you can talk about your own special interests along the way. In writing grant proposals, what is so obviously interesting and exciting to you may not be immediately interesting and exciting to someone from even a closely related field. Show them how exciting your project is to your subfield, but also make sure you emphasize right up front why this work is so important from a broader perspective. And leave nothing to the interpretation of the reviewer. What may by now be intuitively obvious to you likely will not be so obvious

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to the reader. It's your job, not the reader's, to make sure your essential points are well understood.

Read carefully through the sections in this book on the grant review and grant administration processes. Peer review is the most important factor in whether you get your grant or not. It is not a perfect system, since it tends to be somewhat conservative and receives criticism for being somewhat unwilling to support riskier projects, particularly in tight money times. However, everyone in the scientific community agrees it is the best of alternative approaches to deciding who gets funded, and virtually every science supporting agency depends heavily on peer review. As Chapin points out, though, the details of the peer review process differ among agencies, and it is important that you prepare your proposals keeping in mind how they will be reviewed.

Speaking of peer review, it is important to remember that those criticisms you get are not nearly as personal as they feel. Although it is true that some peer reviewers can excessively nit-pick – almost beyond belief – in their attempts to discriminate among proposals – which ultimately is their task – my experience is that most reviewers genuinely want to be helpful. Moreover, in my experience, very few reviews are totally off base, and if the reviewers “just don't understand your work,” the fault likely lies much more with your description than with their ignorance. No one likes criticism, and everyone is human. My advice to principal investigators is to read the reviews and then put them aside for a few days before going back and trying to decide which criticisms are valid. And remember: everyone gets proposals declined. Success rates in most agencies hover around the 25–30 percent level. They are higher for established investigators, which means that most younger investigators really do get rejected on the first or second submission. I always think a lifetime success rate of 50 percent is a wonderful accomplishment.

Chapin's lessons in grant administration are equally important. Taking someone else's money bestows responsibilities. Different public and private agencies have different rules and different reporting requirements. If you violate them, the funder will remember!

I found Dr. Chapin's descriptions of the interests and activities of various federal agencies particularly helpful. I would remind the

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reader that in many fields, there also are many private foundations – some large, some small – who might be interested in supporting your work, particularly in its early stages. Most universities have development offices that can help match you with appropriate private foundations.

Science is a wonderful and rewarding way of life. We live in an era where science and technology are ever more embedded in every societal issue. This makes scientists important contributors to societal progress. Chapin's book helps ease the way into operating smoothly and effectively as a part of the scientific community. My advice is to learn its lessons well.

Alan I. Leshner

Chief Executive Officer

American Association for the Advancement
of Science

Executive Publisher

Science

After ten years as Professor of Psychology at Bucknell University, Dr. Leshner spent nine years at the National Science Foundation, where he oversaw an array of programs in the biological, behavioral, and social sciences and in science education. He then became the Deputy Director of the National Institute of Mental Health, and from 1994–2001 was the Director of the National Institute on Drug Abuse at the National Institutes of Health.

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The book had its origin in a course called “Professionalism in Linguistics” that I taught at the Linguistic Society of America 2001 Summer Institute at the University of California, Santa Barbara. My thanks to Charles Li, the Director of the Institute, for inviting me to participate, and to the students and affiliates who attended the class and gave me great insights on how best to organize and present the material. I especially want to thank two of the class participants, Ellen Barton and Anetta Kopecka, who went above and beyond the call of duty by giving me their reflections on the course after it ended.

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Last, and first, and always, my love and gratitude go to my wife, my life's partner, and my best friend, Susan.