Successful Grant Proposals in Science, Technology, and Medicine

A Guide to Writing the Narrative

There are many resources on grant writing in science, technology, and medicine, but most do not provide the practical advice needed to write the narratives of grant proposals. Designed to help novice and experienced investigators write compelling narratives and acquire research funding, this book is a detailed guide to the content, organization, layout, phrasing, and scientific argumentation of narratives.

The authors draw on more than 25 years of research and analysis of grant proposals, having worked extensively with investigators at different levels, from pre-doctoral students to senior scientists. They have used this experience to design a framework for scientific writing that you can apply directly to narratives. The guidelines and advice that they offer are applicable across many funding agencies, including the NIH and NSF. Featuring many real-life examples, the book covers a range of topics, from organizational alternatives to best practices in grammar and editing, overview visuals, and working with contributors.

Sandra Oster is a discourse linguist and a freelance scientific writer and editor through Oster-Edits, specializing in grant proposals and research papers. She has worked for over 25 years in grant writing, 11 years of which were at Oregon Health & Science University. She continues to give seminars on grant writing, research paper writing, and scientific English within and outside the USA. Sandra is also an attorney.

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In memory of:
Werner and Ann Oster
Harriette Oster

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Preface and Acknowledgments

History of Our Collaboration

We met for the first time when Paul, a neuroscientist and biomedical engineer, was a new assistant professor seeking his first NIH R01 grant and trying to get his first sole-author manuscript published. First submissions of both failed, and the critiques focused on unclear writing. Paul contacted a local university, looking for help with scientific writing, and he was directed to Sandra, a discourse linguist with expertise in technical writing and scientific English. After a 2-month, intensive one-on-one training program, he resubmitted both documents. The grant was funded and the manuscript was accepted. Since then, Paul and Sandra have maintained a close relationship, both professionally and as friends. They began a study of narratives to grant proposals that continues to this day.

Fifteen years later, when Paul became the head of his research institute, he hired Sandra as a full-time scientific writer and editor. In 3 years, 21 of the 22 faculty members had at least one NIH R01, and the institute became the second best-funded department in the university.

Sandra and Paul decided to put what they had learned from studying narratives and helping investigators write and revise narratives into book form in order to share this experience with other researchers. This book is the result of that effort.

Our Approach to Writing the Narrative

There are many resources on grant writing on the market, but many focus on grantsmanship, or they review existing information provided in publications from NIH, such as PHS 398, or from NSF. Our focus is on the prose sections of grant applications – the narrative and the abstract.

The purpose of this book is to describe the ***genre*** of the narrative for investigators. To our knowledge, there has been no concentrated effort to characterize the narrative of the scientific grant proposal as a genre, and we hope our work will motivate others to contribute to this characterization. This work is not definitive, but it takes an important step forward in pinpointing features of content, organization, and scientific argumentation in a narrative, which can help investigators better understand a funding agency's requirements for its narrative and can help investigators compose narratives that hold

together logically while meeting those requirements, yet doing justice to the novelty and significance of the proposed research.

To provide a resource that goes beyond existing advice and instruction, we have included in this book many features of narratives and of scientific English that have not been previously identified and described, such as scientific argumentation, organizational alternatives to major sections of narratives, and different types of classic definitions.

By working closely with investigators, we were able to evaluate the descriptive and prescriptive adequacy of the book's content, its clarity and readability, and its usefulness to both novice and experienced investigators. Our grant-writing seminars for investigators provided us with many opportunities to experiment with different informational designs, allowing us to settle on explanations and visuals that present basic and advanced information about narratives and scientific writing, without talking down to investigators and without requiring exceptional reading concentration. With this said, however, this book is dense, is not a fast read, and cannot be digested quickly.

We draw on information from discourse linguistics, rhetoric, and scientific methodology. We seldom provide hard and fast rules on how to organize a narrative or on how to explain proposed research. We provide guidelines and alternatives that investigators can manipulate and apply while they plan, organize, draft, and revise narratives of grant proposals for submission to a wide variety of funding agencies, not just to NIH or NSF.

To a large extent, we focus our descriptions of content and organizational alternatives on scientific argumentation because investigators not only need to describe their proposed research, but they also need to convince reviewers that their proposed research is worthy of a fundable score. Through scientific argumentation – especially through the relationship between the review of previous research and the analysis of it – investigators can help reviewers understand the novelty and significance of their proposed research.

Our targeted readers are investigators who write grant proposals, whether they be scientists, clinician-scientists (e.g., in medicine, dentistry, and nursing), engineers, post-doctoral fellows, or graduate students. We expect professional, scientific, medical, and technical writers and editors will also find this book useful in its breadth of content and its focus on scientific argumentation. Many features of narratives and of scientific English that we identify are also relevant to other types of documents, such as research papers and review articles.

This book was written for both native and non-native speakers of English. From decades of working with both, we have come to realize that both groups need to work on clarity of language and on vocabulary, phrasing, syntax, and the grammar of scientific English. As a result, we include some information on scientific English throughout the chapters, and Chapter 8 focuses on manipulating features of scientific English in order to shorten the text.

Investigators will need to evaluate our guidelines and organizational alternatives in order to decide which to apply when describing their proposed research and when seeking to convince reviewers that their proposed research is significant and novel. In deciding how to apply our guidelines and alternatives, investigators should be guided

by 3 types of constraints: (1) the genre of the narrative in scientific grant proposals, (2) the submission requirements from their targeted funding agency, and (3) the unique character of their proposed research.

This book focuses primarily on the first factor – the genre of the narrative. Each chapter provides information on necessary content and organizational alternatives to include in the narrative in order to persuade reviewers of the novelty and significance of the proposed research, and of the abilities of the investigator to execute the proposed research successfully in the proposed time frame and budget.

One of the features of this book that distinguishes it from others is that we provide many examples throughout the chapters. These examples have been excerpted from many grant applications that passed through our hands over the years and others that were funded without our assistance. At times we have lightly edited the examples to reinforce points that we are making.

We are grateful to the contributing investigators who allowed us to use excerpts from their narratives, and we identify them in the following list. We truly appreciate their generosity and kindness, and their patience in responding to our questions. We are also indebted to many other investigators with whom we have worked in seminars and who have provided us with information about their research areas and particular scientific methods.

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We cannot forget our families and friends who graciously gave us the time and assistance we needed to pursue this project – with special thanks to Linda, Emily, and Luke Cordo, and to Rose and Arthur Bloom.

Each chapter ends with figures and tables, and then cases (extended examples).