archaeal proteasome structure and assembly.

As a trained mycoplasmologist, I have always been intrigued by unusual microorganisms, and thermophiles are undoubtedly unusual. I believe not only “thermophileologists” and other microbiologists will find this book informative and captivating, but also biochemists, geneticists, evolutionists, ecologists, and biotechnologists.

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Guide to Effective Grant Writing: How to Write a Successful NIH Grant Application (2nd edition)

The title of this book caught my attention: Guide to Effective Grant Writing: How to Write a Successful NIH Grant Application. I have read numerous books and articles on writing grants, taken and given workshops on grant writing, written many grant applications, and served as a Project Officer at the National Institutes of Health (NIH) for some 16 years. Could someone really tell me how to write a successful application? That may be a stretch. However, Otto Yang does identify key points to address to increase the odds of writing a winning NIH grant proposal.

In his second edition of the Guide, Yang synthesizes new observations from years of serving on NIH study sections and writing his own proposals. The Guide is a well-written resource for preparing an application that is factual, fascinating, and fun to read. Yang gives us the framework for success... but, of course, the details that ultimately determine scientific merit are left for us to add, and these must be fresh and novel. The Guide is short, about 100 pages, and most of the 21 chapters are only 2–4 pages long. Although brief, each chapter offers pearls of wisdom for writing an NIH grant application.

Yang begins by introducing us to the NIH grant process and the anatomy of the NIH grant application. He points out that the application process has changed substantially in the past six years, including the format, page limitations, and submission route. Most of the NIH applications are now submitted online through grants.gov by investigators registered in the eRA Commons. He then gives some learned advice about planning the design of the application and overcoming writer’s block. We are encouraged to get an early start, talk with colleagues about the project before writing, think deeply about the goals, craft reasonable specific aims, and set up a spreadsheet with a list of application components and due dates.

Yang takes us through each of the major sections of the NIH grant application, in chapters such as Specific Aims, Significance, Innovation, Approach, References, and Appendices. Although some of this will be of little use to experienced grant writers, investigators who are new or bewildered by grant writing will find this information comforting to an already stressed nervous system. Yang directs the reader to existing information on websites, and the Guide dovetails nicely with the instructions given online for an NIH grant application (http://grants.nih.gov/).

Notably, Yang’s Guide takes us deep into the psyche of reviewers and what is expected, or at least appreciated, by them. Reviewers want to read something that excites them, tickles their curiosity, and then delights them with a clear picture of how the project will unfold, revealing the answers to the questions posed in the hypotheses. They want to know what the problem is, why it’s important, and what clever way is proposed to test the hypothesis. The ideal goal is to make the reviewers wish they had thought of it themselves!

Yang pushes us to build a concise, well-organized story that gives justification for the project and assurance that the principal investigator and co-workers know what they are doing. He stresses the need for the information to be placed in the appropriate sections and in ways that all reviewers in the study section can easily locate.

Like a complex machine with many parts, each NIH application section has a specific function. Layout is important, and we must know where to put information for it to be meaningful. Putting the steering wheel in the trunk is a bad idea. Similarly, putting the details of the methods in the Appendix is a bad idea. Yang gives suggestions on how to organize the Significance, Innovation and Approach sections, and encourages the use of topic outlines with lead-in topic sentences that help guide the reviewer through the proposal. Yang includes common errors to avoid, such as long paragraphs with too many ideas, figures and tables with tiny print, poorly justified or overly complicated specific aims, and (one of my favorites) complete dependence of the whole project on a single unproven premise.

Yang wisely advises us to depend on others when writing an NIH grant application. Now, more than ever, grant writing is a team activity. Colleagues should be immersed in a discourse of the project, considering different approaches and possible pitfalls, and the overall clarity of the proposal. Collaborators should be engaged in the project to strengthen important areas of scientific expertise. Project Officers at the NIH should be consulted to determine the Institute’s level of interest in the project and its possible relevance to ongoing funding opportunities. Scientific Review Officers at the NIH Center for Scientific Review should be contacted to discuss assignment of the application to the best study section and concerns about biased reviewers. University administrative assistants should be contacted early to discuss timelines,
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signoffs, and documents needed to submit the application by the due date.

Otto Yang has the credentials to write this Guide. He has received numerous NIH grants, including F32 (fellowship), K08 (career development), and R01 (research) awards to study the role of cellular immunity against HIV-1. As a study section member, he is able to give us an accurate perspective on what reviewers look for in a proposal.

I will use this book when giving grant-writing workshops to remind attendees of the basics of grant writing as well as the need for style, structure, emphasis and clarity. The Guide will be of value to graduate students and post-doctoral fellows as well as anyone new to the NIH grant process. Yang’s highly organized and readable Guide makes it easy for us to write better applications. Whether the application is successful, though, depends on factors such as scientific merit and Congressional appropriations to NIH.

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Principles of Molecular Virology, 5th Edition

The textbook Principles of Molecular Virology, 5th Edition contains eight chapters and is a relatively concise overview regarding the nature of viruses, capsid structure, genome organization, steps in replication, gene expression, types of infections, pathogenesis, and a final chapter on satellites, viroids, and prions. Because of the relatively concise nature of the book, it is most appropriate for a short module (e.g., a 4-week module) or for a course which is intended to cover only the molecular aspects of viral assembly and replication. I personally teach a full-semester undergraduate course, and while the material that is presented in this book is appropriate for these aspects, the scope of the material is only about one-third of my lecture topics for the entire course. In terms of the strengths of this book, the writing is very accessible and appropriate for a beginning student. There are numerous illustrations, and for the most part these are very simplistic depictions of general themes. One particularly well-illustrated section of the book involves control of bacteriophage λ control of lytic infection versus lysogeny. Another strength of the illustrations is in depicting how positive-strand RNA viruses may process polyproteins for gene expression (Fig. 5.7) or utilize subgenomic mRNAs (Fig. 5.8). This book does a very nice job of presenting these types of basic molecular concepts clearly and concisely. Another advantage of the book is that it is quite affordable compared to other textbook options, and for some students, the fact that it is offered as a Kindle version will be appealing.

The disadvantages of this book are that it may not be detailed enough for a more advanced course. The book acknowledges that an in-depth discussion of immunology is beyond the scope of this text and refers students to additional readings listed near the end of the chapter. Again, for my course, this was a serious disadvantage to adopting this text, as I dedicate three or four lectures to innate and adaptive immunity in response to viral infec-

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