Structuring a Scientific Research Proposal

While funding proposals have much in common with other scientific writing, one key difference is that your proposal must persuade your reader that your research should be funded because it stands to make a significant contribution to your field. To this end, structure a persuasive “narrative” that concretely interweaves responses to the key questions what, how, and why.

Remember that there are many good projects that do not get funded, often because the problem, design, and significance are not communicated concretely and persuasively. Since reviewers are usually tasked with reading many proposals, each proposal will get only 10-15 minutes of their time; this means that you must make an immediate impact in terms of both form and content.

To begin establishing a clear structure for your proposal, consider the following:

- **What** is the general area and specific problem you’re researching? The level of detail you provide in this section will be specific to each audience. If you’re writing for specialists, you won’t need to explain fundamental terms and processes. For a more general audience, you will.
- **How** will you conduct the research? Your aims here are not simply communicative, but persuasive. As usual, discuss your research plan, including your basic aims, methods, and expected findings, but in order to be persuasive, do not assume that it is self-evident why you have set up your research in these ways. You need to argue for it. For example, are there alternative methods your reader might prefer? Why are yours the better choice? Anticipate any significant objections and overcome them in advance.
- **Why** does your research matter? Think about potential impacts for scientific knowledge and benefits to society as a whole. It is not necessary to make “pie in the sky” claims—though agencies like the NSF do privilege “potentially transformative” research. Draw out the possible benefits of your research, but don’t overreach. Provide what evidence you can to persuade your reader of this significance. Consider: What paradigms or methods might change if your research is successful? How might subsequent research in your area benefit from or build upon this project? How might future research need to be approached differently, in light of your work? For example, research methods are regularly discarded in favor of more efficacious approaches.

While the three questions of what, how, and why are interrelated and should be interwoven throughout your proposal, it is often most effective to structure your proposal in discrete sections that clearly and unambiguously address specific elements. While it is not necessarily helpful to confine your proposal to a rigid format, remember that reviewers do often respond positively to a clear structure, such as one organized by well-placed section headers. If you can help them orient themselves as they read, they are more likely to understand the project’s nature and significance.

Consider use of section headings and sub-headings, as in the following sample:

I. **Title**—Your title should sum up the gist of your research in a very concise way

II. **Introduction/ Background**—Position your project within a larger set of concerns in your field, and briefly discuss how your research will contribute to understanding and/or
resolving those concerns. These steps will require relevant citations. Pose your central research questions, and briefly outline the significance of your research.

III. Research Plan—Lay out the most significant, relevant procedures for researching the problem/ hypothesis/ questions you laid out in section II above. In short, how will you answer these questions? It is critical that you write this section specifically to the granting agency’s criteria. NSF GRFP applications should not include exhaustive technical detail, as you will be writing for a more general panel of reviewers. However, granting agencies such as the EPA or USDA will require much more extensive detail in order to demonstrate the requisite knowledge and skills. Consider:

a. What are your research methods? Are you designing unique protocols? Extending a project already underway?

b. Will you perform your research in an especially well-suited facility? In a field setting with particularly salient constraints and/or parameters? Will you need difficult to access equipment, or are your tools commonly accessible?

c. Specify what data you’ll be collecting, and lay out an effective plan for doing so.

d. Describe your methods for data analysis. Will this require a new and innovative approach, or one that is tried and true?

e. What is your specific timeline?

f. What results do you anticipate? Based on the outcomes of your data analysis, what results will indicate that your hypothesis was correct?

IV. Significance—In concrete, accessible terms, address the “Why” question. Remember, while individual researchers may be fascinated with the implications of their work, it is not always necessarily clear to the scientific community, and certainly less to the public at large, how a given project contributes to scientific knowledge in general and to society as a whole. To be effective, you must persuade your reader as to why your work matters.

V. Bibliography

Note that the above sample is just one possible format amongst many—it may be necessary to modify it to suit your needs. Focus primarily on answering the what, how, and why questions, and then structure your proposal in a way that best sells the strengths of your project. In that sense, subsections a-f (above) should be read as questions for brainstorming, rather than inflexible rules for structuring your proposal. These subsections can (and should) be reorganized based on the nature and strengths of your project. For example, if you’ve pioneered an innovative way to collect data or isolate a given variable, you may wish to combine subsections a, c, and d early on, as a way to highlight the unique contribution your project seeks to make.

As you write your proposal, keep the busy reviewer in mind; they will rarely work to mine a proposal for its brilliance. Plan on writing and revising numerous drafts (perhaps 5–6), and get feedback from your advisor and peers, to make sure the significant merit of your proposal is clear.

Resources, and sources for this handout:
http://www2.hawaii.edu/~matt/proposal.html
http://biology.brown.edu/bug/suggested-research-proposal)

Further Reading:
Friedland, Andrew and Carol L. Folt. Writing Successful Science Proposals.