Section 2.2

The Ten Commandments of Research Proposal Preparation

by
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(NOTE: While this article was written with engineering faculty in mind, it contains useful advice for anyone intending to write a proposal.)

Young faculty members in engineering are often ill-prepared to develop funded research programs, primarily because their education has concentrated on technical content without due consideration for the problem of finding and retaining a client base. This situation is unfortunate, because the principles of proposal development and preparation are relatively simple, especially when compared to the modern graduate engineering curriculum. This list of key tenets of proposal preparation was written to "demystify" the process of turning a research concept into a funded project. Each basic principle cited was learned the hard way, either by abject failure (generally my own), or by spectacular success (generally that of my colleagues).

1) Learn what the customer wants

No funding agency, government organization, or private company is ever *initially* interested in supporting your research. Your job is to demonstrate to the "customers" (typically, officers of a corporation or project directors at a funding agency) exactly why your proposal is going to help their particular constituency more than those of your competitors. You have to learn to look at the world through the eyes of your customers in order to develop a clear picture of how you can provide the best product for them. If you are trying to land an equipment grant from industry, clearly (and realistically) demonstrate how funding your work will lead to increased sales or higher profit margins. If you are submitting proposals in response to an RFP (request for proposals), get in touch with the appropriate administrator of the funding agency to find out *exactly* what is desired (phone calls are o.k., but e-mail is better). Academics in general (engineers less than most, thankfully!) have a grossly inflated opinion of the utility of their work. Get realistic about how (or whether) your expertise will help your customer *before* you start writing a proposal. Don't go to the effort of writing a proposal unless you are reasonably certain that you can produce a competitive document. Writing good proposals requires a lot of time and effort, and if you aren't sure that you can demonstrate the utility of your work, expend your writing efforts on something else (like submitting a refereed publication, which requires a similar amount of work but is considerably more valuable in a university environment).

2) Carry water for the customer

The fundamental question facing every reviewer of a proposed project is always the same: *"[W]hat is the likelihood that this team of investigators can successfully complete this job with this budget and this schedule?"* There is no better way to increase the perception that *you* can do the job than if you have *already* done some similar jobs. Consider doing "volunteer" work for your target agency by performing small jobs for minimal (or no) cost. If a project director asks you to evaluate proposals, say "yes" (and then be sure to follow through in a timely manner). If a business that you have asked to donate equipment wants you to give a talk about how you have used the equipment they've already given you, then do so (and do a good job!). Think of small requests from your customers as opportunities to prove that you are so dependable that you warrant first

(or only) consideration on the big requests. Remember that these small jobs give you invaluable inside information on what the customer really wants when the big jobs need to get done.

3) Document your successes in public

Most organizations that support research have mechanisms to demonstrate the return on that research investment. For many funding agencies, a standard measure is the quantity (and quality) of the publications that result from funded research. Each time that you finish an important component of your funded research, write up your results and submit them for publication (or some other appropriate means for dissemination). This step has many important benefits: it gives those who funded your research a concrete demonstration of your success, it gives you a publication record (essential at any university), and your enhanced publication record strengthens your case the next time you submit a proposal in a related field. Don't postpone writing up your results, because once they end up on the back burner they are likely to stay there – get them out while the results are still fresh in your mind.

4) Read proposals in order to write proposals

Nothing will improve the overall quality of your proposals more than having to evaluate the proposals of others. Funding agencies are always desperately looking for peer reviewers, and so you can improve your proposal writing skills (and carry water for the funding agency) by agreeing to evaluate pending proposals when you are asked (and you *will* be asked, once you start submitting proposals). Once you begin reading good proposals, you will learn many important lessons such as how to engage the reviewer to attract or retain attention and how to write clearly and succinctly. As you read poor proposals, you will learn by experience what *not* to do in proposal preparation. More than anything else, reading other proposals will "demystify" the proposal writing process so that you will realize that great research proposals are written by people exactly like you.

5) Learn to think like a reviewer

Once you start reading other proposals, you will begin to see your proposals from the reviewer's standpoint: this knowledge is essential to understanding the proposal preparation process. You will come to understand that proposal reviewers are usually buried in some other work, so that much of the proposal evaluation process consists of trying to reduce the number of proposals that need to be read carefully. Think of this initial pass of the reviewing process as a search for all proposals that can be reasonably tossed in the waste basket (because that is exactly what you will want to do with them!). What remains after the trash is emptied are the serious contenders that deserve your careful attention. What ends up in the trash are the proposals that are unreadable (see point 6 below), disorganized, tentative (don't use "maybe" or "perhaps", etc...), unrealistic (*especially* on the budget pages), or otherwise substandard. *Ask yourself if your proposal cries out to be thrown out!*

6) Learn to write like Hemingway

No one is a natural author. Great writers are made, not born, and the secrets of what makes them great are not really secrets (most of us learned them in high school, but we haven't practiced them since). You begin by outlining your thoughts, because it is a lot easier to change an outline than a finished document. Once the overall outline has been established, begin to fill in the details: many authors like to write a topic sentence for each paragraph as an intermediate step between outline and rough draft document. At each stage of the writing process you must learn to *read* what you have written with the critical eye of a veteran editor. If the material is not clear, clarify it. If transitions are ragged, smooth them. If there is too much detail, remove material until no more can be taken out without compromising the integrity of what remains. Be brutally frank in your assessments of your writing, because it is better for you to find these bugs in the privacy of your office than to have a major figure in your field find them in public during the review process.

Finally, learn to write well, instead of resorting to the affected "quasi-scientific" style that has become a fad in academic circles. *Say what you mean, clearly and succinctly*. Avoid constructions like dangling participles, split infinitives, passive voice, high-tech buzzwords, and other forms of babble that affect a "scientific" style of writing. Study a copy of Strunk and White's "The Elements of Style", or go read a novel by Hemingway.

7) Figure out who your competitors are and how to outflank them

Your proposal will be in direct competition with those written by your colleagues, and each will be reviewed by your common peers. Anything (within reason!) that you can do to lend credibility to your proposal will be effort well spent, since it will distinguish your work from your competitors, and will be interpreted as additional expertise by your peer evaluators. There are many easy ways to make your proposal stronger. For instance, if you have good relations with a guru in your field (especially a senior researcher), ask if they would like to be added to your proposal. Often, if they are not interested in joining your proposal team, they will at least write you a letter supporting your research efforts, which is a valuable document to be added to your proposal (especially for young faculty). Seek out those who will benefit from the successful completion of your work and ask for similar letters of support; recommendations from famous researchers or captains of industry are especially noteworthy. The basic idea here is to add so much momentum to your proposal that no reviewer will want to stop your research juggernaut (but not too much – see point 8 below). If you have colleagues that may compete with you for funds, try reaching out to them to do joint work that explores the problem from slightly different viewpoints. It is generally better to cooperate today with your competitors in research endeavors, because of the strong likelihood that they will be reviewing some of your proposals tomorrow. Be extremely careful about demeaning competitors' research efforts, especially in written correspondence (including e-mail). There are not that many top-notch researchers competing with you in your field; you cannot afford to alienate *any* of them!

8) Demonstrate feasibility (but not completion) of your research goals

Many funding agencies have borne considerable criticism of late because peer reviewers are often perceived as being too conservative in awarding funds for high-risk, high-payoff research investments. The anecdote is told that these agencies will only award funding for projects that have been successfully completed; all other projects are too risky. This lack of confidence in the peer review process can be turned to your gain if you are seeking funds for a project where you have already demonstrated initial feasibility. Try to make your research proposal sound like an idea whose time has come, one that has already established feasibility, one that cannot fail *as long as you can just get this last increment of support from the funding agency*. Attach (as appendices) existing papers that you have published on simpler versions of the same research, or append letters of support from others. The trick here is to gain *leverage* by demonstrating how much commitment has already been dedicated to the project (include your own time, any university or other institutional support that you have used, or any industry contributions). At the same time, you have to take care not to overstate your success, or the reviewers will be asking themselves why they should waste their budget on a process that will be completed whether they contribute or not. It is a fine line between demonstrating proof of feasibility and accidentally undercutting proof of funding need, but it is well worth it to explore this territory.

9) Don't ever take reviews personally

No matter how good your proposals are, sooner or later some reviewer is going to read your work and not "get it." Generally, you will get excellent evaluations from all but one of your peer reviewers; the remaining reviewer will give your project the "kiss of death" by awarding it a poor score. If the project director is sufficiently alert to the problem, another reviewer may be sought out for confirmation, but often the one poor review is enough to land your proposal in the waste basket (usually with a note from the program director to try again in the next funding cycle). The first rule to keep in mind is to distance your ego from the reviews once you receive them. You may read all the reviews, but don't take them seriously until you have put them away for a day or so (enough to let your immediate passions dissipate). Once you have calmed down, re-read unfavorable reviews with an open mind. Was the fact that a reviewer missed your whole point caused by your not making your proposal sufficiently readable? Is the poor review an indication that there is a serious flaw hidden in your proposal? Be honest with yourself as you undergo this line of questioning, and *never take bad reviews personally, no matter how incompetent you feel the reviewer may be!* If your investigations into the reason for the poor evaluation(s) cannot turn up a satisfactory answer, it may be worthwhile to write a *calm* note to the project director explaining your concerns, *but never direct angry correspondence to the project director*! If you cannot resolve the problem of a poor review to your satisfaction, then just chalk up the whole experience as part of the learning process, and vow that *you* will never do a poor job reviewing anyone else's proposals.

10) Remember that you are in control of the entire process

Clerical staff at universities are tired of dealing with faculty who start writing proposals the day before they are due. You will not win many friends if you take this approach. Your local research division will help you to stay abreast of requests for proposals and will aid you where possible in getting your proposal out, but you should understand that you will be doing most of the real work (writing the technical content, bringing together the various extra components such as resumes, publications, lists of past and present funded support, proofreading, etc, etc...). Since the real work is going to be done by you, it is completely up to you whether you do a good job and get done early, or whether you send out a half-baked proposal at the last possible moment. Remember that reviewers who read your proposal will generally be your peers; a quality proposal document (even if it is not funded) will leave a favorable impression on them, where a poor proposal will leave a sour taste. Recognize that you are in control of the proposal development process, and that the results of your proposal writing efforts will become part of your intellectual reputation (both on- and off-campus). *Take the time to do it right, or don't do it at all.*

Biographical Data:

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