I've reviewed a lot of proposals lately and it has made me cranky, so here I am trying to teach the Hungry Man how to Fish and thus Eat for a Lifetime. I'll be blunt: Have you been getting evaluations of "good" on your grant proposals? If yes, then you really need this information.

How to Turn A "Good" Proposal Into An "Excellent" Proposal in Eight Admittedly Arduous Steps

1. Do the Math. You've already done the budget, right? Because budgeting work comes apart in your hands like dry f*cking cornbread, creating more and more crummy little tasks as you handle it until suddenly it's done and you're not totally sure what happened, but you do have an excel file with a grand total figure somewhere near the bottom. Write this big fat number on the back of your hand with a Sharpie and stare at it for a few days. You know what? That number represents a crapton of money by anyone's standards. Divide that number by ten, or even a hundred. Now ask yourself, "What would it take to convince *me* to give someone that much of *my* money?" Uh-huh, I thought so. Listen: your proposal has to be well-nigh perfect to even have a chance of being discussed, let alone funded. Yes, proposal writing is the hardest part of the job, simply because there's so much at stake for all parties concerned. So get ready cause this is going to be slightly less fun than a goddam root canal.

2. Be Specific. I don't know about you, but before I give my money away, I want to be fully confident that the person I am giving it to has both a clue about what they're doing and a plan for how to get there. Paragraphs explaining how Climate Change is Real or why Cancer is Bad are not helpful to me; if I am even considering giving you tens of thousands of dollars to study something then I probably believe it's important even more than you do. What I want are the specifics of how you are going to get the question answered. I want to evaluate the details of your approach. You need to convince me that you've thought hard about it, considered your options, and visualized what success looks like from start to finish.

Let's start with the Title. Here's a sucky Title for a proposal:

"Characterization of Rat Vomit"

As a reviewer, I see this and think, *Okay how about 'rat vomit is gross?' There, I just characterized it. Whoop-de-doo.*

Here's a better Title:

"Identification of Rare Amino Acids within Rat Vomit using Barfatron Energy Spectra"

As a reviewer, I see this and think, *Golly, I didn't know the Barfatron could do amino acids. Let's see what the kids are up to in this one.*

Note that the better Title states not only what you want to figure out, but how you propose to do it. Now I'm going to read your proposal in order to find out how many rats, how much puke, which amino acids and why those, how you correct for bile and saliva contamination, etc., etc. Ironically, we both know damn well that you won't end up following this exact course of action, best-laid-plans and all, but proving to me that you can form a realistic plan is absolutely key.

3. Be Quantitative. After you write anything, go back and replace all qualitative statements with quantitative ones. General Rule for All Scientific Writing: If it is worth taking up the space to say it, then it is worth saying precisely. Knowing and showing the numbers is basically the only thing that separates a Scientist from a Guy Selling Vitamins At The Mall. Both callings have their place, I suppose, but government agencies are better oriented towards funding the former.
Example time! Here's a sucky Methods sentence:

"We will collect vomit from each rat in sufficient volume for analysis."

Here's a better version:

"Once a week during Year 2, a cohort of one hundred post-menopausal female rats will be monitored for pallor changes upon the administration of 150 mL of Woolworth's ipecac solution. All esophageal expulsions produced during the twenty-four hours following the initialization of regurgitation will be collected within sterile 1L Lufthansa sick bags fastened to subjects' ears using STAPLES' staplers and staples."

4. Tell Me Why Oh Why. While your proposal's Introduction has to be mighty short, it must argue in stringent terms that academia as we know it will come to a grinding halt unless someone does the work you propose. Tell about how you examined the shit out of the literature only to become aware of a gaping hole in the current state of knowledge even as it dawned on you that you – and really only you — are perfectly set up to rectify this serious collective intellectual oversight.
Get it? Here's a sucky Introduction sentence:

"Numerous studies have characterized the inorganic acids in rat vomit [refs. 1-8], but to our knowledge, no work has been performed to identify rare amino acids."

Here's a better version:

"The chemistry of rat vomit remains the gold standard for diagnosis of tummy health, a measure of wellness that can be usefully extrapolated to every

organism that has ever lived [ref. 1]. My survey of the literature revealed that amino acid concentrations seldom exceeded 99.9 kg/ml in both pre- and post-menopausal rat vomit [refs. 2-9]. These studies, though current, did not incorporate the contribution of rare amino acids, as their detection has only been made possible by recent advances in Barfatron technology. My previous work has demonstrated exhaustively within other contexts how rare amino acids actually control the whole damn world [refs. 10-12]. Here I propose to definitively quantify the contribution of rare amino acids to rat vomit across menopausal status, thus making possible a new definition of rat nausea, integrated across an energy spectrum ranging from gamma to radio waves."

5. Consider The Funder's Objectives. Newsflash: Funding agencies don't give away money just to experience the Rockwellian charm of playing Santa Klaus. The agencies, as well as those in their service, are actually trying to accomplish something. To get funding, you not only have to convince reviewers that you're competent, you must also convince the agencies that you represent the wisest possible investment towards meeting their objectives. The only way to get a clear idea of what the program's objectives are is to call or visit the Program Manager and ask her (or him, I guess) directly. She'll start out by saying, "It's simple: We want to fund the best science," but keep her talking and you'll eventually hear things like, "Wow, I've heard a lot of buzz over rare amino acids, tell me more," or perhaps, "Yeah, but so much of the Barfatron work that we funded in the 1990s proved to be a dead-end." These conversations are invaluable when you are deciding which grants to apply for. Writing a fundable proposal is a huge task, you can't just shot-gun towards every solicitation you see, it just ain't gonna work. You need to get feedback about your idea's fit before you start, and that's where talking to the Program Manager comes in.

6. Write it Well. Okay, now you have to make all that super specific arcane shit interesting to read. The better written it is, the more of the proposal the reviewer will actually read. More reading equals more chance at gaining an informed review and useful suggestions. Beware of joining multiple PI grants where each "writes her/his own section" and then someone stacks it into a 15-page science Jenga: such piles usually collapse into rejectionland before they even hit the panel. It's simply inescapable that near to the deadline, one of the PIs has to take the reigns for at least three days and read the whole thing out loud a few times to make sure that it flows well and makes sense. And they must also format it beautifully, with at least one dazzling figure or colorful illustration per page – which looks a lot better than any whole page of monolithic black text. Sound like too much work? Then let's do some more math! Take the grand total dollar figure and divide it by 15 pages, and guess what, that's how much money each page of your writing thinks it deserves. Ask your journalist friends how much they get paid per page. Upshot: proposal writing has to be the best writing of your career.

7. Gird Your Loins. Steel yourself for a long haul, because most grants will have to go around at least two times. It's rather like the revision process with a

manuscript in that it's quite rare when something gets accepted without any revisions. Odds are that your reviewers are going to have expertise very close to your own and the funding agency is counting on them to help you tweak your proposal into a plan with the maximum likelihood to succeed. As with papers, the objective is not to get *past* the reviewers, it is to *learn something* from them. The best way to show that you've done this is to include an explicit boxed paragraph before the Introduction stating how any revised proposal has been changed due to input gained during the previous cycle. Mayhaps thusly:

"Within the previous version of this proposal, Panelist #1 objected strongly to our request for one large yacht within which to sail rats back and forth between Oxnard and Catalina Island as a method for triggering seasickness prior to actual vomit collection. In this version, we have reduced costs drastically by substituting four semesters of support for one RA who will spend 10 hrs/wk sharply kicking each rat in the solar plexus until a glassy-eyed retching posture is achieved, in keeping with the suggestion of Panelist #2 that we 'hit the little f*ckers until they blow chunks'."

8. Don't Lose Hope. Buck up because it's probably going to be okay. If you can get just one decent-sized grant before you go up for tenure, that may be enough; it sure will be if I'm reviewing your file. If you can get into the habit of writing two good grant proposals each year, you'll improve rapidly with each cycle and likely get there in time. I'll say it again: always talk to the Program Manager before writing, tell her your idea and pour your heart out. And remember that even though you're an expert, you still have an awful lot to learn.

Guess what I'm psychic! Lots of people are going to say that the above advice is sort of good but also sort of wrong and that I should have instead specified x, y and z. The people who say that should go write their own blog posts and specify x, y and z. Then they should tweet me so that I can read & RT them.

And just in case someone is still reading, I feel moved to gripe about how I really, really hate the words "Characterization" and "Implications" to the point that I wish that they had never been invented by the Greeks or Lats or whatever, both being so vague as to be utterly useless. I don't care how you 'characterize' something, I want to know what you measured. I don't care what you think the 'implications' are, I want to know what you claim this means. For cripes sake, quit dancing around and say something, so I can either agree or disagree with you and we can both move on with our lives.
Fortunately for the world at large, I have lots more unsolicited advice to give out, such as what you should do after you get tenure, what to say about climate change, whether or not to have a baby *and* how to make cheese. *You also can't comment on this page and* here's why.