How to Write a Successful Grant Application

Oklahoma State Regents for Higher Education

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Tennessee, while an NSF-EPSCoR eligible state, doesn’t participate in the Research Infrastructure Improvement (RII) award, but is eligible for co-funding. For this presentation, TN is not shown.
Active Oklahoma EPSCoR Awards
Getting Started

**Think.** What do you want to do?

Do you have an adequate foundation of preliminary data to launch a grant application?

Outline three or four concise specific aims.
Getting Started

Forget about it.

Find something else to do for awhile.
Getting Started – Planning

Now, think about it again.

Assess your field. Do you want to go it alone or are there opportunities for collaborating with a more experienced grantee?

Check out the competition; see which other projects in your field are being funded. Search the relevant databases (http://www.nsf.gov/awardsearch/index.jsp) (http://crisp.cit.nih.gov).

Evaluate yourself: How do your strengths match up with the topics you uncovered in your database search? Can you capitalize on your expertise and fill in any gaps with mentors, consultants or collaborators?

Figure out what resources and support your organization has and what other support you'll need.
More Planning

Find two colleagues.

One should be dead-on in the discipline that is the topic of your nascent grant application.

The other should be generally conversant with the field, but not an expert in the subject area of your planned application.

Both should be experienced grantees, preferably from the agency to which you are applying.

At least one should be on your campus.
Planning with Colleagues

Now, talk with both of them about your ideas for a grant application. Ask them if they will share a successful grant they have written.

Show them your specific aims.

Show them your recent peer reviewed publications that are relevant to the subject matter of your proposed application (some reviewers look at your pubs first, if they don’t like the quality and quantity, they won’t pay serious attention to your application).

True colleagues will be critical as well as being supportive. Don’t be thin skinned! Don’t be reluctant to revise your plans as needed.
Planning

See if your proposal matches any specific initiatives at the relevant granting agencies.

Call a Program Officer for an opinion of your idea.

Look at the receipt dates for new applications. Give yourself plenty of time to prepare your application, probably three to six months.
OK, Sit Down and Start Writing

With all this and more in firmly in mind, at some point you actually have to start writing the darned thing.

Write the application in the Project Description sequence.

But, if you get stuck, move on to another section.

Write the Summary last, but not at the last minute. It’s the one thing everyone reads.
Preparing Your Application

Your application has two audiences: the majority of reviewers who will probably not be familiar with your techniques or field and a smaller number who are.

To succeed in peer review, win over the primary reviewers, who will act as your advocates in guiding the discussions.

Peer reviews work this way because time is limited and discussions are short.
Preparing Your Application

Your objective is to write and organize your application so the primary reviewers can readily grasp and explain what you are proposing.

During the discussion of your application during peer review, the other reviewers will ask the primary reviewers questions about your application, and they'll also skim it during that time (and possibly before the meeting as well).

Most likely, they will read only your summary (abstract), significance, and specific aims.

But **all reviewers are important** because each reviewer gets one vote.
PSYCHIATRIC HELP 5¢

THE DOCTOR IS IN
Reviewer Psychology

To keep reviewers on your side, make your application super user friendly.

**Label all materials clearly.** Make it easy for reviewers to find information.

**Keep it short and simple.** Start with basic ideas and move progressively to more complex ones. State the key points directly, and write basic concepts as nontechnically as possible. You may want to use *Scientific American* as a model for the level of writing to use for your nontechnical parts.

**Guide reviewers with graphics.** A picture is worth a thousand words, probably more. Graphics can help reviewers grasp a lot of information quickly and easily, and they break up the monotony of hundreds of pages of text each reviewer contends with.

**Edit and proof.** Your presentation can also make or break your application. Though reviewers assess science, they are also influenced by the writing and appearance of your application. If there are lots of typos and internal inconsistencies in the document, your score can suffer.
Agency Specificity

How to

Beg for $$

From NSF
NSF Outcome Goals

- **People** - A diverse, internationally competitive, and globally engaged workforce of scientists, engineers, and well-prepared citizens.

- **Ideas** - Discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.

- **Tools** - Broadly accessible, state-of-the-art information bases and shared research and education tools.
What is the **intellectual merit** of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?
What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?
Project Description:

Clear statement of work
Objectives
Expected significance
Relation to longer-term goals
Relation to the present state of knowledge in the field
Description of experimental methods and procedures for documentation and data sharing
Broader impact is a significant part of the narrative

May not exceed 15 pages
NSF Proposal Format

Project Summary: must describe **intellectual merit, broader impacts**, and be understandable to a scientifically or technically literate lay person (not more than one page)

Table of contents: automatically generated by FastLane

Pagination: FastLane will not automatically paginate a proposal

Margins and Spacing: 2.5 cm margins at the top, bottom and each side

  Height of letters not smaller than 10 point

  Type density no more than 15 characters per 2.5 cm

Readability

Other: No internet addresses

  NSF funding in the past 5 years with comment on the quality of the prior work

  Group proposals may have up to 5 pages each for each PI

  Reference information is required - no page limitation

  Biographical sketch is required for each senior project personnel
Agency Specificity

How to Beg for $$ From NIH
Eventually, the reviewer must write the critique. Here is the template they use for NIH – other agencies are similar:

**Significance**: *ability of the project to improve health*

**Approach**: *feasibility of your methods and appropriateness of the budget*

**Innovation**: *originality of your approach*

**Investigator**: *training and experience of investigators*

**Environment**: *suitability of facilities and adequacy of support from your institution*
NIH Research Plan

a. Specific Aims. *What do you intend to do?*

If you don’t get the reviewer’s attention here, all is lost!

a. Background and Significance. *Why is the work important?*

b. Preliminary Studies/Progress Report. *What has already been done?*

c. Research Design and Methods. *How are you going to do the work?*
a. Specific Aims

Introductory paragraphs followed by

Aim 1:

Aim 2:

et cetera

b. Background and Significance

c. Preliminary Studies
d. Research Design and Methods

Aim 1:

Rationale and Design

Pitfalls and alternative strategies

Detailed methods

Aim 2:

Rationale and Design

Pitfalls and alternative strategies

Detailed methods

et cetera
NIH Format

F. Human Subjects

G. Vertebrate Animals

H. Literature Cited

Appendix
Now, no matter who you’re begging for money, here are a few more general tips…
Be the Master of Form as well as Substance

**Beware**: Most granting agencies strictly enforce formatting requirements and may return improperly formatted applications! Don't risk having your application returned because you exceeded the page limits or used an improper font, font size, or margins.
General Goodies

Make sure your idea is not too broad. Your hypothesis must be testable during your three- to four-year award with the level of resources you are requesting.

Keep in mind that your topic should fit with the mission of the granting agency.

Reviewers also want to see how your project fits into the big picture in your field. Make this clear and explicit. Search agency databases to see what other projects in your field are funded, so you can carve out your niche.

Don't confuse your hypothesis with your methods. Methods are the means for performing your experiments. Your experimental results will prove or disprove your hypothesis.
Develop Solid Hypotheses

Choose an important, testable, focused hypothesis. It should be based on previous research.

**An example of a good research hypothesis:**

Analogs to chemokine receptors can inhibit HIV infection.

**Examples of a poor research hypothesis:**

Analogs to chemokine receptors can *be biologically useful*.

*A wide range of molecules* can inhibit HIV infection.
Sharpen the focus of your application.

Applicants often overshoot their mark, proposing too much.

Make sure the scale of your hypothesis and aims fits your request of time and resources.

Reviewers will quickly pick up on how well matched these elements are.

Your hypothesis should be testable and aims doable with the resources and time frame you are requesting.
Psychiatric Intervention is a Good Thing

You **WILL** get frustrated, angry with the world, mad as hell, short tempered with your wife, kids and pets and so forth as you write your grant.

In fact, you will become clinically deranged at times.

But, you will recover.
Eventually, you will have a draft narrative (unless your computer crashes and you forgot to back up your files....)

Set it aside for a time.

Go back and rewrite it so that it makes sense.

Repeat this process until you are sick of looking at it.
In Your Spare Time….

Besides narrative, there is a bunch of other stuff that you have to do.

This means the administrative form pages.

This is good stuff to do when you are brain dead from writing your science narrative.
Another good thing to do at some point during the process is your budget. Prepare your budget after you have written your research plan and have a good idea of what the costs of your project will be.

Request only enough money to do the work. Reviewers will judge whether your request is realistic and justified by your aims and methods. Significant over- or under-estimating suggests you don't understand the scope of the work.
More Budgets, Budgets

As a rule of thumb for calculating your costs, figure salaries will be 60 to 80 percent of the total request. Make sure your PI’s salary takes into account the mandatory cap (NIH) or other granting agency rules.

As a new investigator, you should request a relatively modest budget. Be a cheap date – but don’t make your budget so low that you cannot do the work proposed if you are funded.
You Have a Decent Draft

Remember those two colleagues?

Now that you have a decent draft, give it to them.

If they are good colleagues, they will be critical.

Don’t get upset by criticism, thank them. It’s better that they point out the flaws than the reviewers.

Consider their comments and revise accordingly.

But its ultimately your grant application and you know the subject matter better than anyone else.

So be as objective as possible. Consider the comments of your colleagues but they won’t (shouldn’t) be offended if you don’t accept each comment.
The Deadline is Now!

At some point, the deadline will be approaching fast. You will be clinically insane and obsessed with polishing each and every sentence into a gem. But it can’t go out the door until its routed through Research Administration.

Please remember that your Research Administration staff are human beings. In fact, *they are from the government and are here to help*.....

In any case, you need that signature on the face page before it goes out the door.

So don’t take it to Research Administration at 4:30 p.m. on the deadline day and expect them to sign off without having a chance to review it. Plan ahead!
It’s Out the Door

Now what happens?

Your baby goes to a peer review panel.

The members of the panel get a big box of grant applications, at which time they mutter expletives which cannot be repeated here.

The box with the grant applications sits on the reviewer’s desk (or the floor) until the time before the meeting gets short.

Eventually, the time comes and your grant application undergoes peer review.
There are only two possible outcomes.....
Odds are, especially for your first application, that it will not be funded on the first try.

So, get mad for awhile.

Then, get over it and plan a revised application.

A revised application may or may not permit you to respond to the previous critique. Follow the guidelines.

Be positive in your response, thanking the panel for their insightful advice. But don’t be afraid to point out your disagreement, doing it respectfully, if appropriate.

Involve your two colleagues in the process.

Send it back.

The most important word in grantsmanship is **persistence**.