Grantsmanship Workshop - How to Develop a Fundable Research Proposal

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Disclaimers
- This is a general advice for writing 'research' – not 'training' grant proposals.
- This advice may not apply to grant proposals that seek funding from 'industry' or 'private donation'.
- This advice applies to writing grant proposals in basic or applied disciplines (social, behavioral, physical, biological, etc).
- This advice works for funding from Federal Agencies (NIH, NSF, USDA, NASA, FEMA, NEA, US-DOED, DOE, DOL, EPA, etc) and some major Foundations.

Recently Changes in the Public Land-Grant Universities
- State supported university - entitlement
- Teach classes and publish papers based on ideas
- Tax payers pay faculty member salaries and research dollars
- State located university that behaves like private university - investment
- Teach classes and publish papers based on fundable ideas
- Faculty seeks his/her own salaries with fundable proposals

Academic Research Cycle for Faculty – (The uG/P Factor)

What does a funded grant cover?
- Research expenses - supplies, equipment, travel, subjects, etc.
- Personnel – your summer salary, your release time (buy out), your graduate student’s stipend, post doc and technicians, coordinator
- Collaborators and consultant cost, % salaries for director of statistics and design, food service and dietary assessment, nutritional and biochemical assessment, etc
- Alterations and renovation –
- Indirect cost – 41.5%, 28%, 26%, 8%, 0%

To be a Faculty in the 21st Century with Research Programs
- You need $$$$$$$$$$$$$$$
- You need to write ‘fundable’ proposals
- Writing proposal is not buying lottery ticket (it is the quality, not quantity counts)
Diseases related to grant writings

- There are serious documented diseases being described in the literatures related to grant funding problems
- Individual case studies

Hyper-Procrastination-emia

**Patient:**
- 32 yr Caucasian female
- 3 yr postdoc
- 2 yr fixed term faculty

**Symptoms:**
- Spent last two years trying to get started on her first proposal
- Has written and discarded 2,356 specific aims and 5 boyfriends
- Has considered an alternative career as a stand up comic

Hypo-NIH-Funding-emia

**Patient:**
- 42 yr Caucasian male,
- Associate professor.
- NIH funding in 1995 with his first NIH RO-1.
- Now “lower half” (triaged) in both recent submissions.

**Symptoms:**
- Loss of libido
- Feelings of worthlessness,
- Thinking about starting a small pizza company
- Mother asks weekly why he didn’t go to med school.

Hyper-writing-grants-uria

**Patient:**
- 31 yr male/female (?), uncertain ethnic background (?)
- Assistant Professor in a major university
- Up for tenure (year 5)
- Has submitted 14 grant proposals in 5 years

**Symptoms:**
- Told his dept chair that he would write a grant every week until successful
- Recently seen coloring his hair in bathroom and eating a bar of soap for lunch

Rx for Grant-Sick Faculty

- Recommend altered point of view about the process.
- Submission of grant proposal is a continuous growing process and a way of life. Take the ups and downs in stride.
- Submission of grants proposal is a creative engine
- Be HPP (Humble, Patient and Persistent)!!

Any Well-Trained Person Can Become Funded

**Your Key to Success**

- Your Idea!
- Your Commitment!
- Your Grant-Writing Skills!
Your Idea is KEY

HOW TO DEVELOP AN IRRESISTIBLE, FUNDABLE IDEA

What Makes An Idea Irresistible??

- Paradigm Shifters (change the world)
- Paradigm Pioneers (get the $ $)
- Settlers (me too!)

Pioneers - Being FIRST

You need to make yourself **FIRST** in whatever category you choose!!!(Charles Lindbergh, Amelia Earhart)

KEY Elements in Developing a Good Idea

- **Be Knowledgeable**
  - Extensively read existing literature
  - Teaching helps you being knowledgeable
- **Be Thoughtful**
  - Devote Time to just thinking
- **Be Creative**
  - Look for parallels with other fields
- **Be Open**
  - Share ideas with your colleagues
  - Not being personal

Apply the “Principle of the Farm”

“You can’t cram farming”

PLOWING the SOIL and SEWING the SEEDS of a successful grant

• Attend international/national meetings that are not exactly in your main stream of discipline to find out the state-of-the art (think out side the box)
• Develop colleagues on and off campus. Establish true collaborations with world experts. Go to their posters and presentations etc. Establish an ongoing scientific dialogue.
• Develop the necessary techniques and establish preliminary “feasibility data” for your ideas.
• Develop a “stable” of good ideas to draw from.
Your Second KEY is COMMITMENT

• To Research
• To the Grant-Writing Process

FIRST Essential Need of a Committed Grant Writer

PASSION!!

PASSION = COMMITMENT

“...if research is truly what you want to do, then you must be willing to pay the price... It takes time, patience, stubbornness, years and years of seven-day weeks and eighteen-hour days, years of poverty level wages, predictions of doom and failure, rejections of papers and grants, depression and self-doubt...But one persists...because this is what you want to do.”

Mina J. Bissell, 1997 ASCB presidential address

SECOND Essential Need of a Committed Grant Writer

ATTITUDE

NEGATIVE
• I can’t
• Too little time
• Too much competition

POSITIVE

I can and I will
(young investigator gets a break)
I will reorder my priorities
I welcome the chance to compete

Think BIG, Think WIDE and Act NOW!

THIRD Essential Need of a Committed Grant Writer

CREATIVE TIME

Two Kinds: Lead Time & Quality Time
Keep an ONGOING LOG OF IDEAS Months ahead!!!!

Thinking in Question Format: Formally write out every interesting question that you can think of related to the area of interest or the basic theme of the project.

Thinking in Experiment Format: Write out every possible experiment you would like to do, with no regard to money, expertise or equipment.

Thinking in Hypothesis Format: Formally write out as many untested hypotheses as you can on the theme of the project.

Let the ideas incubate and try it again.

How do you get started?

Grant Applications to Very Different Funding Agencies are Very Similar!

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Before writing, consider your point of reference

Who are you writing to?

The Review Process

A full understanding of the review process, including who is doing the evaluation, can significantly enhance your chances of success!
Who are Your Reviewers?

They are:

- Accomplished
- Dedicated
- Knowledgeable
- Conscientious
- Fair

Who are Your Reviewers - Really??

They are actually:

- Overly committed and overworked
- Underpaid for their efforts
- Tired
- Inherently skeptical
- Looking for the easiest way to get the job done well

The Realities of Pursuing Grant Support

- Enthusiasm cannot be directly communicated to the granting agency
- Ideas must first be transferred, therefore, to a written application
- The application must then be screened and evaluated by a review panel
- There are more good ideas than there are resources to support them

The Pathway Too Often Taken

The Idea → The Applicant → The Application → The Review Panel

The Applicant

The Review Group

Characteristics of a Successful Salesperson

- Makes a good first impression
- Is well-prepared
- Is credible
- Delivers a clear message
- Provides supporting documentation
- Has appropriate endorsements
- Has something special to offer
- Is persistent

KEY POINT

You Have to Sell Your Ideas to Your Reviewers!

Making the Primary Reviewer Your Advocate!!
Style of Writing

- Write as though you were teaching a 1st or 2nd year grad student.
- Write as if you were submitting a Scientific American paper
- Teach, teach the reviewers. Then you don’t have to sell them.
- Care about your reviewers! COMMUNICATE!

Specific Aims Section

- One of the most important sections in the grant application, because it is template or master plan for the rest of the proposal
- Short application are simply an expanded version of this section
- This section works very well as a pre-proposal
- It is the most difficult section to write
- It must quickly engender enthusiasm for your idea
- The flow of logic must be compelling

KEYS to Writing Effective Specific Aims

- Whenever possible “test a hypothesis” in the specific aim and title. You wish your work to be referred to as “hypothesis driven”
- Whenever possible, use the word “mechanism” in the specific aims and title.
- Most grants do best if there are only 3-4 specific aims.
- Make the aims specific but far reaching. Avoid making the aims a simple list of experiments.
- Write aims you are excited about!

Too Experimental

Specific Aim 1: To test the hypothesis that the Klothos mouse will develop premature emphysema when on a low protein diet.

Better

Specific Aim 1: To test the hypothesis that nutritional protein deficiency is a critical variable influencing the loss of lung parenchyma in aging.

Specific Aim 1: To determine the mechanism for loss of lung parenchyma in aging.

Exp.1a. To test the hypothesis that protein deficiency contributes to loss of parenchyma in the aging lung.

Exp. 1b. To test the hypothesis that protein supplementation can prevent the loss of lung parenchyma in the aging lung.

Exp 1c. To test the hypothesis that premature aging is associated with protein deficiency.
The “DON'Ts of Writing Specific Aims

1. DO NOT state hypotheses that you cannot actually test with your experiments.
   - AVOID using the phrases “to correlate,” “to describe,” or “to develop.” You do not want your grant tagged as “descriptive.”

2. DO NOT use wishy-washy, passive tense, or flowery language. Write your aims in the “active form” with strong, meaningful verbs.

3. DO NOT write aims that can be viewed as “a fishing expedition.” e.g. MicroArray Data

Draft your Experimental Plan

• Start the experimental plan early, because some of your specific aims may fall apart as you try to design a plan to test them.
• Experimental plan should be a plan, a paradigm or a map and it should include your logic.
• Tie up all loose ends of each experiment. Try not to leave anything to the imagination of the reviewer e.g. # subjects, dose response curves, etc.
• Summarize details don’t reiterate them all.
• A picture says 1000 words.

Write a Draft of the Background and Significance

• Teach, Teach, Teach, Teach, Teach. Pictures are worth a thousand words.

What you want the reviewer to know:
1) You have a full knowledge of the breadth of literature in your area. You are the state-of-the-art.
2) Where your experiments fit into history. Where your building blocks fit in the wall.
3) Enough background to understand individual specific aims. Refer to them.
4) Know how the work relates to a particular problem or disease. How could it influence the future of medicine or science? Don’t overstate.

“How much preliminary data do I need?”

You don’t have to do all the experiments before submission.

You want to show the reviewers:
1) You can perform the necessary techniques and methods.
2) You are committed to this area of research and are off and running.
3) New techniques are feasible.
4) Stay in order of specific aims.

Start Over, Rewrite, Rewrite Rewrite

“The only good writing is re-writing”

• Imagine an ‘out of body’ experience - pretend you are a reviewer (what are you looking for?)
• Have other scientists read the grant after you have put together your best shot.
• Have a non-scientist or grad student read the grant for understanding and English.

Rewrite, Rewrite Rewrite.
What are reviewers looking for? DOES YOUR APPLICATION MEASURE UP?

1. **Significance**
   - Does this proposal address an important problem?
   - Will the outcome of this proposal advance the scientific knowledge in the area?
   - What will be the effect of these studies on the concepts or methods that drive this field?

2. **Approach**
   - Are the conceptual framework, design, methods, and analyses adequately developed, well-integrated, and appropriate to the aims of the project?
   - Does the applicant acknowledge potential problem areas and consider alternative tactics?

3. **Innovation**
   - Does the project employ novel concepts, approaches, or methods?
   - Are the aims original and innovative?
   - Does the project challenge existing paradigms or develop new methodologies or technologies?

4. **Investigator**
   - Is the investigator appropriately trained and well suited to carry out the work?
   - Is the work proposed appropriate to the experience level of the principal investigator and other researchers (if any)?

5. **Environment**
   - Does the scientific environment in which the work will be done contribute to the probability of success?
   - Does the proposed experiments take advantage of unique features of the scientific environment or employ useful collaborative arrangement?
   - Is there evidence of institutional support?

WHAT DO REVIEWERS LOOK FOR LAST?

What singles out this grant application from all others under consideration?

WHY IS THIS GRANT SPECIAL AND, THEREFORE, DESERVING OF SUPPORT?
• Do Not Play Hide and Seek with the Reviews
• Be Explicit!!
• Help the reviews to recognize the judging criteria

Hints for Final Formatting
1) Stay with the Page/Font requirements of the NIH.
2) Embed figures into the text. MAKE THEM LARGE ENOUGH TO BE READABLE.
3) If you are inexperienced at MS Word or your word processor get some help. It can be a nightmare!!!
4) If you found 20 misspellings and typos in a $1,000,000 application, would you trust that person with the money?

Your Pathway to Grant Support
The Idea

The Applicant

The Application

The Review Group

Awesome

Responding to the Reviews
1) Do it in stages. Get over your anger and disappointment. Don’t take it personally.
2) Respect the reviews and the reviewers. Take them seriously. Often they are right.
3) “Thank God for unanswered prayers.”
4) Directly respond to the reviewer’s comments with positive responses. If they are clearly wrong, kindly show them the way, based on fact, references, etc.
5) Don’t send the exact same grant back. Show some progress, some new thinking, etc. However, don’t add anything that could raise new questions if you have a close score.

Rolling in $$$
• Looking out for other opportunities (RFP), Industries, private donors
• Be flexible
• Be responsive
• Thing BIG, think wide (program grant, center grant, etc)
• Repeat the process – no lag time
HHS Grantsmanship Workshop

- Due date to your chair – Feb 15
- Due date to consultant – March 15
- Workshop begins – March 31
- Submission of your grant – October 1, 2003