PART 1 - Research Proposals

Funding is highly competitive.

To be funded, your proposal must be better than 80-90% of the proposals submitted.
You can write a competitive proposal even if you are not smarter than 80-90% of your competitors.

Hierarchy of a proposal

1. Big Idea or Big Question
   Many careers
   curing cancer
   saving amphibians from extinction
   understanding the mind-body connection

2. Your part of it problem
   You should identify an under-explored niche within this big problem or question.
   Solving it will be your “Long-term goal”
   Your career (or significant part of it).
   Must drive your field vertically
   Cannot just confirm or marginally extend work of others.

3. Single proposal and its Specific Aims
   Your work for duration of funding cycle or dissertation work, e.g., 3-4 years.

Defining and Refining your idea

Circular process to fit in the context of what is known:
   Pose an idea
   Review the literature
   Revise the idea
   Review more literature
   Etc.
**Develop a 1-page version to shop around.**

Explain 6 things:
1. Principal “knowns” on which your proposed work builds.
2. Gap in the knowledge base that you will fill.
3. Central hypothesis you will tested.
4. Rational (underlying reason) for why your work needs to be done.
5. What could be expected from your work – how it will advance your field.
6. Why your expected outcomes are important to advance your field.

**Style (here and elsewhere)**

Seek clarity and assertion

*Have you read Joseph Williams’ book?*

Grammar & spelling must be perfect

*Remember that “data are”*

Avoid:

- *I hope to …*
- *I wish to …*
- *I would like to …*
- *I intend to …*
- *I will try to …*
- *I believe …*
- *I will tease out …*
- *Whether [or not?]*
- *If I can …*
- *My study will shed light on … [shudder]*

Structure your proposal so that it discovers something interesting no matter how the truth turns out.

**Feasibility**

*Can you do it?*

- Do you have time?
- Can you get hold of the resources?

*Is someone already working on it? You don’t want to get scooped.*

- Who is your competition?
- What other groups are interested?

Published work
Are you reviewing the published abstracts every month?

**Funded work**
What grants have been awarded to study this question?

**Preliminary work**
Who has presented recently at scientific meetings?

**How do you sell a proposal?**

*In this order:*

1. **Sell your idea**
   as the most compelling and clearest articulation of the idea within the theme of the funding program.

   From the GrantDoctor:
   “Richard Feynman once said that if you can't explain a bit of science in simple terms, you don't understand it. A corollary might be that if you can't explain your work's significance in simple terms, maybe it doesn't have significance--or maybe you just don't understand its significance, which, for a scientist, is just as bad. Many scientists are not good storytellers, and that makes it harder for them to identify and articulate the central narrative of their work. Many scientists don't even know where they stand in relation to the scientific frontiers, and even if they do, they can't articulate it in their grant proposals.... Solving this one is up to scientists.”
   
   [http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2006_08_11/no_more_boring_science/(parent)/68](http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2006_08_11/no_more_boring_science/(parent)/68):

2. **Sell your project**
   as the best way to address the idea or problem

3. **Sell yourself**
   as the investigator of choice

**Tailoring your proposal to the funding source**

*You MUST find an organization that wants to fund what you want to propose.*

*How do you know what an agency is interested in funding?*

- White papers from agencies on their mission and directives.
- Standing programs with listed areas and funded grants
- RFPs – Requests for Proposals – new initiatives.
How literally do you take their directives?  
LITERALLY.  
They are looking for excuses to reject the most proposals with the least work.  
Your proposal will not be reviewed if you do something so trivial as to use the wrong font or margins.  

Note who is eligible to apply?  
Enlist your advisor’s help.  

In-class group activity:  
Review 1 page proposal pitches  
Important ideas to discuss:  
What is the Big Q?  
Importance  
How has the PI made the case his question is an important question to study?  
How has the PI structured the proposal to make his case?  
How do the Specific Aims relate to the Big Q?  
Does the investigator propose to investigate the BigQ directly, or does he propose smaller, more specific questions to serve as proxies?  

Sell job  
How does the PI sell the proposed studies?  
How does the PI sell the PI?  

Types of Proposals  
Thesis proposals  
Blueprint for a thesis project.  
Required by the university.  
Must be approved by the major professor and each member of the committee.  

Money to attend a scientific conference  
You must be presenting research.  
Anything will do.  
Department & Dean’s office  
Must apply 6 weeks in advance.  
One meeting/fiscal year  
fiscal year breaks on 1 July.  
FIU Graduate Student Association
Grant Proposals
Agencies target specific areas of research and particular types of researchers.

Academic targets of grants

Institutional scientists
$25k - $500k

Institutional Programs
$500k - $5 million

Institutions
$25k - $5 million

Grad students and postdocs
$500 - $50k

Types of things funded

Research projects
Institutional enhancement
Training programs

Grants & contracts

Difference between a grant and a contract
Your freedom is greater with a grant.
You are rarely tied to the exact project you propose, particularly if you chose to adapt it to make it better.
Your ultimate produce is the peer-reviewed publication.

Publish good papers and people will not only forgive you for changing your project, they will praise you for being so productive with the funds you received.

A contract is for a specific piece of work within the scope specified by the granting agency.
Product is often formal written report quarterly, & final.
Generally awarded for applied work.
Resulting publications are appreciated.

Good things about research grants
Money for equipment, supplies, travel, meetings.
Paid time for thesis research
Track record
Funding begets more funding if you do the work and publish the result.
Works even if you start small.

Small grants are easier to get.

Constraints on grad student funding
Grants from government agencies and some foundations (not all) are issued to the institution, not the individual. Institutions do not allow grad students to apply for major research grants. The loophole: grad students can write and submit grants with their advisor as the Principal Investigator (PI)

**How do you find out what grant funds are available**

Check the web

- GrantsNet - AAAS & Howard Hughes grants database
  - [http://www.grantsnet.org](http://www.grantsnet.org)
- National Acad. Sci. fellowships listing
  - [http://www.nationalacademies.org/grantprograms.html](http://www.nationalacademies.org/grantprograms.html)
- FIU Division of Sponsored Research and Training
  - [http://www.osra.fiu.edu/funding.htm](http://www.osra.fiu.edu/funding.htm)

Read the acknowledgments of papers

Sometimes people get funding from places you wouldn't think to look and they always thank their benefactors in print.

Ask other grad students

In dept, at meetings.

Ask Grad Program Director

The department gets all sorts of funding announcements.

Other sources

- Scientific organization
  - Sigma Xi
  - Animal Behavior

**Organization & Formats**

Federal agencies

- NSF, EPA, NIH, USDA, DOD

State research contracts

- Florida State Dept. Fish & Wildlife
- South Florida Water Management District

Private foundations

- Whitehall Foundation, American Cancer Society, American Heart Association, etc.
- Explorer's Club, National Geographic Society

Hobbyist clubs
A garden club in Pennsylvania has funded 3 of our students to do tropical field work.

Grad student specials (FLU grad students DO get grants)

Great stipend & travel but little supplies

- NSF grad fellowship
- EPA STAR & EPA GRO
- NASA predoctoral fellowship

Good for supplies & travel

- NSF Dissertation Improvement Grant

Good for both

- NIH Ruth L. Kirschstein National Research Service Award (NRSA)

Small grants - supplies or travel

- Scientific societies (e.g., Sigma Xi)
- Excellent way to get a track record
PART 2 - How to plan the proposal

Check the required format and adjust plan accordingly
Are you eligible to submit this proposal?
A 2 page format will not require a major lit review, but 10 pages will.

Identify your audience
Who will read the proposal?
Your committee
A panel of faculty
  in your area
  outside your area
Administrators
  grant program officers
What will it take to make a favorable impression?
What do these people want to see?
[at this stage, ask class for a list of things that would impress them personally]

Do a thorough literature review
Nothing kills a grant more surely than missing an important paper that shows your idea won't work or has already been done.
Know the classics
Know the latest.
  Prove to reviewers that you are working on the cutting edge.
  Cite recent reviews and newer papers.
  Cite the classics.
  Cite everybody who might review your proposal (who MIGHT review your proposal?)

Refine your idea.
Make sure you phrase your idea to address an important issue.
Applied problem
Theoretical problem
  preferably grounded in the literature
Practice explaining your idea so that you can excite people with it.
Phrase the question for maximum interest and impact.
  Practice required, so practice

Design the experiments or studies
Determine what data are critical to solve your problem?
   Ask people if they would be convinced by such data.
   *Ask your professor, ask your lab, ask other students.*
   *If they say no, why would you bother with the study?*

Use the best methods
   If a published paper has advanced the state-of-the-art, you must not propose to use antiquated methods that are no longer considered adequate.

Now write the proposal itself.
*Anatomy of a proposal - varies by organization and type*

Cover sheet
Abstract
Main Proposal
   Brief summary of the project's goals
   Background (literature review)
   Preliminary Results
   Research Plan
   Time table
   Bibliography
   *Literature cited above*

Biographical sketch
Budget
   Spreadsheet
   *Direct costs*
   *Indirect costs*
   Justification of expenses

Other funding
   Present support
   Pending support

*Formalize the questions*
   Big goal of project
   Sub goals
   May be phrased as specific hypotheses, au Platt
   As a useful heuristic, plan the publications that will result.
Addressing each aim will constitute a hypothetical publication.

Divide the project into logical sections
  Determine the logical sequence of data collection

**The main proposal section**

Things you must sell
The question
  *You have to hook the reader.*
  *The proposal should read like a good mystery story without the final chapter.*
  The final chapter will be answered by your study

The methods
  *You must convince the reviewers that you know how to do the research in the time proposed.*
  *Methods must be presented methodically*
  *Methods must be plausible.*
  *Time table must be reasonable.*

Your qualifications
  **Pilot data**
  You must prove YOU can do it.
  **Publication record**
  Shows that you have follow-through.

*Describe the experiments or data collection procedures that you will perform for each section*
  Be ultra logical.
  Cite methods of published works to save space.
  Include sample sizes and how you determined them
  Describe statistical procedures that will be used.

**Time line**
  year by year, month by month, (maybe week by week)
  Must seem realistic to everybody.

**The Budget**
  Work out the budget to the dime, but stay within the guidelines.
  *Compromises required.*
  Justify every expense
  *Expect reviewers to look for places to cut your budget.*

**Abstract**
  MUST be the BEST WRITTEN part of the proposal.
  Often badly or quickly written but the abstract is all that many important people will read, so make it good.
  Never repeat text from the main body in an abstract.
Readers become annoyed by seeing the same text twice.

Make it understandable by anyone.
Do not be esoteric, or some congress staffer will have your funding revoked.

**Cover letter**
Helps agency determine which panel gets the proposal.

**RED TAPE**

*Before you can submit a proposal, you must have it approved by people all over the university!!!*

IACUC & IRB
Require formal training certificates and protocol approval.

Your Academic Advisor

University Forms
Budget Sheet
Internal clearance form
*(about 1 weeks per level)*
Dept Chair
Dean
OSRA

**What happens with grant proposals you submit?**

*Agency*
Decides which program & panel reviews it.
Sends it out to review.

*Reviewers pick it apart, looking for*
importance of problem
demonstrated knowledge of background
strength experimental design
demonstrated record of the PI
justifiability of budget items

*Agency again*
Panel and Program Director rank the proposals
Program director makes final funding decisions.
Divvies up the funds starting with the best proposals and working down the list until the money runs out.

**Other issues**

*Who gets the check?*
Grants must often be routed through the university, which takes a cut of the proceeds called INDIRECT COSTS.

Explain Indirect Costs

% Purpose & uses

**Who owns the data?**

If the check was to the University, then the University owns the data.

**Who is responsible if things go wrong?**

If the science doesn’t work, the person named as the P.I. is blamed.
If money is misspent, both the PI and the University may get in BIG trouble.

FIU was fined $11 million for misuse of grant funds by a PI in Engineering.