Proposal Writing

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Adapted from slides from Timothy Pinkston, USC and Bryant York, PSU

http://www.cmd-it.org
Types of Proposals

• Research
  – Single-investigator
  – Multi-investigator
• Research Infrastructure
• Education
  – Curriculum Development
  – Educational Innovation
• White Paper, Special Projects, RAPID, EAGER, Travel, Workshops, Postdoctoral Fellowships, Faculty Fellowships (industry or foundations), etc.
• Supplements – standard, REU, RET, ROA
• SBIR, STTR
Meta-Tips

• Know the agency’s organizational structure
• Know your agency’s programs
  – Solicited vs. unsolicited proposals
• Review the Summary of Awards
  – Past trajectory
• Know your program officer and division director
  – Current trajectory
• Participate in agency-sponsored workshops
  – Help set future trajectories
• Serve on review panels and as an ad hoc reviewer
  – Read lots of proposals
  – Practice good citizenship
• Develop good proposal-writing habits
Outline

• Research Proposal Preparation

• Tips for Writing Successful Proposals

• Some Fatal Flaws in Proposal Writing
Research Proposals

A fundable proposal describes a good idea and attainable goal, well expressed and motivated, with a clear indication of methods for pursuing the idea, evaluating the findings, making them known and having broad impact. NSF now requires a data management plan.

Societal Challenges

Scientific Inquiry

Technological Advancement
Step 1: Carefully Read the Program Announcements and Solicitations

- Find the right program early!
  - It’s better to do this well before you write
- Talk with your Program Officer to make sure that your ideas fit in the program
  - If the Program Officer tells you that your ideas are too narrow or don’t fit the program, look for other sources
- Make sure that your project is worthwhile, realistic, well-planned, and innovative

Start this process many months before the deadline
Step 2: Develop Your Good Idea

- **Key Questions**
  - What do you intend to do and how will you do it?
  - Why is it important?
  - What does the literature provide?

- Make sure the idea is innovative and exciting
  - Survey the literature
  - Talk with others in the field

- Convince people that you can do it
  - Obtain preliminary data to support feasibility
  - Determine available facilities and resources
    - What infrastructure do you have to work with?
    - With whom will you work (students, collaborators, industry partners)?
Step 3: Prepare the Proposal

- Obtain the agency’s Grant Proposal Guide (GPG)
- Get it - Read it - Follow it
  - Proposal preparation and submission
  - Submission of collaborative proposals via
    - Subaward
    - Separate, yet linked, proposals
  - Review criteria and review process
  - Return without review criteria
  - Withdrawal, declination, and award processes
Parts of a Proposal (NSF)

• Cover Sheet and Certifications
• Project Summary
  — Both intellectual merit and broader impacts described
• Project Description
• References cited
• Biographical Sketches
• Budget and Budget Justification
• Current and Pending Support
• Facilities, Equipment and Other Resources
• Supplemental Documentation
  — What is allowed may vary by programs and directorates
• Single Copy Documents
  — Reviewer suggestions, confidential information, letters of support, etc.
• Data management document (2-pages)
Project Summary

• This one page is critical because it:
  – It may affect which program or panel will review your proposal
  – It must include a statement addressing both merit review criteria: *Intellectual Merit* and *Broader Impacts*
    • Proposals that do not separately address both criteria within the one-page Project Summary will be returned without review

• Intellectual Merit
  – Describe the scientific/engineering problem and its importance
  – State the overall objective of the project
  – State the specific aims
  – Describe how the aims will be achieved

• Broader Impacts
  – Educational & outreach activities; infrastructure; dissemination of results; underrepresented groups; benefits to society
Project Description

• This is the key to a strong proposal
• Overall concept and rationale
• Hypothesis-driven or data-driven or innovation-driven
• Execution
  – Careful
  – Thorough
  – Appropriate

• **Warning:** Most NSF formal proposals are limited to 15 pages. Some preliminary proposals and other special cases may be limited to fewer pages. Check the program solicitation!
In 15 pages, you need to cover

- Objectives and expected significance
- Relation to present state of knowledge
- Experimental methods and procedures
- Results from prior agency-sponsored support (required if applicable)
- Relation to your (the PI’s) longer term goals
- Broader impact
- Optional sections:
  - preface, background, preliminary studies, specific objectives, significance, experimental plan
Project Description

- Know your audience – the reviewers, PO!
  - Write accurately, concisely, and clearly
  - Make it easy for reviewers to like your proposal
  - You never get a second chance to make a first impression
  - First page tells it all
  - Figures and tables get your points across clearly
  - Some reviewers (particularly on interdisciplinary proposals) may not be experts in your specific field
Biographical Sketch

• Usually limited to only two pages
• Professional preparation
• Appointments
• Publications
  – 5 closely related
  – 5 other significant publications
• Synergistic activities
• Collaborators & other affiliations
  – Collaborators (last 4 yrs) & co-editors (last 2 yrs)
  – Graduate and Postdoctoral Advisors
  – Thesis Advisor and Postgraduate-Scholar Sponsor
Budget

• Budget should be
  – reasonable, but request what you need
  – for personnel, equipment, travel, participant support and other direct costs (subaward, consultant, computer services, publication costs)
  – for cost of educational activities associated with research, where appropriate

• Must be accompanied by “Budget Justification” for direct cost line items
Current and Pending Support

• List everything, including the proposal being submitted
  – current, pending and anticipated
• Be careful of overlap
  – Perception of overlap could be detrimental in the review
• Multiple submissions
  – when they are allowed to same program
Outline

✓ Research Proposal Preparation

• Tips for Writing Successful Proposals

• Some Fatal Flaws in Proposal Writing
Get Help

• Read:
  – Sponsoring agency publications
  – Successful proposals

• Look before you leap:
  – Serve as a reviewer and panelist

• Talk with people in-the-know:
  – Current Program Officers
  – Former POs (rotators or IPAs)
  – Successful colleagues
  – Sponsored projects office at your institution
Start Early and Get Feedback

• Write:
  – Rewrite and rewrite again...

• Get critiques from:
  – Mentors and colleagues
  – Previous members of review panels
Be Reasonable

• Be aware of the scope:
  – “Too ambitious” vs. “Too narrow”

• Be honest and up-front:
  – Address issues instead of trying to hide them
  – Acknowledge possible experimental problems and have alternatives
Make It Easy for Reviewers

• Know your audience:
  – All reviewers may not be experts in your specific field

• Simplify and streamline:
  – Make sure you get your overall idea across

• Pay attention to details:
  – Run the spell checker and proof-read
  – Prepare clear photos, graphs, etc.
  – Make the font size as big as you can
Seven Deadly Sins of Proposal Writing

1. Failure to focus on the key problems and payoffs
2. No persuasive structure: *poorly organized*
3. No clear differentiation: *competitive analysis*
4. Failure to offer a compelling value proposition: *potential impact*
5. Key points are buried: *no highlights, impact is lost*
6. Difficult to read or appreciate: *full of jargon, too many low-level technical details or not enough details*
7. Credibility killers: *misspellings, grammatical errors, wrong technical terms, inconsistent format, …*
Funding Criteria: Intellectual Merit

• How *important* is the activity to *advancing knowledge and understanding* within the field or across different fields?
  • *Significance of expected results*: incremental? high impact? high-risk but high-gain?

• How well *qualified* are you to conduct the research?
  • Not necessary to have track record on specific topic, but *quality of prior work* usually a consideration, as are *preliminary results*

• How creative, *original* are the concepts and ideas?
  • Should be *ground-breaking* in some aspect

• How well conceived, *organized* is the proposed activity?
  • *Well-articulated problem* and well-structured research *plan*

• Is there sufficient access to *resources*?
  • Ownership is not necessary, only *access* to equipment, facilities, human capital, …
Funding Criteria: Broader Impacts

- Does the activity advance discovery and understanding while promoting teaching, training and learning?
- Does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- 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 other disciplines and society as a whole?

(See www.nsf.gov/pubs/gpg/broaderimpacts.pdf)
Outline

✓ Research Proposal Preparation
✓ Tips for Writing Successful Proposals
  • Some Fatal Flaws in Proposal Writing
Fatal Flaws

- Inflate the budget
- Use a template for letters of support
- Assume your past accomplishments are well known
- Assume a website is sufficient for research dissemination
- Provide a vague statement about assessment
- Assume program guidelines have not changed from previous year
- Assume your spelling and grammar are perfect
- Substitute vague comments for good examples
- Assume page limits and font size restrictions are not enforced
- Disregard deadlines
Closing Remarks

• Many successful proposals share similar characteristics
  – clearly written, well motivated, organized, original, targeted, important, accomplishable, impactful, significant

• Funding depends on many things, some of which are beyond your control
  – availability of funds, portfolio of existing funded research projects, set of reviewers, timing, ...

• Be persistent and give your best effort; success will come!
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