Academic Career Workshop

How Do Proposals Get Funded and Why?

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Life Cycle of a Proposal

Start

Conceptualize

Try again

What next?

Declined

Funded!

End

& Revise

Write

& Revise
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.
Properties of a Research Goal

- Simple to state
- Not obvious how to do it
- Clear benefit
- Progress and solution are testable
- Can be broken into smaller steps
  - So that you can see intermediate progress

By Jim Gray, Turing Award Winner
http://research.Microsoft.com/~Gray/talks/Turing2.ppt
Funding Criteria: Intellectual Merits

- 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 participation* of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?

• Will it enhance *research infrastructure* and *education*, such as facilities, instrumentation, networks and partnerships?

• Will you *disseminate results broadly* to enhance scientific and technological understanding?

• Does the proposed activity have potential *benefits to other disciplines* and *society* as a whole?
Ad Hoc and Panel Reviews

- **A minimum of 3 reviews/proposal (typically 4 or more)**
  - A score of *E, V, G, F, P* is given by each reviewer
  - *Comments* on intellectual merit and broader impacts
  - Typically, a *recommendation* to fund (or not) is given

- **Panel Review:**
  - Proposals are discussed and *evaluated collectively*
  - *Proposal summary* is written—couple of sentences
  - Intellectual merits are described: *strengths and weaknesses*
  - Broader impacts are described: *strengths, weaknesses*
  - *Improvements* may be suggested (optional)
  - *Panel recommendation*: *Competitive* or *Not Competitive*

- **Comments are intended to help** unsuccessful PIs improve their proposals for the next competition
Basis for Decisions: Reviewer Input

• **Reviews**
  – Content/justification of the reviews by reviewers oftentimes is more important than just the rating

• **Program Director uses reviews and panel summary/recommendation in award decisions**
  – Fairness
  – How substantive the reviews are
  – Technical problems raised in the reviews
    • major vs. minor issues
  – Reasons for the reviewer concerns or enthusiasm
Basis for Decisions: Balanced Portfolio

- **Program Director uses other information in addition to reviewer input in making decisions**
  - Innovation and creativity
    - High risk, high reward projects
  - Breadth of research areas
  - Priority areas and systems
  - Demographics and diversity
  - Broadening participation
  - Institutional impact: EPSCOR, MSI, PUI, etc.
  - Integration of research & education
  - International collaborations
The *Intellectual Merit* of the proposed activity

- Creativity, originality, *and potentially transformative*
- Potential to advancing knowledge and understanding within and across fields
- Conceptualization and organization
- Qualifications of investigators
- Access to resources
“Transformative Research is research driven by ideas that stand a reasonable chance of radically changing our understanding of an important existing scientific concept or leading to the creation of a new paradigm or field of science. Such research also is characterized by its challenge to current understanding or its pathway to new frontiers.”

The *Intellectual Merit* of the proposed activity
- Creativity, originality, *and potentially transformative*
- Potential to advancing knowledge and understanding within and across fields
- Conceptualization and organization
- Qualifications of investigators
- Access to resources

**The *Broader Impacts* of the proposed activity**
- Discovery while promoting teaching, training and learning
- Participation of underrepresented groups
- Enhancement of infrastructure for research and education
- Dissemination of results to enhance scientific and technological understanding
- Benefits to society

**Program-specific merit review criteria**
- Some programs have additional review criteria in solicitation

**There are NSF general statements regarding intellectual merit and broader impact, but also some programs list examples of these criteria specific to the program**
NSF Proposal Review Ratings

Distribution of Average Reviewer Ratings

Number of FY’03 Proposals: 29,164 Declines, 10,791 Awards (37% success)
Why Do Some Proposals Fail?

• Absence of innovative ideas or hypothesis
  – Will provide only an incremental advance
  – Not exciting or cutting edge

• Errors
  – Unclear or incomplete expression of aims
  – Faulty logic or experimental design
  – Less than rigorous presentation

• Unrealistic, sloppy or incomplete

• Resources and facilities not in place
  – PI qualifications/expertise not evident
  – Necessary collaborations not documented
If You Have to Resubmit…

• **Stay calm!**
  – Take ten… breaths, hours, days
  – Examine the criticisms carefully

• **Get in touch:**
  – Call, email, or visit your Program Officer

• **Think carefully about too rapid of a resubmission:**
  – Take time to self-evaluate the proposal/project
Funding and Post-award

• **Funding**
  - Budget and scope adjustment may be part of negotiations prior to an award recommendation
  - Funding options: standard grant (all $ at once) or continuing grant ($ released annually)

• **Post-award**
  - Do what you promised
  - NSF notifications & requests via FastLane
  - Supplement opportunities
    - REU - Research Experience for Undergraduates
    - ROA - Research Opportunity Awards
    - RET - Research Experience for Teachers
  - Submit annual and final reports (a must!)
  - Warning! Overdue annual and final reports will hold up recommendations of all NSF actions (e.g., additional funding, incremental funding, PI changes, extensions, etc.)
Get Support in Proposal Writing

- **Agency Publications**
  - Program Solicitations
  - Grant Proposal Guide
  - Web Pages
  - Funded Project Abstracts
  - Reports, Special Publications

- **Program Directors**
  - Incumbents
  - Former “Rotators”, “IPAs”

- **Mentors on Campus**

- **Previous Panelists**

- **Serving As A Reviewer**

- **Sponsored Research Office**

- **Successful Proposals**
Useful NSF On-line Documents

- FY 2009 NSF Budget Request

- FY 2008 NSF Budget

- Grant Proposal Guide (NSF 04-23)

- Science and Engineering Statistics

- General Information