University of Southern California

USC

USC Viterbi School of Engineering

Academic Career Workshop

How Do Proposals Get Funded and Why?

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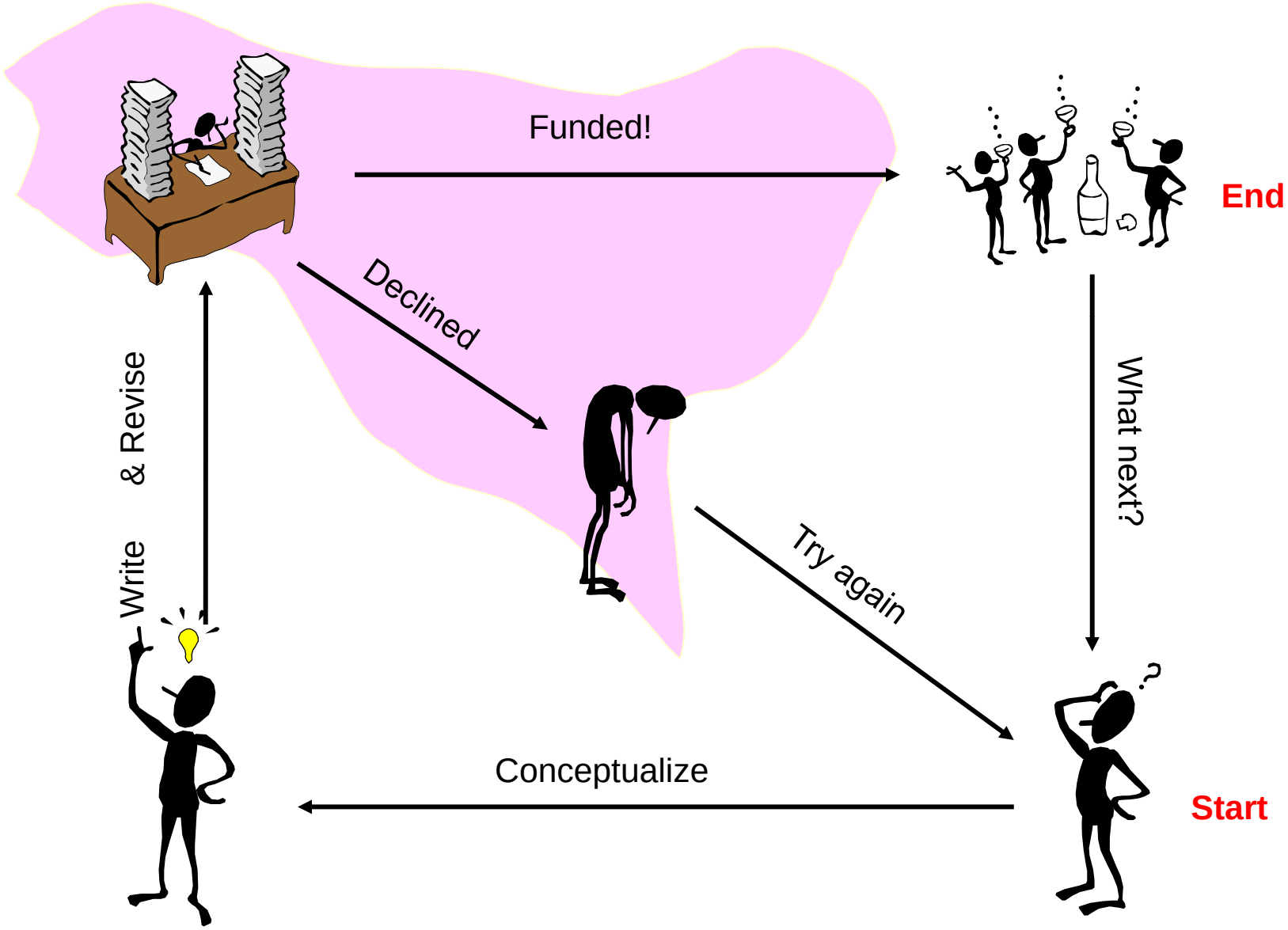
Professor, USC

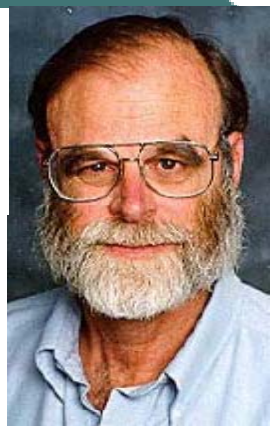
Life Cycle of a Proposal



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.

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**

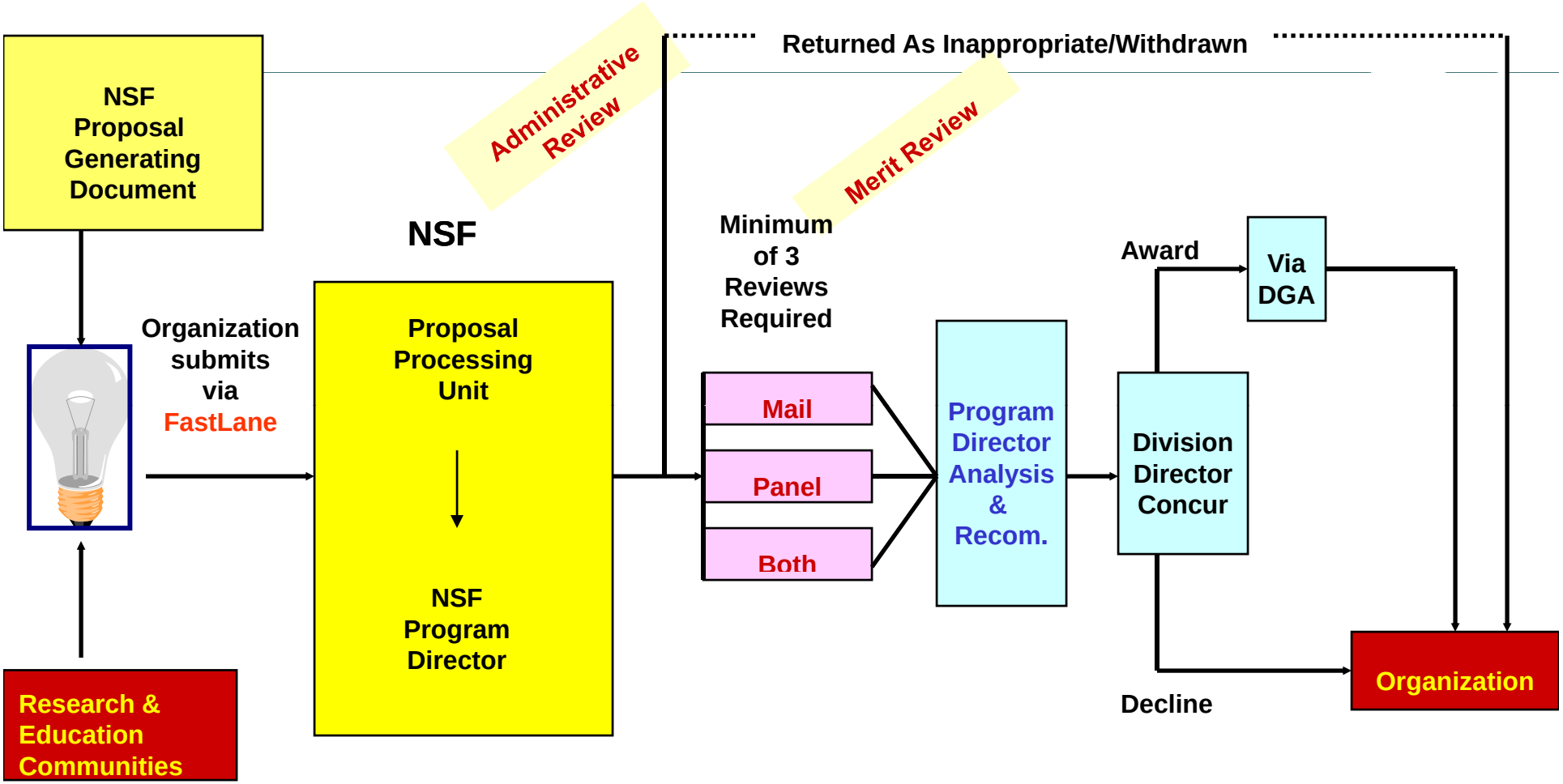
Basis for Decisions: Reviewer Input

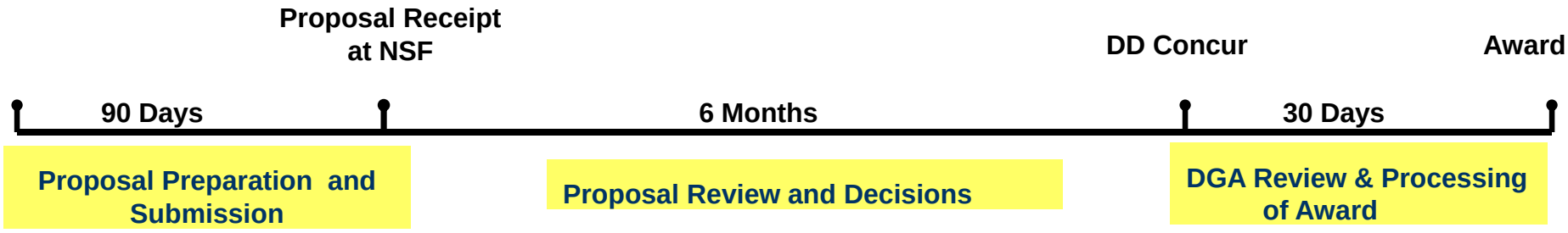
- **Reviews**
  - **Content/justification of the reviews by reviewers oftentimes is more important than just the rating**
- **Program Director uses reviews and panel summary/recommendation in award decisions**
  - **Fairness**
  - **How substantive the reviews are**
  - **Technical problems raised in 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**

NSF Proposal Review and Award Process & Timeline





NSF Proposal Merit Review Criteria

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

"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."

- **See official definition given on page 10 of *Enhancing Support of Transformative Research at the National Science Foundation*, by the National Science Board found at *http://nsf.gov/pubs/2007/nsb0732/nsb0732.pdf***

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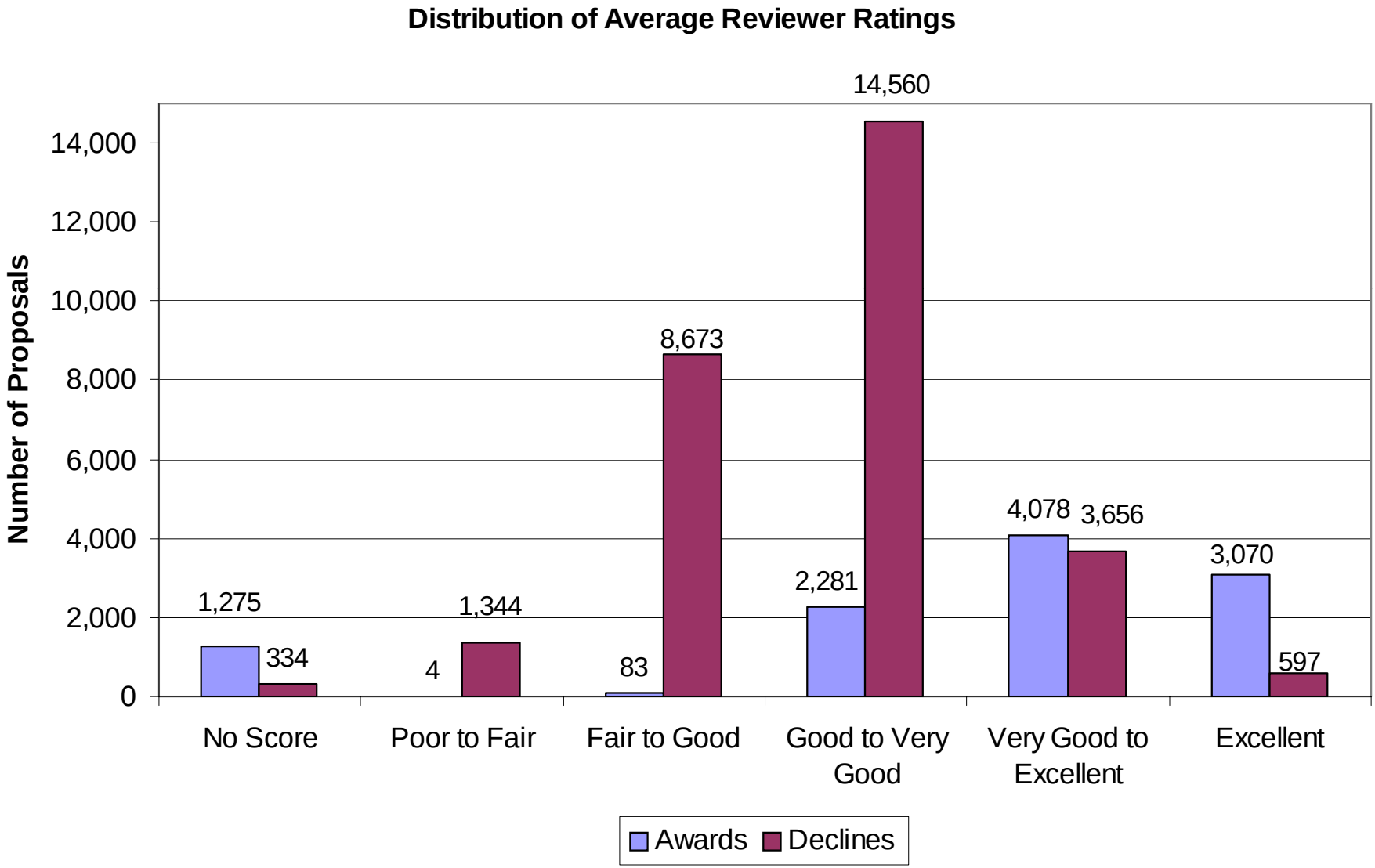
  - Creativity, originality, ***and potentially transformative***
  - Potential to advancing knowledge and understanding within and across fields
  - Conceptualization and organization
  - Qualifications of investigators
  - Access to resources
- The ***Broader Impacts*** of the proposed activity
  - Discovery 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
  - See ***http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf***

NSF Proposal Review Ratings



Number of <u>FY'03</u> 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**
  - **http://www.nsf.gov/about/budget/fy2011**
- **FY 2008 NSF Budget**
  - **http://www.nsf.gov/about/budget/fy2010**
- **Grant Proposal Guide (NSF 04-23)**
  - **http://www.nsf.gov/publications/pub_summ.jsp?ods_key=GPG**
- **Science and Engineering Statistics**
  - **http:// www.nsf.gov/statistics/**
- **General Information**
  - **http://www.nsf.gov/**