

Funding opportunities available at the NSF



National Science Foundation
WHERE DISCOVERIES BEGIN

By Robert Makowsky

Strongly encouraged by Kelly Vaughan

NSF Grant Awards

- Turnaround within 6 months
- Only 4.5% of budget goes to agency operation
- At NSF: 1200 employees, 300 contractors, 100 rotating scientists & engineers from academia
- From Scientific Community: 50,000 scientists & engineers participate in advisory system for proposal review

NIH vs NSF

- NSF has a broad mission: "To promote the progress of science". NIH has a narrower mission: "To improve the health of the people of the U.S." Nevertheless, the NSF budget (\$6.2 billion, 2007 request) is a fraction of the NIH budget (\$28.6 billion).
- Precise comparisons of average award size at NSF and NIH are difficult given great variation depending on discipline and grant mechanism.
- NSF is an independent federal agency; NIH is a cabinet-level agency (i.e. DHHS). Cabinet-level agencies tend to be more influenced by governmental directives.
- NSF is almost exclusively concerned with extramural support of research. NIH has a significant intramural research component.

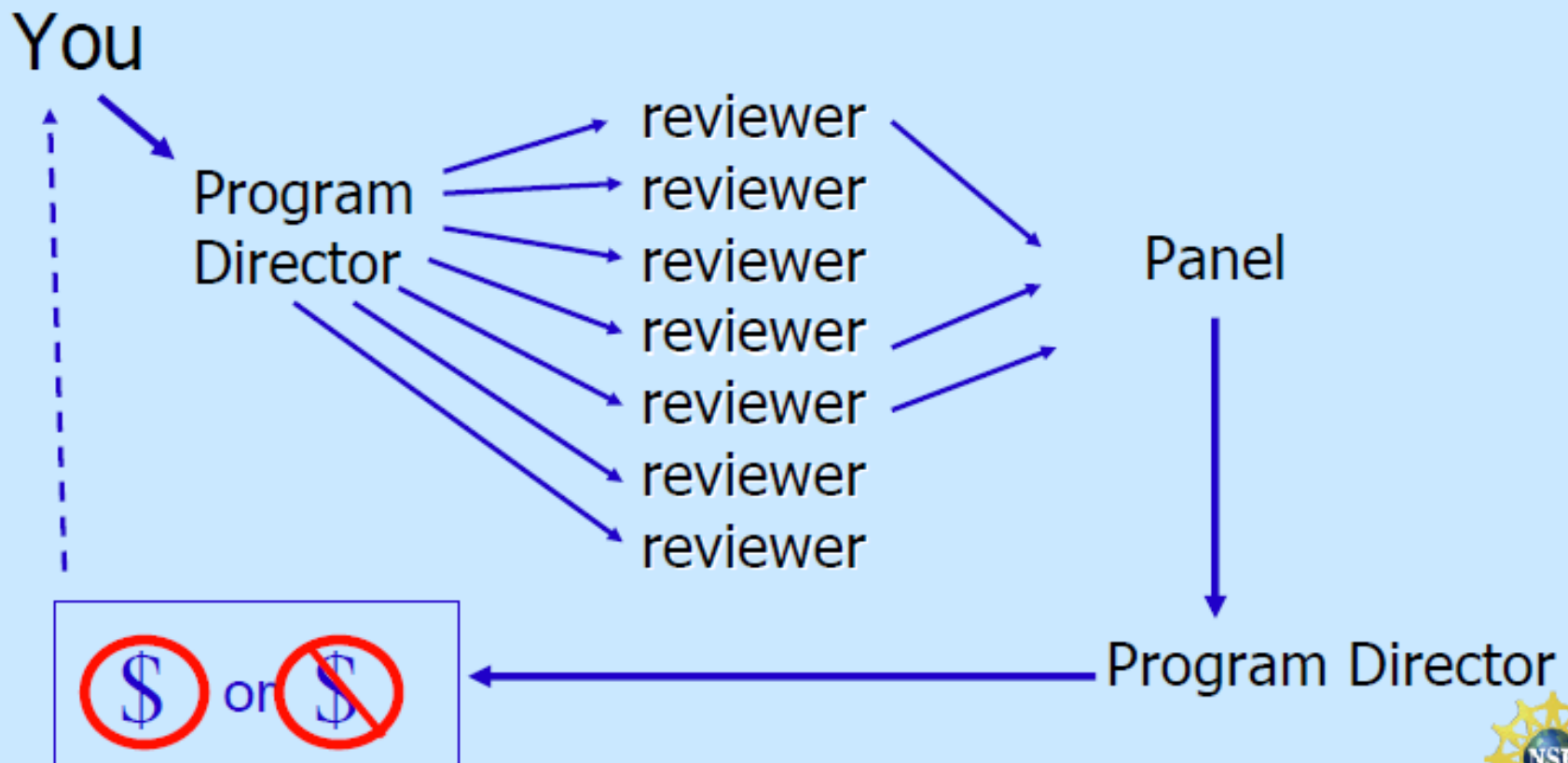
NIH vs. NSF continued...

- NSF grant review committees ("advisory panels") issue *recommendations* to the Program Directors who then draw up potential funding lists based on committee recommendations and funding priorities for the division. NIH grant review committees ("scientific review groups") issue priority scores and percentile rankings to an Advisory Council which considers Institute funding priorities (but rarely adjusts rankings).
- The size of the average NSF research grant is significantly less than that of the average NIH R01.
- Sometimes, NIH and NSF agree to jointly fund a project.

Review Process Overview

Four possible layers of review

Two distinct audiences – technical and general



NSF Core Strategies

- Develop intellectual capital (promote diversity in science and engineering (S&E), attract US students to S&E, promote public understanding of S&E, and support research on learning and teaching of S&E)
- Integrate research and education (invest in discovery and knowledge creation, accelerate progress and advance frontiers of knowledge in priority areas, invest in Centers, and enhance S&E research and education capability of individuals and institutions)
- Promote partnerships

NSF Strategic Goals

- People: A diverse, competitive, and globally engaged U.S. workforce of scientists, engineers, technologists and well-prepared citizens
- Ideas: Discovery across the frontier of science and engineering, connected to learning, innovation and service to society
- Tools: Broadly accessible state-of-the-art science and engineering facilities, tools, and other infrastructure that enable discovery, learning and innovation

NSF Priority Research Areas

- Adaptive Systems Technology
- NSF Centers Programs and Funding
- Climate Change Science
- Cyber-enabled Discovery and Innovation
- Cyberinfrastructure
- Dynamics of Water Processes in the Environment
- National Nanotechnology Initiative
- Networking and Information Technology R&D
- Science and Engineering Beyond Moore's Law
- Selected Crosscutting Programs

NSF Organization-Directories

- Directorate for Biological Sciences (BIO)
 - Directorate for Computer and Information Sciences (CISE)
 - Directorate for Education and Human Resources (EHR)
 - Directorate for Engineering (ENG)
 - Directorate for Geosciences (GEO)
 - Directorate for Mathematics and Physical Sciences (MPS)
 - Directorate for Social, Behavioral and Economic Sciences (SBE)
- Each **directorate** is divided into **divisions**, and divisions have **specific programs** and funding opportunities

Comments Associated with High Ratings

“This proposal suggests a clear, elegant, well-documented approach to a problem that has plagued this field for decades.”

“The PI has a beautiful plan. Undergraduates or new graduate students can step right into this work, yet it solves a major problem and will be publishable in a first-rate journal.”

“This is certainly adventurous, and I frankly would have doubted it could be done. Yet the PI has proven the method in preliminary work AND had it accepted by a peer-reviewed journal!”

“This reads like a dream. I have rarely seen a proposal, even from long-established investigators, that shows such careful thought and meticulous presentation.”

Problems Associated with Low Ratings

- No well defined hypotheses or tests of same. Lack of focus. “Why all the rambling, this seems like a fishing expedition.”
- Extraneous aspects or PIs. “What does that component/co-PI have to do with the central focus of the proposal?”
- Important information on experimental and sampling procedures is omitted. “I really can’t tell what is going to be done and how.”
- The work can certainly be carried out, but it doesn’t address any topic of broad current interest. “I would probably not read a paper describing the results.”
- Scope of the work is out of proportion to the budget and amount of time needed to do the work.

Working with your Program Director

What is the proper etiquette for dealing with program officers?

- Funding decisions are based on many factors, but **not on** personal relationships with program directors.
- Program Officers should be treated as you would a respected colleague.
- They are very busy: contact them only when necessary (check the agency web site first) and in a way that allows for an efficient reply (email is preferred).
- Do not contact them when you are upset (following a declination).

What makes for a competitive NSF proposal?

- Original ideas
- Succinct, focused project plan
- Cost effective
- Knowledge and experience in the discipline
- Experience in essential methodology
- Realistic amount of work
- Sufficient detail
- Strong rationale/evidence of effectiveness

General NSF Review Criteria

- What is the intellectual merit of the proposed activity?
- What are the broader impacts of the proposed activity?
- Additional criteria may be listed in the solicitation/announcement of opportunity.

Intellectual Merit – 5 components

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- How well qualified is the proposer to conduct the project?
- To what extent does the proposed activity explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to necessary resources?

NSF Broader Impacts

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the proposed activity broaden the participation of underrepresented groups?
- To what extent 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 society?

Who May Submit Proposals

- Universities and colleges – US universities and two- and four-year colleges (including community colleges) acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

NSF realities- You might not be competitive if...

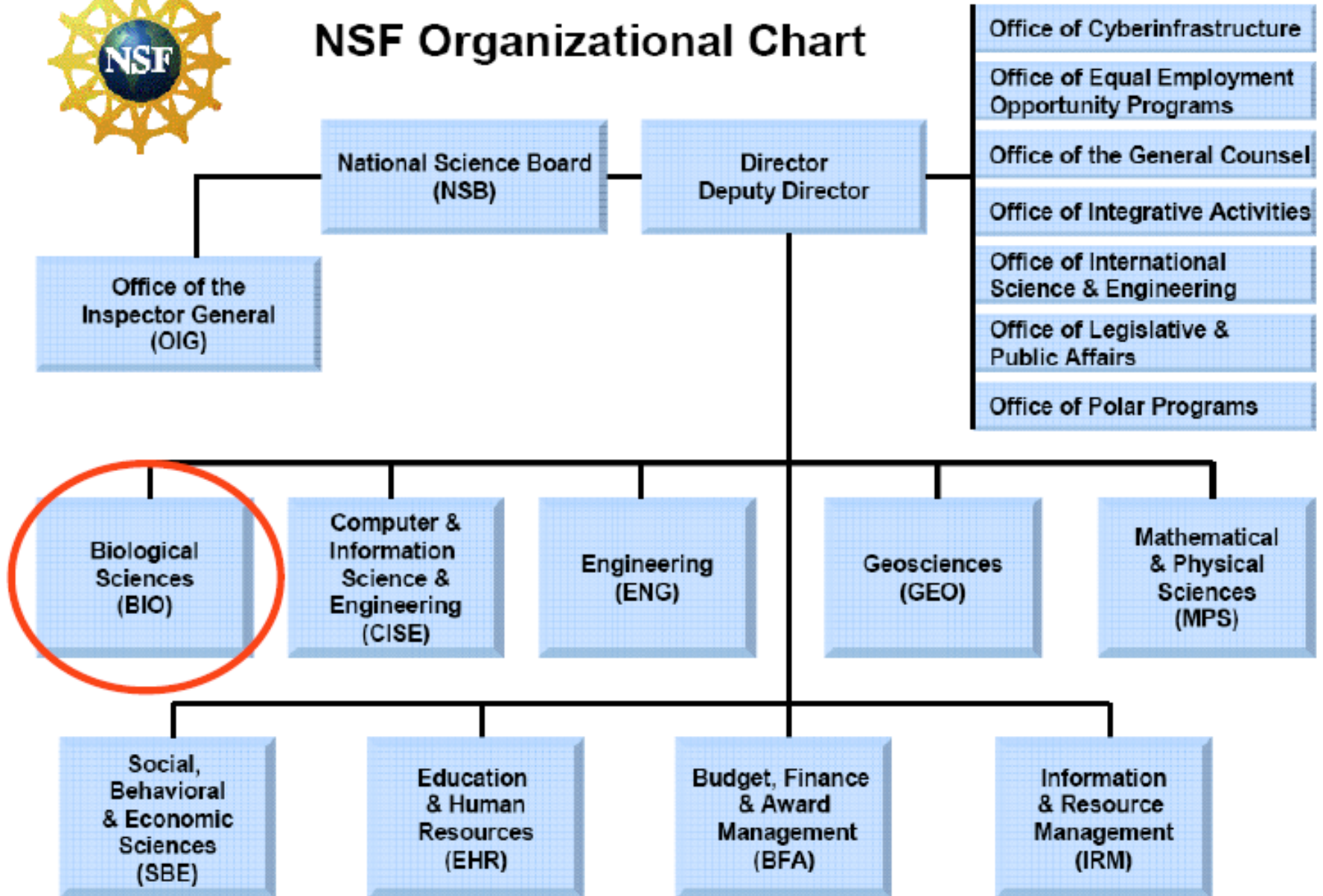
- Your work is clinically relevant
- You have an NIH R01
- You have >200K annual support from other sources
- You need 100% salary support
- You don't have Broader Impact

NSF Limitations

- Little money (<200K/year)
- Little time (3-4 years)
- Little salary support for PI (<20%)
- Can't submit the same project to NIH with NSF award. But, if your NIH got trashed and you can't resubmit.....



NSF Organizational Chart



Division of Biological Sciences

- Biological Infrastructure (DBI) – Human resources, research resources.
- Environmental Biology (DEB) – Ecology, ecosystem, population and evolutionary processes, systematics and biodiversity.
- Emerging Frontiers (EF) – Digitization, imaging, and enhancing photosynthesis.
- Integrative Organismal Systems (IOS) - Behavioral, developmental, neural, and physiological/structural systems.
- Molecular and Cellular Biosciences (MCB) – Biomolecular, cellular, and genes and genomes.

Types of NSF Grants

- R1- Similar to R01
- ROA- Research Opportunity Award:
- CAREER- Faculty Early Career Development Program
- RIG- Research Initiation Grant
- RUI- Research at undergraduate Institution
- SGERs (small Grants for Exploratory Research; <\$200,000 for 2 yrs)
- F- Graduate and post-graduate fellowships
- RAPID- Rapid Response Research-
- EAGER- Early-concept Grants for Exploratory Research
- FASED- Facilitation Awards for Scientists and Engineers with Disabilities
- Supplements (including REU, RET)
- Proposals for equipment, conferences, symposia, and workshops

NSF Opportunities for Grad. Students

Alliances for Graduate Education and the Professoriate
Arctic Research Opportunities
Centers of Research Excellence in Science and Technology (CREST) and HBCU
Research Infrastructure for Science and Engineering (RISE)
Developing Global Scientists and Engineers (International Research Experiences for Students (IRES) and Doctoral Dissertation Enhancement Projects (DDEP))
Doctoral Dissertation Improvement Grants in the Directorate for Biological Sciences
Dynamics of Coupled Natural and Human Systems
East Asia and Pacific Summer Institutes for U.S. Graduate Students
Ethics Education in Science and Engineering
Federal Cyber Service: Scholarship for Service
Graduate Research Fellowship Program
Integrative Graduate Education and Research Traineeship Program
International Research and Education: Planning Visits and Workshops
National STEM Education Distributed Learning
NSF Astronomy and Astrophysics Postdoctoral Fellowships
Pan-American Advanced Studies Institutes Program
Partnerships for International Research and Education
Postdoctoral Fellowships in Polar Regions Research
Presidential Awards for Excellence in Science, Mathematics and Engineering
Mentoring

NSF Opportunities for Grad. Students

Doctoral dissertation Improvement Grants (DDIG)

The National Science Foundation awards Doctoral Dissertation Improvement Grants in selected areas of the biological sciences. These grants provide partial support of doctoral dissertation research to improve the overall quality of research for Ph.D candidates. Allowed are costs for doctoral candidates to participate in scientific meetings, to conduct research in specialized facilities or field settings, and to expand an existing body of dissertation research. Generally \$12,000-\$15,000 for supplies.

NSF Opportunities for Post-Docs

Alliances for Graduate Education and the Professoriate

Arctic Research Opportunities

Centers of Research Excellence in Science and Technology (CREST) and HBCU Research Infrastructure for Science and Engineering (RISE)

International Research and Education: Planning Visits and Workshops

International Research Fellowship Program

NSF Astronomy and Astrophysics Postdoctoral Fellowships

NSF Earth Sciences Postdoctoral Fellowships

NSF Fellowships for Transformative Computational Science using cyber Infrastructure

Pan-American Advanced Studies Institutes Program

Partnerships for International Research and Education

Postdoctoral Fellowships in Polar Regions Research

Postdoctoral Research Fellowships in Biology

Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring

ASEE/NSF Corporate Postdoctoral Fellowship for Engineers

Intelligence Community (IC) Postdoctoral Research Fellowship Program

NSF Opportunities for Post-Docs

Postdoctoral Research Fellowships in Biology

- The Directorate for Biological Sciences (BIO) awards Postdoctoral Research Fellowships in Biology to recent recipients of the doctoral degree for research and training in *selected* areas supported by BIO and with special goals for human resource development in biology. The fellowships encourage independence at an early stage of the research career to permit Fellows to pursue their research and training goals in the most appropriate research locations regardless of the availability of funding for the Fellows at that site.

NSF Opportunities for Post-Docs cont...

- Because the fellowships are offered only to postdoctoral scientists early in their careers, NSF encourages doctoral advisors to discuss the availability of BIO fellowships with their graduate students early in their doctoral programs. Fellowships are awards to individuals, not institutions, and are administered by the Fellows.
- For 2011, interest lies in
 - Broadening Participation in Biology
 - Intersections of Biology and Mathematical and Physical Sciences

Success with the NSF

- If you really want to know the system
 - Serve as a reviewer or panelist
- If you get an award and want another
 - Do the work
 - Publish
 - Provide timely annual reports
 - Keep in touch with the PD
 - Serve as a reviewer or panelist

Preparing NSF Proposals

- Grant Proposal Guide (GPG)
www.nsf.gov/pubsys/ods/getpub.cfm?gpg
- NSF publication on broader impacts
<http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.
- NSF HomePage -- Guide to Programs
Program Announcements – eligibility, goals, special requirements
- Announcements – eligibility, goals, special requirements