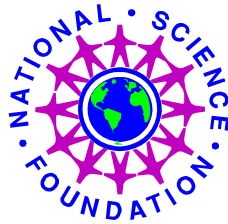


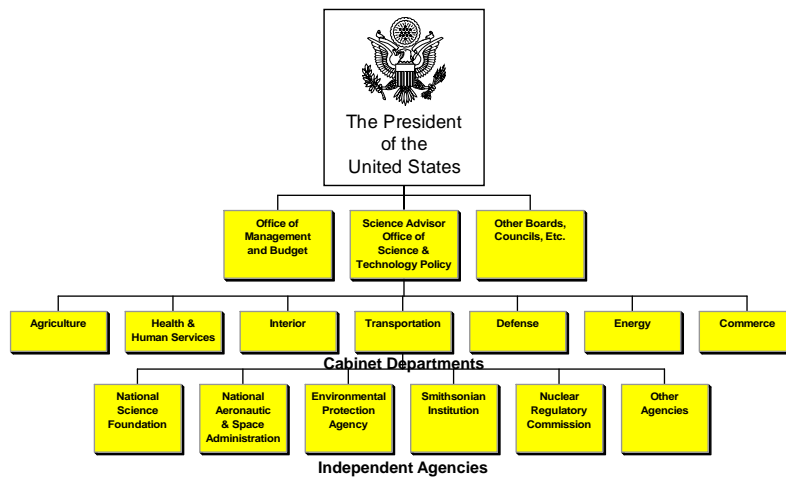
Funding Opportunities at the National Science Foundation



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NSF Is an Independent Agency of the Executive Branch of the U.S. Government



The Changing Context of Scientific Inquiry

- Increasing pace, scope, and impact of scientific discovery
- New modes of investigation
- Growing demands for scientific education and workforce development
- The need for change agents to spur transformational research

The NSF Mission

- To promote the progress of science
- To advance the national health, prosperity, and welfare
- To secure the national defense
(from the NSF Act of 1950)

The NSF Vision

Advancing discovery, innovation, and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering

NSF Strategic Outcome Goals

External Goals

- Discovery
- Learning
- Research Infrastructure

Internal Goal

- Stewardship

Discovery Investment Priorities

- Promote transformational, multidisciplinary research
- Investigate the human and social dimensions of new knowledge and technology
- Further U.S. economic competitiveness
- Foster research that improves our ability to live sustainably on Earth
- Advance fundamental research in computational science and engineering and in fundamental, applied, and interdisciplinary mathematics and statistics

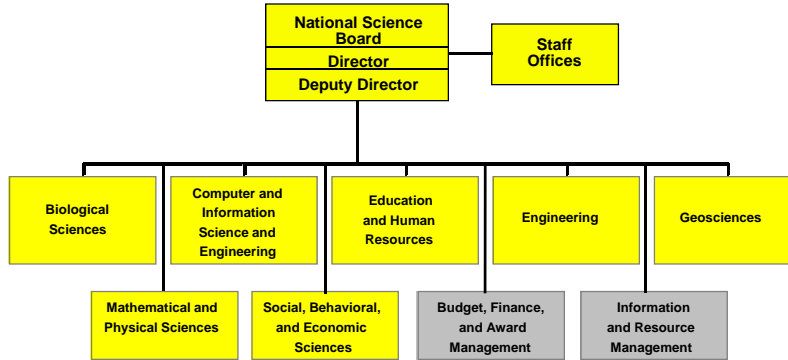
Learning Investment Priorities

- Build strong foundations and foster innovation to improve K-12 teaching, learning, and evaluation in science and mathematics
- Advance the fundamental knowledge base on learning, spanning a broad spectrum from animals and humans to machines
- Develop methods to effectively bridge critical junctures in STEM education pathways
- Prepare a diverse, globally engaged STEM workforce
- Integrate research with education, and build capacity
- Engage and inform the public in science and engineering through informal education

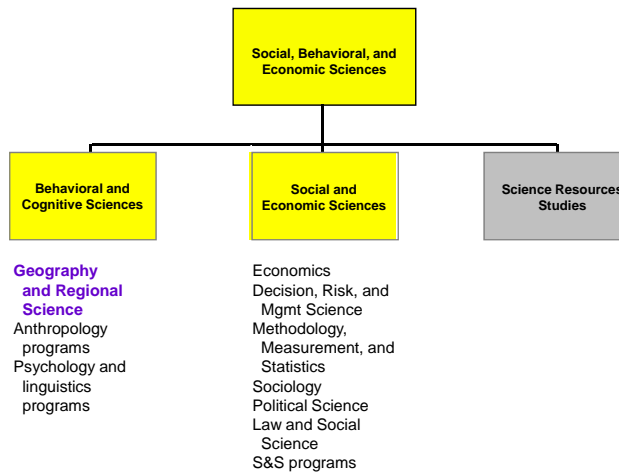
Research Infrastructure Investment Priorities

- Fill the gaps in our ability to provide enabling research infrastructure
- Identify and support the next generation of large research facilities
- Develop a comprehensive, integrated cyberinfrastructure to drive discovery in all fields of science and engineering
- Strengthen the nation's collaborative advantage by developing unique networks and innovative partnerships

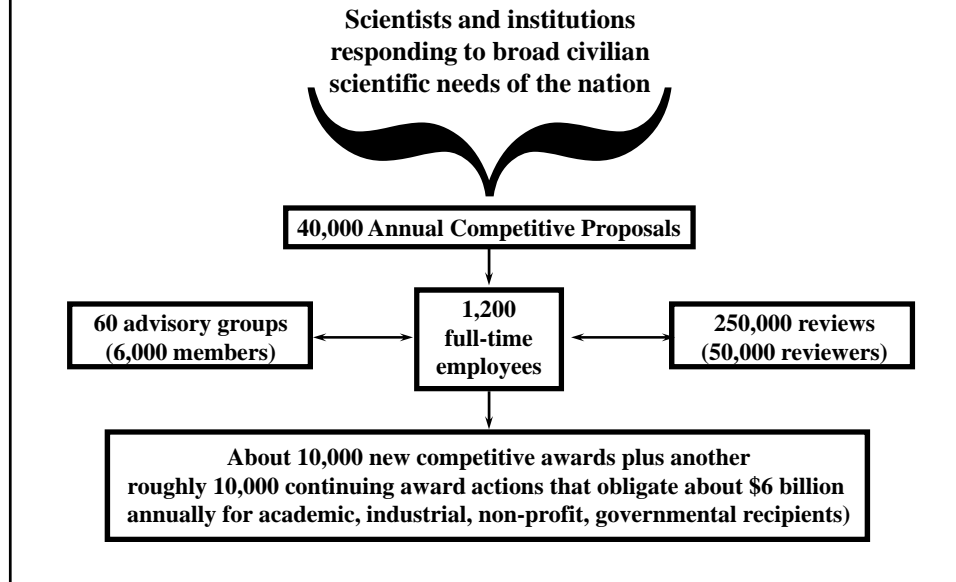
NSF Is Divided into Directorates



Directorates Are Divided into Divisions, and Divisions Are Divided into Programs



NSF Is a Science Management Agency



Much of NSF's Funding Goes to Support Basic Research

What is basic research?

"It's like true love!"



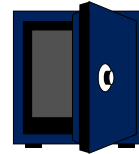
You can't really define it,
but you know it when it's there.

Let's Try to Describe Basic Research Anyway...

- It's research that contributes to general understanding.
- It's research that's well grounded in a general theoretical framework or that generates development of new frameworks.
- It's research that's valuable even if we don't care about its specific findings or applications.
- It's research that often increases our knowledge of how we expand our knowledge.



How Do You Gain Access to Some of NSF's Funds?



- Submit a proposal to compete in one of the standing program competitions for “unsolicited proposals”

GRS Target Dates: January 15 and August 15

- Submit a proposal for a special program competition like the Doctoral Dissertation Research Improvement Award competition

GRS DDRI Deadlines: February 15 and October 15



Geography and Regional Science Program

- GRS supports basic scientific research on a variety of problems associated with human, physical, and biotic systems on the Earth's surface, including:
 - Analyses of spatial characteristics and processes associated with these systems and their interactions at human scales.
 - Investigations into the nature, causes, and consequences of human activity within particular "places and spaces" and the extension to regional and global spheres.



Geography and Regional Science Program

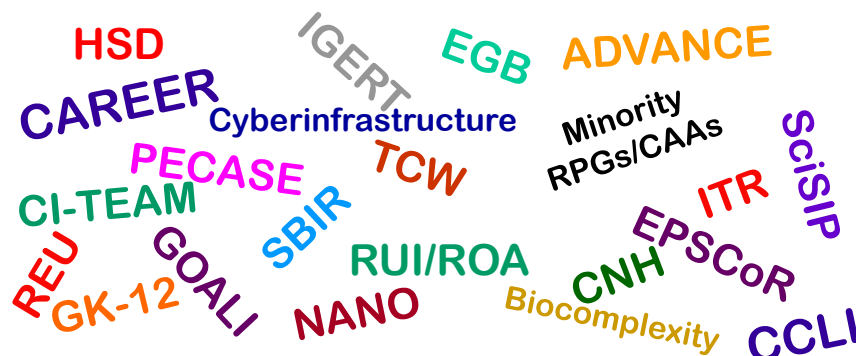
- Special concerns of the GRS Program:
 - Supporting the highest quality basic research to advance theoretical understandings in geography and related fields.
 - Advancing development of the people engaged in geographic research and education.
 - Supporting the development of new methods, tools, and resources for geographic inquiry.



Geography and Regional Science Program

- With rapidly increasing demands on limited funds, the GRS Program has been reevaluating its priorities:
 - We now are placing greater emphasis on activities whose significance extends more broadly. (“**Connectivity**” is strongly encouraged.)
 - We also are seeking to promote active involvement of geographers in interdisciplinary efforts.

In Addition to Its Standing Programs, NSF Has Many Special Funding Opportunities



Check the NSF Web site for more information
or contact relevant program officers

Current Major Emphases at NSF

- Major cross-cutting themes
 - Cyberinfrastructure
 - International Polar Year
 - Sensor Research
- Special emphasis on larger-scale, interdisciplinary teams addressing thematic issues
- Continued emphasis on enhanced integration of research and education
- Phase down of former priority areas (like Biocomplexity in the Environment) reflects a restructuring of how NSF's investment strategy is presented rather than a major shift in substantive emphasis.

Biocomplexity in the Environment

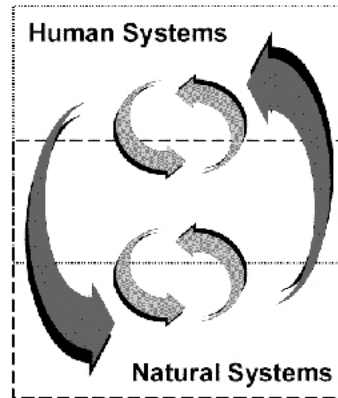
- Special competitions of FYs 2001 to 2005 have morphed or emerged as free-standing activities.
 - Coupled Biogeochemical Cycles (**CBC**) morphed into integrated natural cycles competitions.
 - Genome-Enabled Environmental Science and Engineering (**GEN-EN**) is morphing into an environmental genomics competition.
 - Instrumentation Development for Environmental Activities (**IDEA**) has been integrated into sensors competitions.
 - Materials Use: Science, Engineering, and Society (**MUSES**) has emerged as a free-standing program.
 - Dynamics of Coupled Natural and Human Systems (**CNH**) is reemerging into as a free-standing program.

Dynamics of Coupled Natural and Human Systems (CNH)

- Take key words in the competition title very seriously:

Dynamics of
Coupled
Natural and
Human
Systems

- Competition has morphed into a standing multi-directorate program.



Human and Social Dynamics

- SBE-led priority area has held annual competitions since FY 2004.
- Major emphasis areas:
 - Agents of change
 - Dynamics of human behavior
 - Decision making, risk, and uncertainty
- Complementary approaches:
 - Spatial social science
 - Modeling human and social dynamics

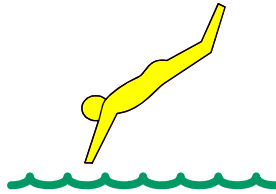
Human and Social Dynamics

- Teams must be multidisciplinary in character and propose truly interdisciplinary work.
- Initial competition had 6% success rate, but the success rate of more recent competitions has been about 25%.
- Next competition is likely to have proposal-submission deadlines in early 2008.

Be Aware of Special Funding Opportunities for Underrepresented Researchers

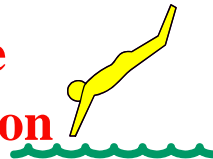
- Programs for researchers from underrepresented groups and minority institutions.
- Programs for researchers at predominantly undergraduate institutions.

How to Plunge Into the Research Funding Pool



**Some Advice on Obtaining Funding
from NSF (and Other Sources)**

Obtaining Funding Is Like Entering a Diving Competition



Your chances of success are best if you:

- Learn the rules of the competition.
- Learn which entries receive the highest marks.
- Learn how the competition is organized.
- Hone your skills and correct your defects.
- Take care to do your best.
- Realize that how you place will also depend on how well other competitors do.

How Do You Learn the Rules of NSF Competitions?

- Read and follow instructions in the NSF *Grant Proposal Guide*.
 - Publication is available online at <http://www.nsf.gov>
- Follow instructions in any special announcements or solicitations
- Contact the relevant program officer(s).
 - Phone numbers and e-mail addresses are available via WWW.

Learn Which Entries Receive the Highest Marks



Try to think like a program officer!

NSF Programs Are Engaged in “Reverse Alchemy”



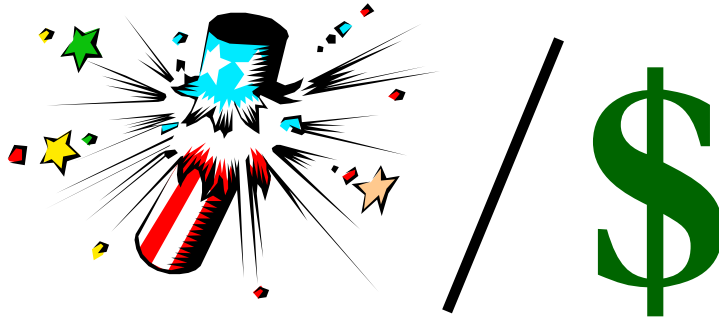
- We have “gold.”
- We want to invest it in “basic research.”
- We want to receive the best possible “return on investment.”

The “Investment Broker” Analogy Is Even Better

- We have funds to invest.
- We’re selecting from a range of options.
- We’re looking to invest in a portfolio that will maximize returns.



What Is the Crucial Ratio for a Program Officer?



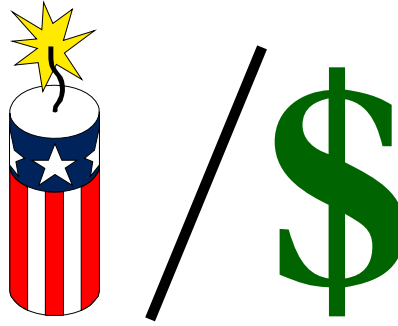
“Bang for the Buck!”

What Kind of “Bang” Is a Program Officer Looking For?

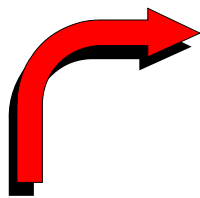
- Significant contributions to general scientific understandings.
- Enhancements of theoretical understandings in addition to any expansion of specific knowledge.
- Broader impacts, such as enhanced education, greater diversity, improved infrastructure or methods, and beneficial applications.
- Dissemination of results, especially in refereed, widely disseminated publications.

So What Is the Crucial Ratio for a Program Officer?

**Likelihood of
Significant
Contributions to
General Scientific
Understanding and
Broader Impacts**



“Potential Bang for the Buck!”



Decisions Will Be Based on NSF Merit Review Criteria

NSF now asks reviewers to comment
on two major criteria:

- **Intellectual merit**
- **Broader impacts**

The First Criterion:

What is the intellectual merit of the proposed activity?

The following are suggested questions to consider in assessing how well the proposal meets the criterion:

- How important is the proposed activity to advancing knowledge and understanding within its own field and across different fields?
- How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, please comment on the quality of prior work.)
- To what extent does the proposed activity suggest and explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to resources?

The Second Criterion:

What are the broader impacts of the proposed activity?

The following are suggested questions to consider in assessing how well the proposal meets the criterion:

- 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 (e.g., gender, ethnicity, geographic, etc.)?
- 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?

When You Prepare a Proposal, Think Like Those Who Will Evaluate It

- External reviewers

- They tend to be specialists; relevant theory and technical details matter.



- Advisory panel members



- They largely consist of generalists; so broader significance matters.

- Program officers

- We're the investors, seeking "big bangs for our bucks."



What's Included in a Competitive Research Proposal?

- An explanation of the theoretical framework within which the research question is set.
- Specification of the methods to be used to answer the question.
- Elaboration of how expected results will enhance the broader theoretical framework and make broader contributions.
- Biographical information about investigator(s).
- A budget with justification of expenses.

Some Tips on Writing a Competitive Research Proposal

- Try to answer any reasonable questions that reviewers might ask about your plans.



“Have an out-of-body experience” –
Reread your drafts from a reviewer’s perspective.

- Make sure your proposal is technically correct.
Careless writing and math imply careless scholarship.
- Convey your enthusiasm in your writing.
- Comply completely with the guidelines.

Use **FastLane** or **Grants.gov** as required for the specific competition. (Give yourself extra time if you must submit via Grants.gov -- as is now required for GRS.)

What Expenses Should Be Listed in a Budget?

All expenses necessary to complete the project.

- For every possible expenditure, ask yourself:
 - Is this expenditure necessary to complete the project?
-- or --
 - Would the research be diminished substantially if this expenditure is not made?



If you answer “**Yes**” to these questions...
Include the expenditure in the budget.

If you answer “**No**,” leave the item out
or reduce it to reasonable levels.



- Be cognizant of overall funding limits for awards and for a program or competition as a whole.



What If Your Proposal Is Funded?

- Work with the program officer(s) to ensure that the “Bang for the Buck” is maintained during any pre-award negotiations.
- Check with NSF regarding any significant changes during conduct of the project.
- Conduct the research properly and disseminate the results promptly.
- Regularly report findings, products, and contributions (even after the funding has ended).

What If Your Proposal Is Declined?



- Pause a while to let the pain subside somewhat.
- Evaluate the reviews.
 - If criticisms focus on correctable points, revise and resubmit the proposal.
 - If criticisms are more general, consider other funding sources or other lines of inquiry.
- If you have questions or want additional information, contact the program officer.

Some Related Advice from Some Colleagues

A Good Proposal

- A good proposal is a good idea, well expressed, with a clear indication of methods for pursuing the idea, evaluating the findings, and making them known to all who need to know.

The Ten (or so) Commandments for Proposal Writing



- Thou shalt have a brilliant idea.
- Thou shalt read the *Grant Proposal Guide* and the relevant program announcement or solicitation.
- Thou shalt explicitly address **Intellectual Merit** and **Broader Impacts** in the Project Summary.
- Thou shalt get help with proposal writing.
- Thou shalt write for the right audience.
- Thou shalt not irritate the reviewers with small fonts, dense type, and excessive jargon.

A Division Director's View of the Major Reasons Proposals Are Declined



- Proposals fail to establish a sound theoretical framework and/or are poorly related to relevant literature.



- Proposals fail to specify research methods in sufficient detail or have flawed research plans.



- Theoretical frameworks are sound and research plans are solid, but they don't match up with each other.

How to Develop a Proposal

- Determine the best possible funding sources.
- Give yourself plenty of **TIME**.
- Understand the ground rules.
 - Read announcements and instructions carefully.
 - Read the *NSF Grant Proposal Guide*.
 - Make sure your project really fits the program scope.
 - Look over prior award abstracts.
 - Ascertain evaluation procedures and criteria (see the solicitation).
 - Talk with NSF program officer about specific questions.
- Coordinate with your chair and research office.
- Ask successful PIs for copies of their winning proposals.

"Few things are harder to put up with than the annoyance of a good example." Mark Twain

Speaking of Time... A Suggested Timeline for Developing Proposals

3 months before the deadline	Develop prospectus for proposal and share it with colleagues as well as relevant agency program officers.
1 month before the deadline	Complete what you think is a very solid first draft of the entire proposal. Share it with colleagues and ask for honest, constructive advice.
2 weeks before the deadline	Use comments from colleagues to revise the proposal one or two more times.
1 week before the deadline	Forward the proposal to your sponsored projects office so that they can complete their work and submit the proposal a day or two before the deadline
5 months after the deadline	Politely ask the managing program officer when a decision might be made about your proposal (if you haven't heard about its status already).

Above All Else, Be Persistent!

Remember the words of Christopher Morley:



*“Big shots are just little shots
who keep shooting!”*

A Final Reminder...

- If you have questions, contact:
Your sponsored research office
Your NSF program officer
- If you need additional information:
Surf into the NSF Website
at <http://www.nsf.gov>



The NSF Staff Is at Your Service



Well, it's not quite that easy, but we will do whatever we can to help you make the strongest possible case for your projects.

Call or write!

Contact Information

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- **Consult the NSF web site to identify program officers for other programs or competitions.**