Overview of the National Science Foundation

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 - Research Administration Advisor—Pre-Award

- Select Slides courtesy of Beth Tranter, Chief of Staff, Office of Research, Virginia Tech
- NSF 15-004, NSB2015, and NSF Strategic Plan

Overview

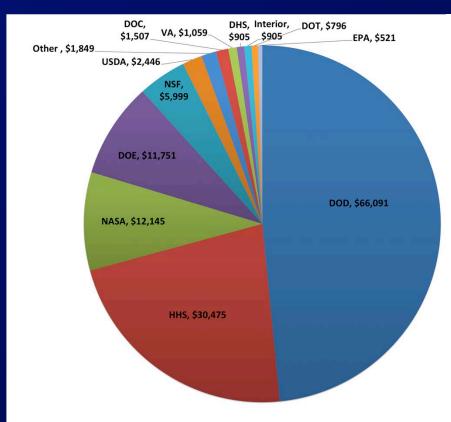
- Overview of NSF Structure and Operation
- Types of NSF Awards
- The National Science Board Merit Review Criteria
- Preparing the Proposal
- The NSF Proposal--Award Timeline



Overview of NSF Structure and Operation



The Federal Funding Landscape



Total R&D by Agency FY 2015

Budget Authority in Billion of Dollars

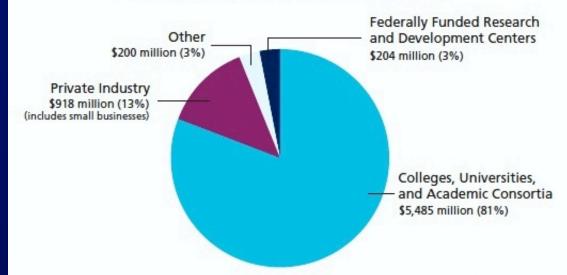
Total R&D = \$136,449 **Billion**

Source: AAAS R&D report series, based on OMB and agency R&D budget data.



INSTITUTIONS FUNDED BY NSF

FY 2014 Obligations for Research and Education Programs (\$6,807 million)

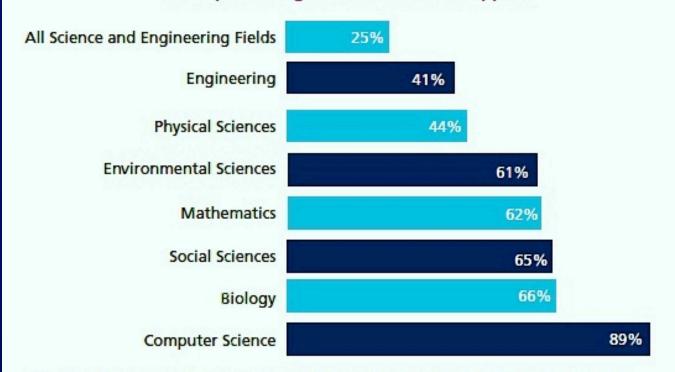


Note: NSF Research and Education Programs include Research and Related Activities, Education and Human Resources, and Major Research Equipment and Facilities Construction appropriations. Other institutions funded include federal, state, and local governments; nonprofit organizations; and international organizations. Totals may not add due to rounding.



NSF SUPPORT OF ACADEMIC BASIC RESEARCH IN SELECTED FIELDS

(as a percentage of total federal support)

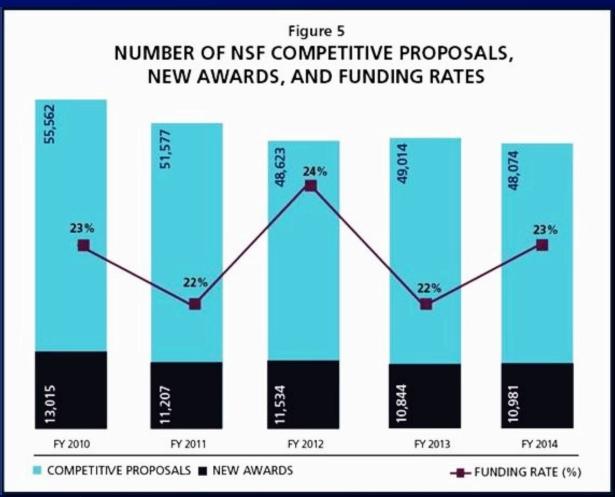


Note: Biology includes Biological Sciences and Environmental Biology; excludes National Institutes of Health.

Source: NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research & Development, FY 2013.



NSF Proposals and Funding Rate



NSF Organization Chart

http://www.nsf.gov/staff/organizational_chart.pdf http://www.nsf.gov/staff/orglist.jsp

DIRECTORATE FOR

(GEO)



Allison C. Lerner, Inspector General













INFORMATION SCIENCE &

ENGINEERING (CISE)



DIRECTORATE FOR

EDUCATION & HUMAN



DIRECTORATE FOR

ENGINEERING





IRECTORATE FOR

PHYSICAL SCIENCES



CONOMIC SCIENCES





The University of Mississippi

NSF Award Types



What does NSF Fund?

- Research Proposals
- Graduate Research Fellowships
- Equipment proposals (Major Research Instrumentation, etc.)
- Conferences, symposia and workshops
- International travel proposals
- Collections Development
- Major Research Equipment and Facilities Construction (rarely)
- Facilitation proposals for Scientists and Engineers with Disabilities (FASED)
- Antarctic Artists and Writers' Program
- Joint solicitations with other agencies
- and more!!!!!



Types of Announcements

- Program Descriptions (PDs)
 - "Investigator initiated research"
- Program Solicitations/Announcements (PAs)
- Supplements (including REU, RET, International)
- Dear Colleague Letters (DCLs)
- Crosscutting Program Solicitations:
 - Cross-Directorate Programs (CAREER, MRI, GOALI, SusChEM, etc.)
 - Centers (I/U-CRC, ERCs, STCs, NSECs, SLCs, MRSECs, etc.)



Types of Awards

- Standard grants
- Supplements to standard grants (REU, RET, International etc)
- Cooperative agreements
- Contracts
- Graduate Research Fellowship Program (GRFP) Individual awards, but funding flows through the institution.
- RAPID and EAGER Projects

The National Science Board Merit Review Criteria



Merit Review Criteria

- What is the intellectual merit of the proposed activity?
- What are the broader impacts of the proposed activity?
- Program-specific criteria may be listed in the program announcement

Merit Review Criteria

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge;
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

Five Review Elements

THIS SLIDE IS THE **OFFICIAL WORDING REVIEWERS GO BY**

The following elements should be considered in the review for BOTH criteria:

- 1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
- 2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- 3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
- 4. How well qualified is the individual, team, or organization to conduct the proposed activities?
- 5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Intellectual Merit

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

Transformative Research

- Involves ideas, discoveries, or tools that radically change our understanding of an important existing scientific or engineering concept or educational practice or leads to the creation of a new paradigm or field of science, engineering, or education. Such research challenges current understanding or provides pathways to new frontiers.
- Characteristics of transformative research are that it:
 - Challenges conventional wisdom
 - Leads to unexpected insights that enable new techniques or methodologies, and/or
 - Redefines the boundaries of science, engineering, or education

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 women and underrepresented groups? ("Diversity")
- 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?

* Note: these bullets are to stimulate ideas on achieving desirable societal outcomes; Broader Impact review criteria are nearly the same as they are for Intellectual Merit.

Implications for Broader Impacts, and the emergence of national goals

- Increased economic competitiveness of the United States
- Development of a globally competitive STEM workforce
- Increased participation of women, persons with disabilities, and underrepresented minorities in STEM
- Increased partnerships between academia and industry
- Improved pre K-12 STEM education and teacher development
- Improved undergraduate STEM education
- Increased public scientific literacy and public engagement with science and technology
- Increased national security
- Enhanced infrastructure for research and education, including facilities, instrumentation, networks and partnerships

The Importance of Merit Review Criteria

"NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary." - Grant Proposal Guide, Ch. III

The Project Description must contain, as a separate section within the narrative, a section labeled "Broader Impacts of the Proposed Work" (GPG Ch, II)

Proposal Preparation



PREPARING the Proposal

- The proposal is more than just the "narrative"
- FOLLOW the NSF Guidelines for each section
 - Compliance Review

Major Proposal Components

- Cover Page
- Project Summary (1 page)
- Project Description (15 pages)
- References Cited
- Biographical Sketches
- Budget
 - Budget Justification (3 pages)
- Current and Pending Support
- Facilities, Equipment, and Other Resources
- DATA MANAGEMENT PLAN
- POST DOC MENTORING PLAN
- Other Special Information and Supplementary Documentation (only if authorized)

Cover Page

- Identify the Funding Opportunity
- Proposal Title
- Start Date and Duration
- Co-Pls
- Compliance issues (human subjects, animal subjects, etc.)
- Other details of the proposal



Project Summary

- Three required sections
 - Overview
 - Intellectual Merit
 - Broader Impacts
- Maximum 4600 characters combined; Cannot exceed 1 page
- Generally written in the third person
- NOT an abstract of the project
- Should stress significance and innovation
- Summarize project overall goal(s) objectives
- List methods to be employed
- Identify expected outcomes
- The Entire structure of the Summary is a **Compliance Review Item

Project Description

(15 pages)

- Detailed description of the project's overall purpose, specific objectives and expected significance
- Relation to longer-term goals of researcher(s)
- Contribution to present state of knowledge
- Results from prior NSF support, if any (5 pp. max.)
 - **Compliance Review Item
- Clear description of experimental methods and procedures
- Detailed work plan, with major tasks and timelines
- Address broader impacts of project (*specified section with title)
 **Compliance Review Item
- Plans for dissemination of outcomes

* "Broader Impacts of the Proposed Work"



References

- This section is required
- Include: Author(s), article and journal title, vol. #, page numbers, year of publication
- If available electronically, include url
- Follow an accepted scholarly format
- Do NOT include commentary parenthetical to narrative!
- No page limit



Biographical Sketches

- Required for Senior Personnel (PI's, co-PI's and Faculty Associates)
- Two-page limit, NSF format required **Compliance Review Item:
 - Professional preparation
 - Appointments
 - Publications (5 directly related and 5 other)
 - Synergistic activities (up to 5)
 - Collaborators and other affiliations
 - Optional: Other personnel w/exceptional qualifications may be listed (Postdocs, GRA's, etc.)

Budget

- Must be supplied for each year of project duration
- Justification required for all major items (3-page limit)
- Must match project design and work plan EXACTLY!
- Details on budget structure, allowable costs, etc., may be found in the GPG, Sections II-10 thru II-17.
- Remember: The budget should be exactly what the project requires; no more, no less. Deliberate padding or "lowballing" is quickly spotted.

Current And Pending Support

- Required for Senior Personnel (PI's, co-PI's and Faculty Associates)
- Status of the support (Current, Pending, or Submission Planned in Near Future)
- Title of project
- Source of Funding
- Project Period
- Place of Performance
- Effort committed



Facilities, Equipment and Other Resources

- Used to assess the adequacy of the organizational resources available to complete the project successfully
- Must describe only those resources that are directly applicable to the project
- DO NOT include a laundry list of all equipment in your lab

Data Management Plan

- All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans.
- 1. the types of data, samples, physical collections, software, curriculum materials, and other materials to be produced;
- 2. the standards to be used for data and metadata format and content
- 3. policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
- 4. policies and provisions for re-use, re-distribution, and the production of derivatives; and
- 5. plans for archiving data, samples, and other research products, and for preservation of access to them.

Post Doc Mentoring Plan

- Each proposal that requests funding to support postdoctoral researchers must include, as a separate section within the 15-page Project Description, a description of the mentoring activities that will be provided for such individuals.
- Examples of mentoring activities include, but are not limited to: career counseling; training in preparation of grant proposals, publications and presentations; guidance on ways to improve teaching and mentoring skills; guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas; and training in responsible professional practices.
- The proposed mentoring activities will be evaluated as part of the merit review process under the Foundation's broader impacts merit review criterion.
 Proposals that do not include a separate section on mentoring activities within the Project Description will be returned without review.
 - **Compliance Review Item



Collaborative Proposals

- Proposals from 2+ institutions linked together in FastLane with one lead organization
 - Each institution is awarded funds separately by NSF, but work together as a common unit on research
 - Lead organization will link proposals from collaborative institutions by using a temporary proposal # and PIN
 - Lead organization officially submits proposal first, then collaborators submit online
 - IMPORTANT: All collaborators must submit to NSF in a reasonable timeframe, usually same day. Failure to do so may cause the proposal to be rejected.
- Alternative: Lead institution subcontracts to collaborators

PROPOSAL SUBMISSION

- Proposals are generally submitted via the NSF FASTLANE system
- PI prepares the proposal in FASTLANE with assistance/input from ORSP
- ORSP (the Authorized Institutional Representative) submits the proposal
- NSF allows optional use of Grants.gov for proposal submission, but ORSP currently discourages this practice



PHASE I – PROPOSAL PREPARATION AND SUBMISSION – 90 DAYS

- 1 Opportunity Announced. All funding opportunities are announced on the NSF website and Grants.gov. Program Descriptions, Program Announcements and Program Solicitations are mechanisms used by NSF to generate proposals. Unsolicited proposals to specific NSF programs may be submitted at any time.
- **2 Proposal Submitted.** The Grant Proposal Guide (GPG) is the source for guidance on preparing and submitting a proposal to NSF. The GPG details formatting and submission requirements. The proposing organization submits the proposal to NSF via the NSF FastLane System.
- **3 Proposal Received.** Proposals are received by the NSF Proposal Processing Unit and are assigned to the appropriate program for acknowledgement and, if they meet NSF requirements, for review. A proposal may be returned without review if it does not meet NSF proposal preparation requirements, such as page limitations, formatting instructions, and electronic submission, as specified in the GPG or program solicitation. The GPG identifies all of the reasons for which a proposal may be returned without review.

http://www.nsf.gov/bfa/dias/policy/merit_review/illustration.pdf

PHASE II – PROPOSAL REVIEW AND PROCESSING – 6 MONTHS

- 4 Reviewers Selected. Reviewers are selected based on their specific and/or broad knowledge of the science and engineering fields; their broad knowledge of the infrastructure of the science and engineering enterprise, and its educational activities; and to the extent possible, diverse representation within the review group. Sources of reviewers can come from the program officer's knowledge of the research area; references listed in the proposal; recent professional society programs; computer searches of science and engineering journal articles related to the proposal; reviewer recommendations included in proposal or sent by email. Proposers are invited to suggest persons they believe are especially well qualified to review the proposal, as well as identify persons they would prefer not review the proposal.
- 5 Peer Review. All NSF proposals are reviewed through use of the two NSB-approved merit review criteria: Intellectual Merit and Broader Impacts. Some solicitations may have additional review criteria. External reviewers' analyses and evaluation of the proposal provide information to the NSF Program Officer in making a recommendation regarding the proposal.
- **6 Program Officer Recommendation**. After scientific, technical and programmatic review, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be recommended for an award or declined for funding. Due to the large number of proposals received, the review and consideration process can take up to six months. Large or particularly complex proposals may require additional review and processing time.
- 7 Division Director Review. If the decision is made to decline the award, the organization is notified and review information is available in the FastLane System. If the decision is to award, the recommendation is submitted to a Grants & Agreements Officer in the Division of Grants and Agreements (DGA).

PHASE III - AWARD PROCESSING - 30 DAYS

- **8 Business Review.** The Grants and Agreements Officer in the Division of Grants and Agreements (DGA) conducts a review of business, financial, and policy implications. Generally, DGA makes awards within 30 days after the program office makes its recommendation. Additional processing time may be required if: the organization has not received prior funding: if the award is a cooperative agreement; or it involves special situations (such as coordination with another Federal agency or a private funding source).
- **9 Award Finalized.** The award itself is comprised of an award notice, budget, proposal, applicable NSF conditions, and any other documents or requirements incorporated by reference into the agreement. Each NSF award notice specifically identifies certain conditions that are applicable to, and become part of, that award.

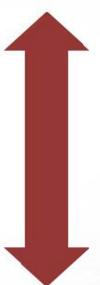
Note: This time frame typically does <u>not</u> apply to large-scale awards (~\$20-\$40M) such as Centers. Centers often take 2 years to complete the cycle from proposal announcement to award.

The Proposal Review Process

Individual rankings:

Panel recommendations:

- "Excellent"
- "Very Good"
- "Good" (not good!)
- "Fair"
- "Poor"



Remember: Program Directors have some flexibility

Takeaways

- Follow the guidelines
 - NSF is diligent about proposal compliance
- Contact ORSP early and often for assistance
- Think about all elements (narrative, personnel/ collaborators, budget, resource needs) as a cohesive whole
- QUESTIONS???



Most Recent Primary Source Data (FY14)

- NSF Performance and Financial Highlights: http://www.nsf.gov/pubs/2015/nsf15004/nsf15004.pdf
- National Science Foundation's Merit Review Process: http://www.nsf.gov/nsb/
 publications/2015/nsb201514.pdf

