How NSF Makes Awards: Insights from Inside the Black Box

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Overview

- Agency Mission, Organization & Function
- Proposal Review & Award Recommendation Process
- Why Proposals Get Declined
- General Tips and Other Information

My Situation at NSF

- August 2014 - August 2017
- Geography & Spatial Sciences Program (SBE Directorate)
  - Co-reviews proposals with ~27 other programs
- Cross-Directorate:
  - Dynamics of Coupled Natural & Human Systems
  - Working Group on Navigating the New Arctic
- International: Belmont Forum – Transformations to Sustainability Initiative
- Other:
  - SBE Science of Broadening Participation WG
  - PoC – HBCU Dear Colleague Letter

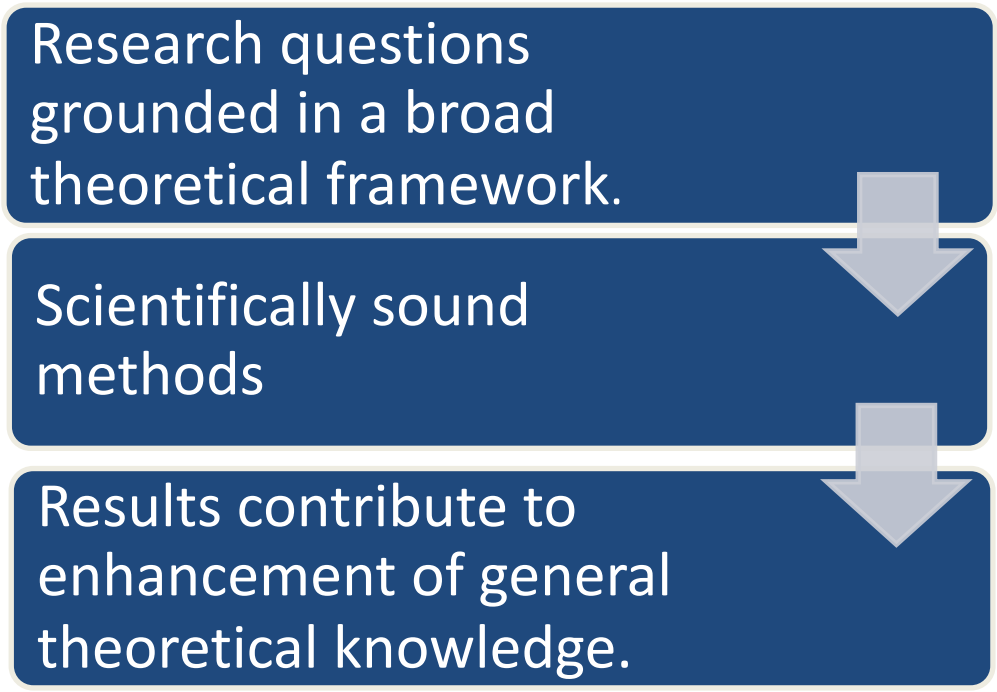
Agency Vision & Mission

- To promote the progress of science;
- To advance the national health, prosperity, and welfare;
- To secure the national defense.

(NSF Act of 1950)

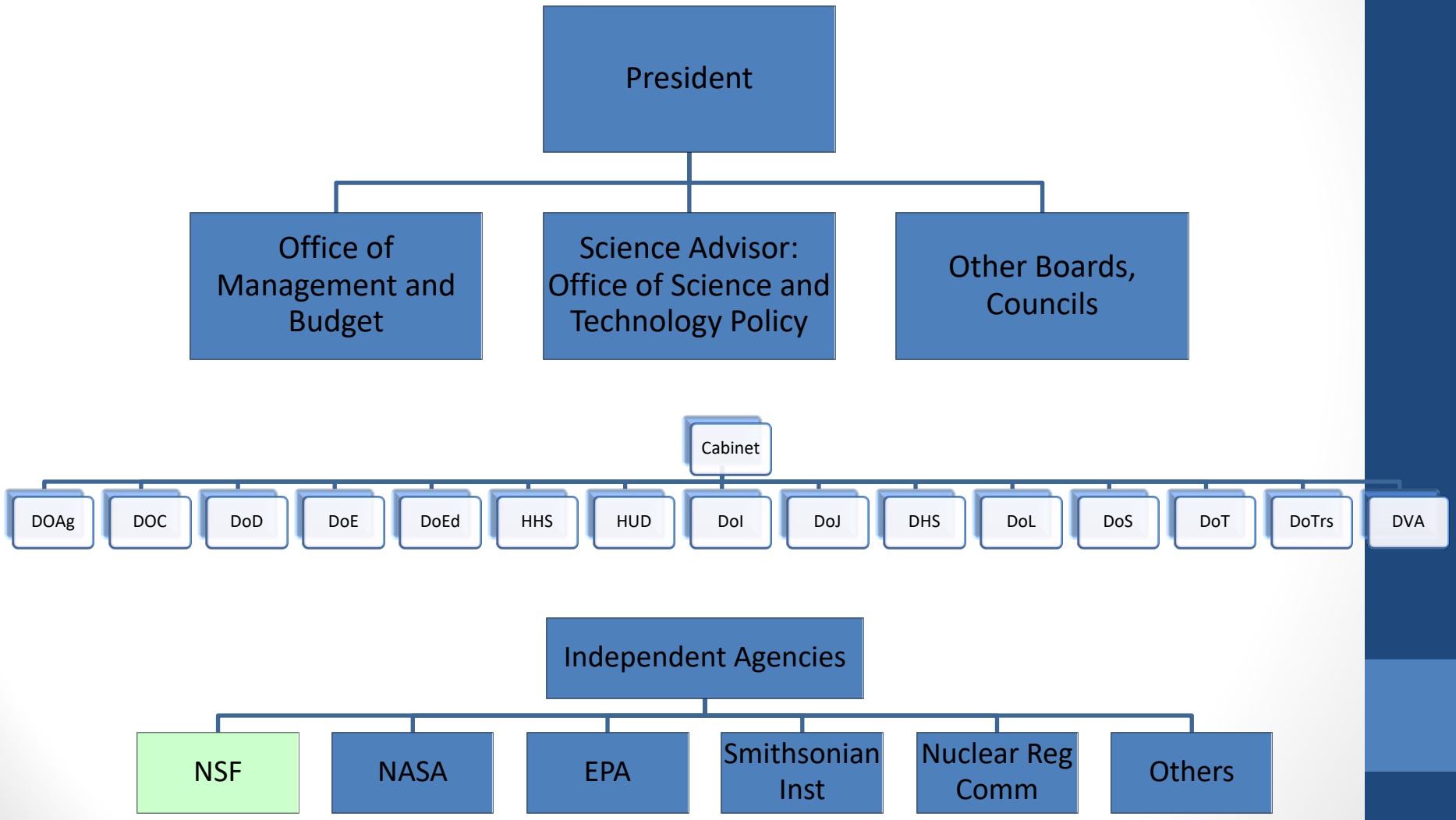
A nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education.

NSF funds *Basic Science Research.*

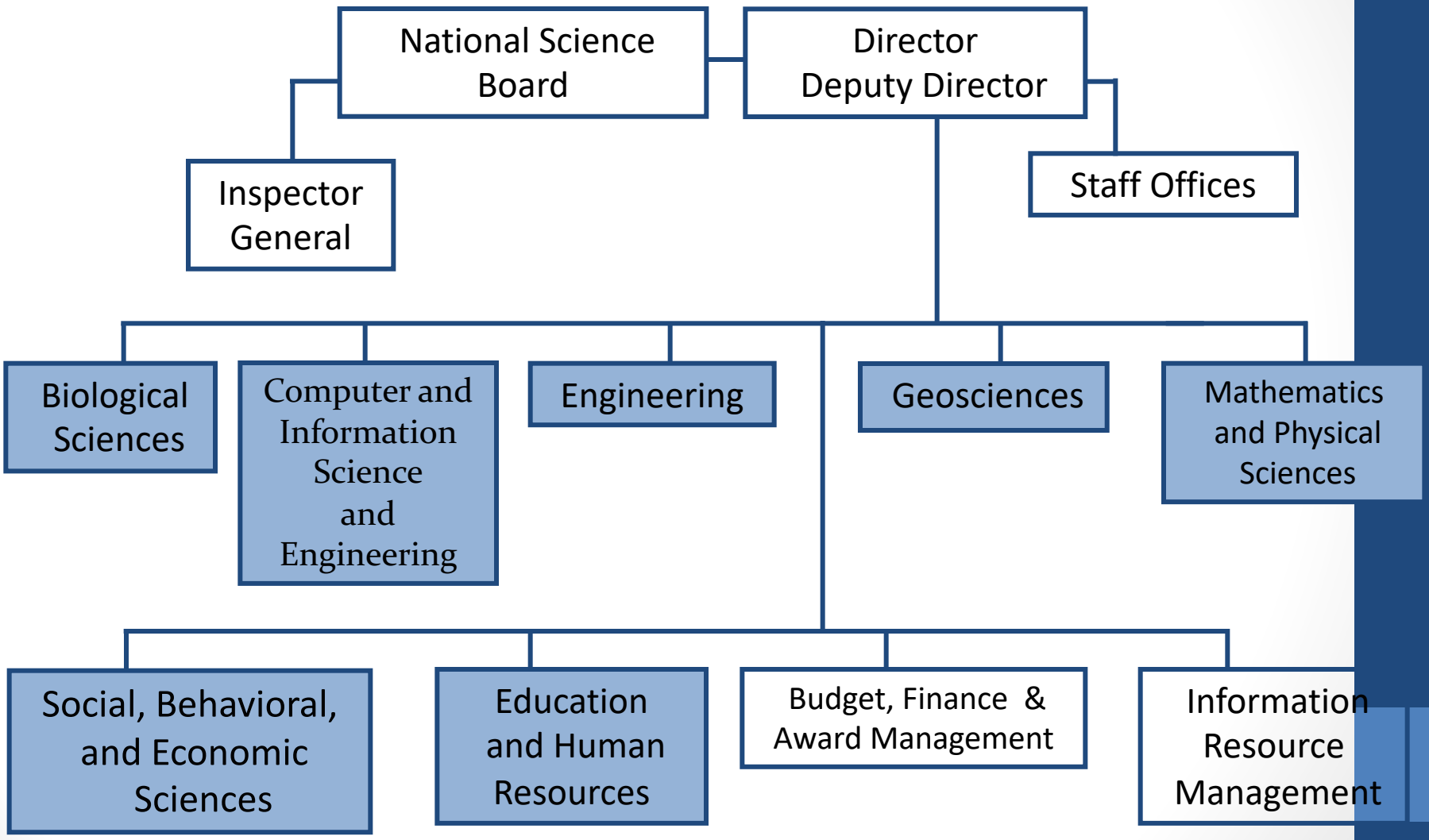


NSF does not fund Clinical Research.
NSF does not fund solely Applied Research.
NSF DOES fund research using Qualitative Methods.
NSF DOES fund international research.

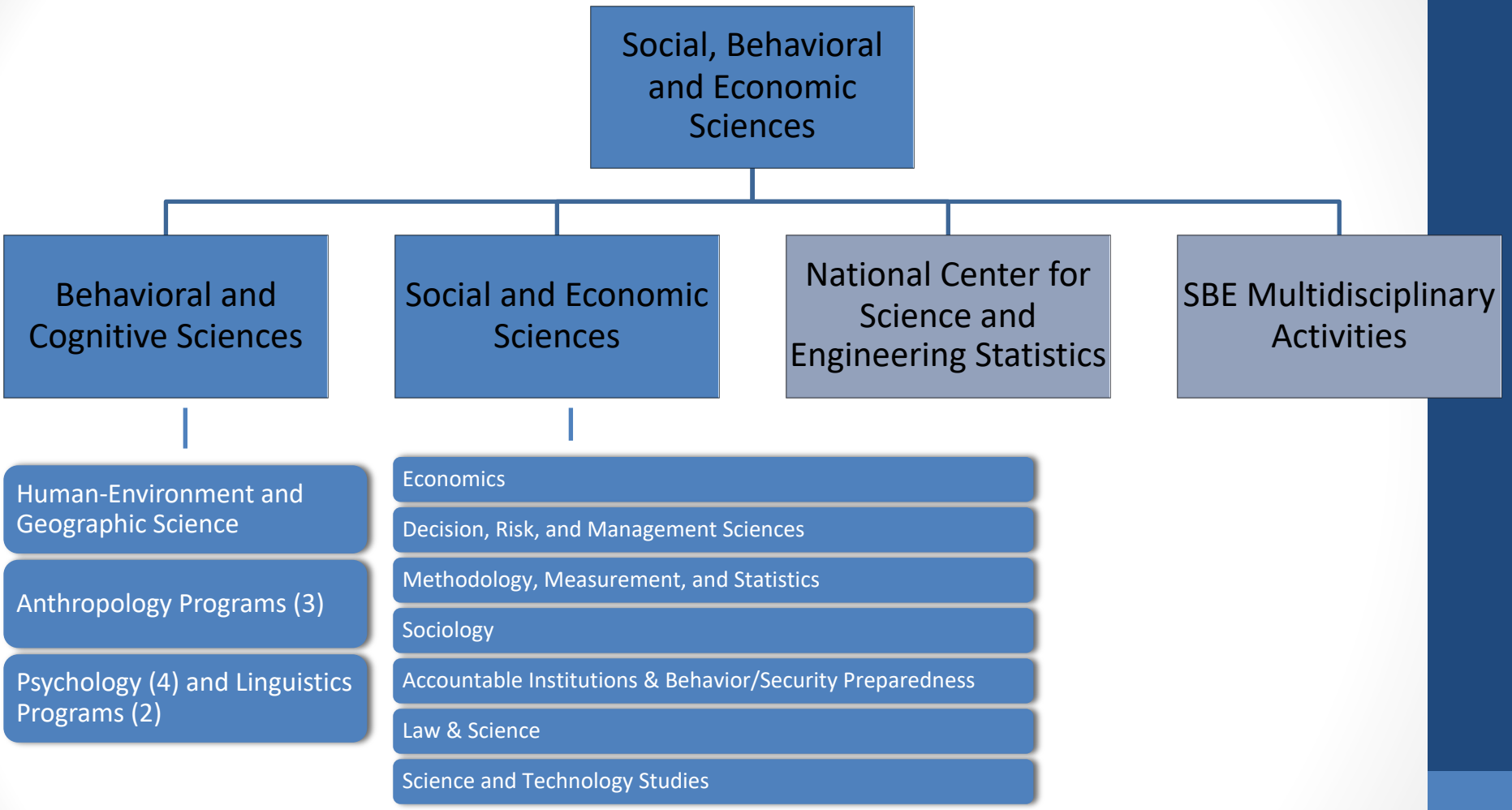
An independent agency of the Executive Branch of the U.S. Government



Agency Organization & Function



Directorates => Divisions =>Programs, Sections or Clusters



=> Consult cognizant Program Officers for program specific information and READ Program Solicitations carefully!

Agency Organization & Function

- Core Programs - Disciplinary-based
- Cross-Directorate (interdisciplinary) Programs, e.g.:
  - Innovations at the Nexus of Food-Energy-Water (INFEWS)
  - Smart & Connected Communities (SCC)
- Special Initiatives (announced via Dear Colleague Letters):
  - Science of Broadening Participation
  - COVID RAPID funding
- International Initiatives:
  - SBE-RCUK Agreement (now SBE-UKRI)
  - Belmont Forum (e.g., Transdisciplinary Research for Ocean Sustainability)
- Rotating Program Officers (aka Director or Managers) & Merit Review Process

Merit Review Process

Merit Review Criteria

- Intellectual Merit: Potential to advance knowledge
  - To what extent do the proposed activities suggest and explore creative, original, or ***potentially transformative*** concepts?
  - Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a ***sound rationale or methodology***?
- Broader Impacts: Potential to benefit society and contribute to the achievement of specific desired societal outcomes.
- Program-specific Special Review Criteria

Examples of Broader Impacts

- Improved STEM education and/or educator development
- Development of a diverse scientific workforce
- Enhanced infrastructure for research & education
- Increased public scientific literacy and/or public engagement with science and technology
- Knowledge, products, and other contributions of direct value to society
- Enhanced international scientific collaborations
- Contributions to public policy; national security; improved U.S. economic competiveness

Multi-faceted Review Process

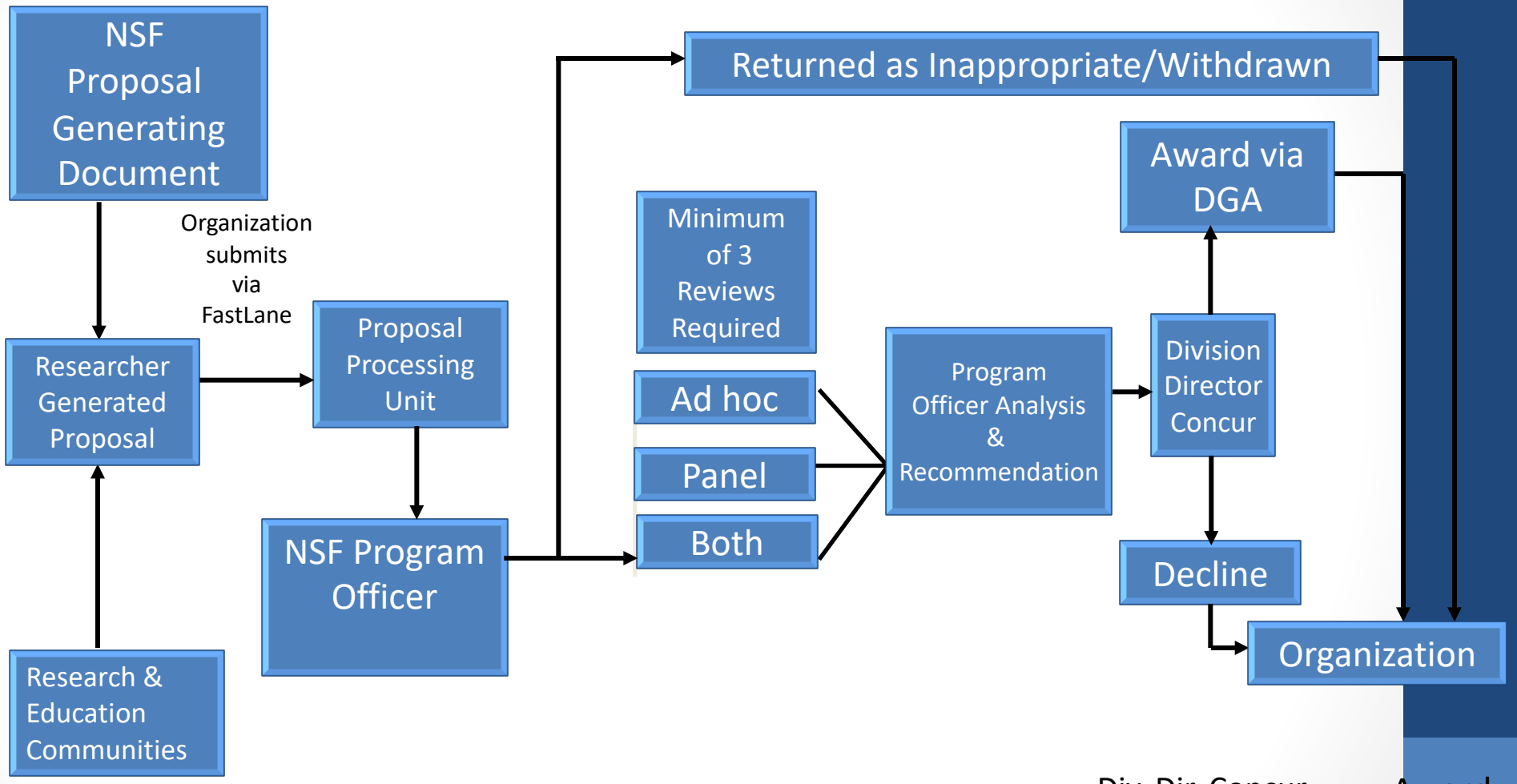
- External (Ad Hoc) Reviewers
  - Specialists, so relevant theory and technical details matter.

- Advisory Panel Members

  - Generalists, so broader significance matters.

- Program Officers
  - Investors seeking “big bangs for their bucks.”

Award Process Time - ~ 6 months



Recommendation Process

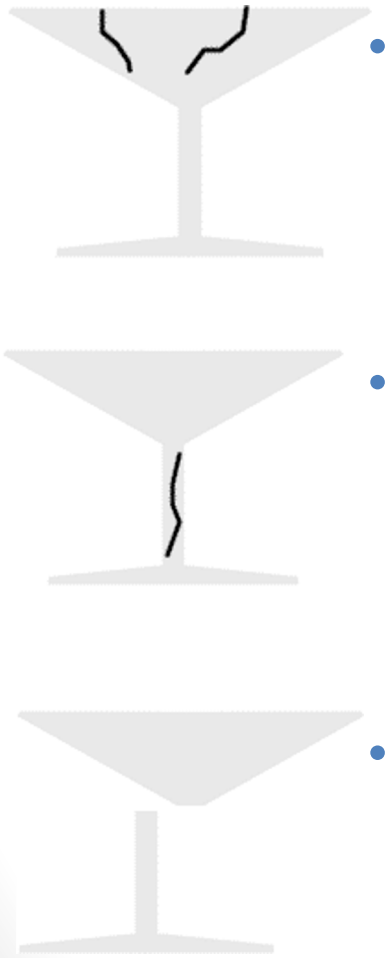
- Written reviews by ad hoc reviewers and panelists – Overall rating: Excellent, Very Good, Good, Fair, Poor
- Advisory Panel – Recommendation on Competitiveness for Funding
- "Bin" Approach to Recommendations (3-5)

- Program Officers Make Final Decisions - Portfolio Balance Approach

Factors POs Consider:

- Support for high-risk proposals with potential for transformative advances in a field;
- Different approaches to significant research and education questions;
- Capacity-building in a new and promising research area;
- Potential impact on human resources and infrastructure;
- NSF core strategies, such as: (1) the integration of research and education and (2) broadening participation;
- Achievement of special program objectives and initiatives;
- Other available funding resources; and
- Geographic distribution.

Why Proposals Are Declined



- Failure to establish a sound theoretical framework and/or poorly related to relevant literature.
- Flawed research design OR failure to specify research methods in sufficient detail. Often, plans for data analysis are insufficient.
- Sound theoretical framework, solid methodology, but they don’t align with each other.

Other Reasons

- Failure to respond to solicitation.
- Failure to follow directions.
- The project is too focused on a specific case.
- Project is “too applied”.
- Anticipated contribution incremental.
- Bad Luck.

Funding Rates

Across Directorates, ranged between 23 and 37% in FY 2019.

Agency average was 26%.

GEO and BIO highest; CSE, EHR and SBE lowest.

Table 1. Research Proposals, Awards, and Funding Rates

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Proposals	35,609	42,225	41,840	38,490	39,249	38,885	40,869	41,039	40,678	40,364	33,613
Awards	10,011	8,639	7,759	8,061	7,652	7,926	8,993	8,782	8,553	9,043	8,580
Funding Rate	28% [13]	20%	19%	21%	19%	20%	22%	21%	21%	22%	26%

Source: NSF Enterprise Information System, 10/01/19.

General Tips

- Present a compelling Problem and a detailed plan for investigating it.
- Include contingency plans.
- Convey enthusiasm and passion for the project, but don’t exaggerate.
- It’s not a Revise & Resubmit process.
- It’s not (about) You. It’s (about) the Science.

General Tips

- Talk to a Program Officer:
  - Get in touch early in the process (and well before the deadline).
  - Send an email rather than cold-calling; Include a 1-2 page summary of the project.
  - Ask for feedback on how the project fits with program priorities.
  - Inquire whether there are other programs or initiatives (such as DCLs) that may be relevant.
  - **If a proposal is declined, schedule a follow-up chat to get feedback on whether and how to revise.**

Revising a Proposal, or Is "Not Competitive" the Kiss of Death?

- Principal Investigators submit on average about 2.3 proposals for every award they receive.
- ~2/3rds of proposals are "not competitive".
- Two types of NC proposals:
  - Poor quality proposals (lots of Fair or Poor ratings)
  - Great ideas but not yet ready – usually because of methodological flaws
- Competitive or Medium/Low Competitive
  - Solid proposal but not the most innovative
  - Some flaws but not fatal – fundable but not at top

Co-Review & Reassignment

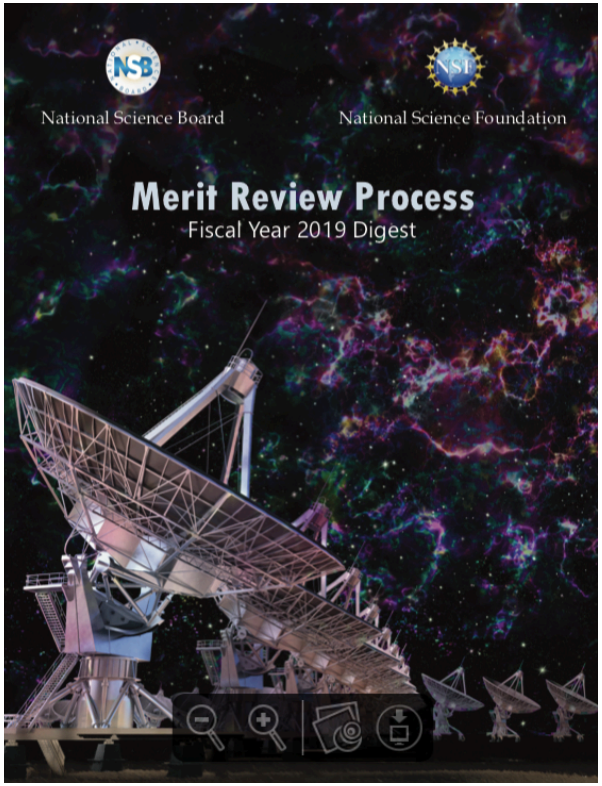
- At discretion of cognizant program officers
- May be requested by PIs at submission
- Often initiated by POs
- Usually expands funding – not “double jeopardy”

- On occasion proposals are reassigned to other programs.

Emerging Interests

- "Convergence" Science
  - Research driven by a specific and compelling problem ["wicked Problems"].
  - Deep integration across disciplines.
  - Increasingly mentioned in new cross-directorate initiatives
- Co-Production of Knowledge – especially in research in/about Indigenous Communities

More information on Merit Review:
https://www.nsf.gov/bfa/dias/policy/merit_review/



QUESTIONS?

https://www.nsf.gov/nsb/publications/2020/nsb202038.pdf