Merit Review 2.0:
Reducing the burden of writing and reviewing proposals

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https://www.nsf.gov/bfa/dias/policy/meritreview/

Goals of meeting

- To elicit your ideas on how NSF might more actively engage colleges and universities in discussions about how to compete effectively as proposal success rates decline.
- To describe some potential pilot activities aimed at enhancing NSF's merit review process and get your feedback.

Research Proposal Trends

- # proposals submitted ↑ # PIs submitting proposals ↑

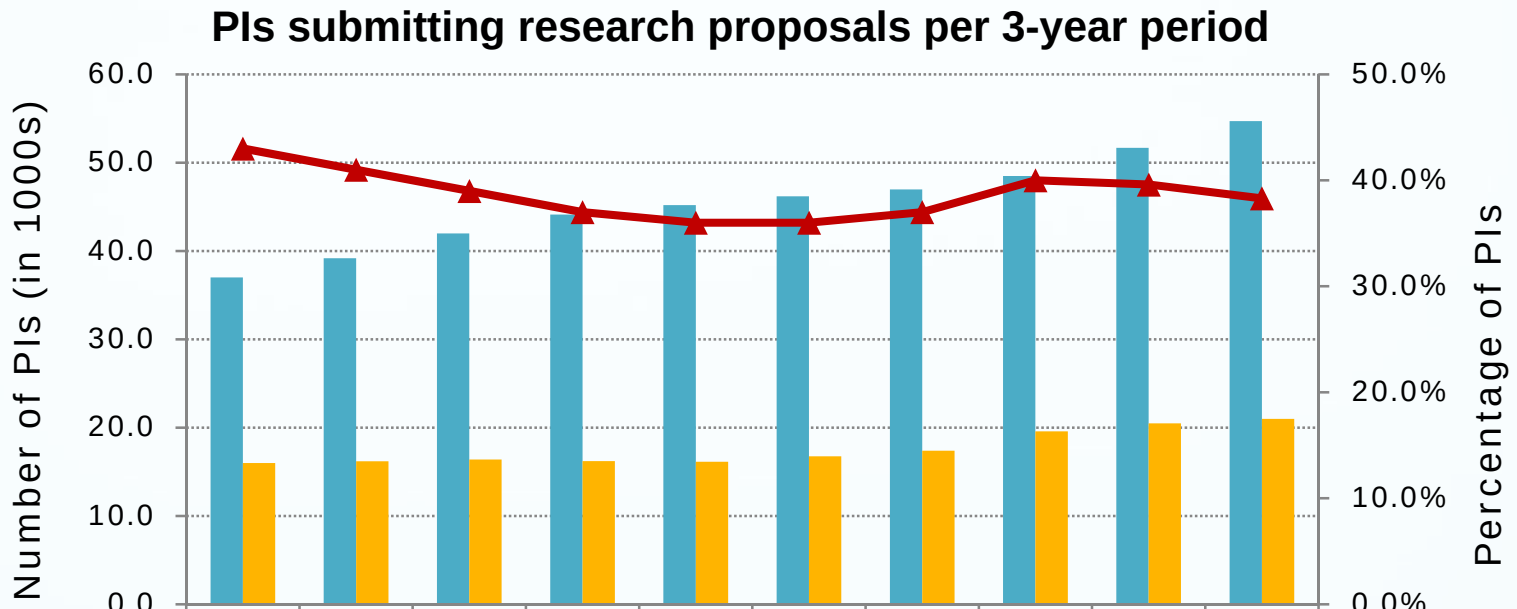
FY2000 - 2011
Proposals: up 95%
Success rate: down 40%
(In FY2011 = 18.6%)

Over the past decade -
PIs applying: up 48%
PIs awarded: up 31%
PIs not funded: up 60%

…and Consequences

- The merit review process is under stress
- ***PIs:***
  - The number of proposals submitted per PI before an award is up
  - The proportion of PIs not receiving funding in three years is up
- ***Reviewers:***
  - Increasing number of proposals increases reviewer workload
  - Increased use of panel-only review increases time and travel commitment for those participating, narrows overall participation
- ***NSF staff:***
  - Workload is high

Main source of proposal pressure



	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
PIs Applied	37.0	39.2	42.0	44.1	45.2	46.2	47.0	48.5	51.7	54.7
PIs Awarded	16.0	16.2	16.4	16.2	16.1	16.8	17.4	19.6	20.5	21.0
PIs Funded %	43.0%	41.0%	39.0%	37.0%	36.0%	36.0%	37.0%	40.0%	39.6%	38.3%

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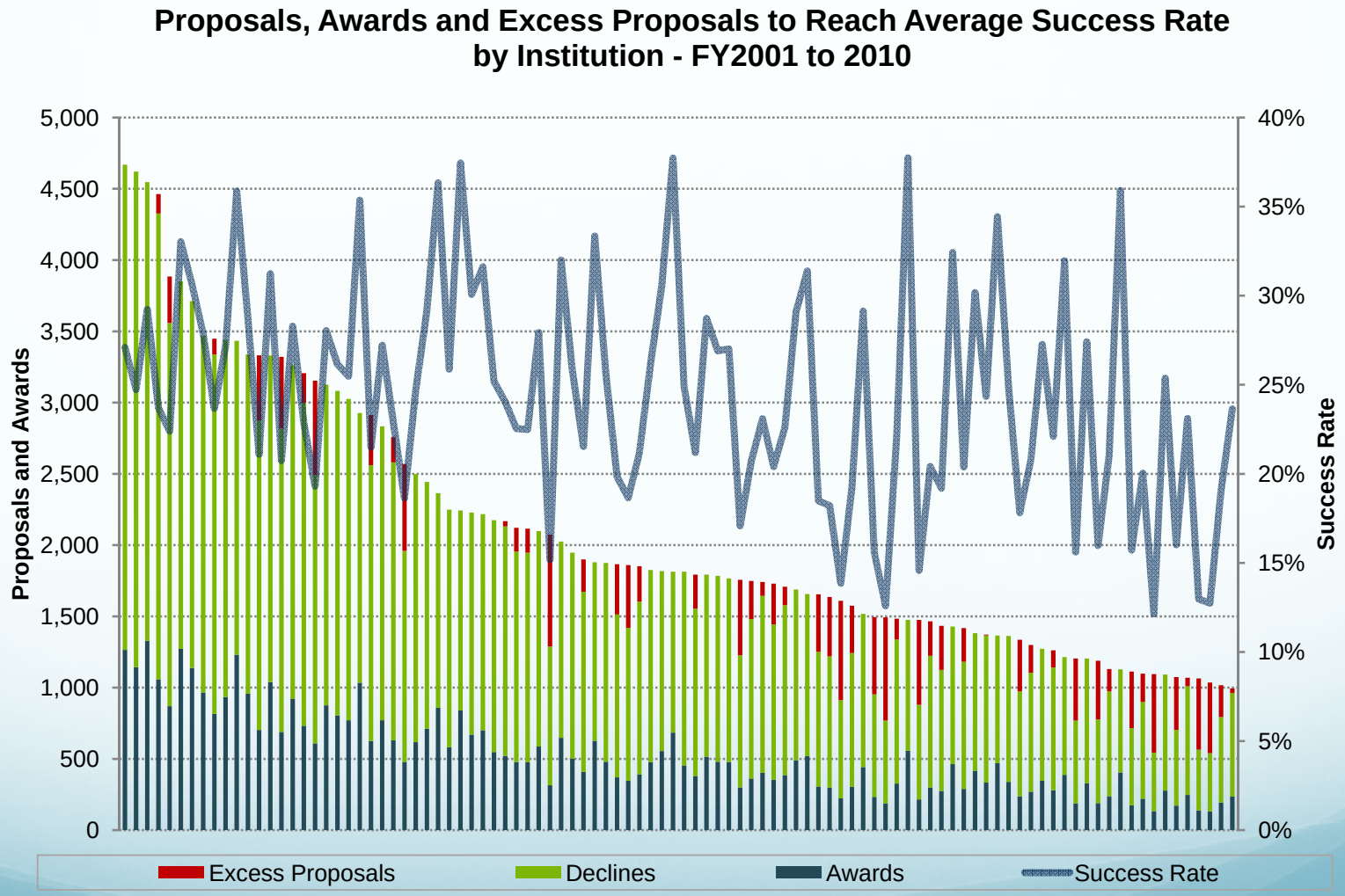
Success rate

100 institutions submitting the most proposals



Three-fold variation in success rate

What causes variations in success rates? What can institutions do? Would more focused outreach be helpful?

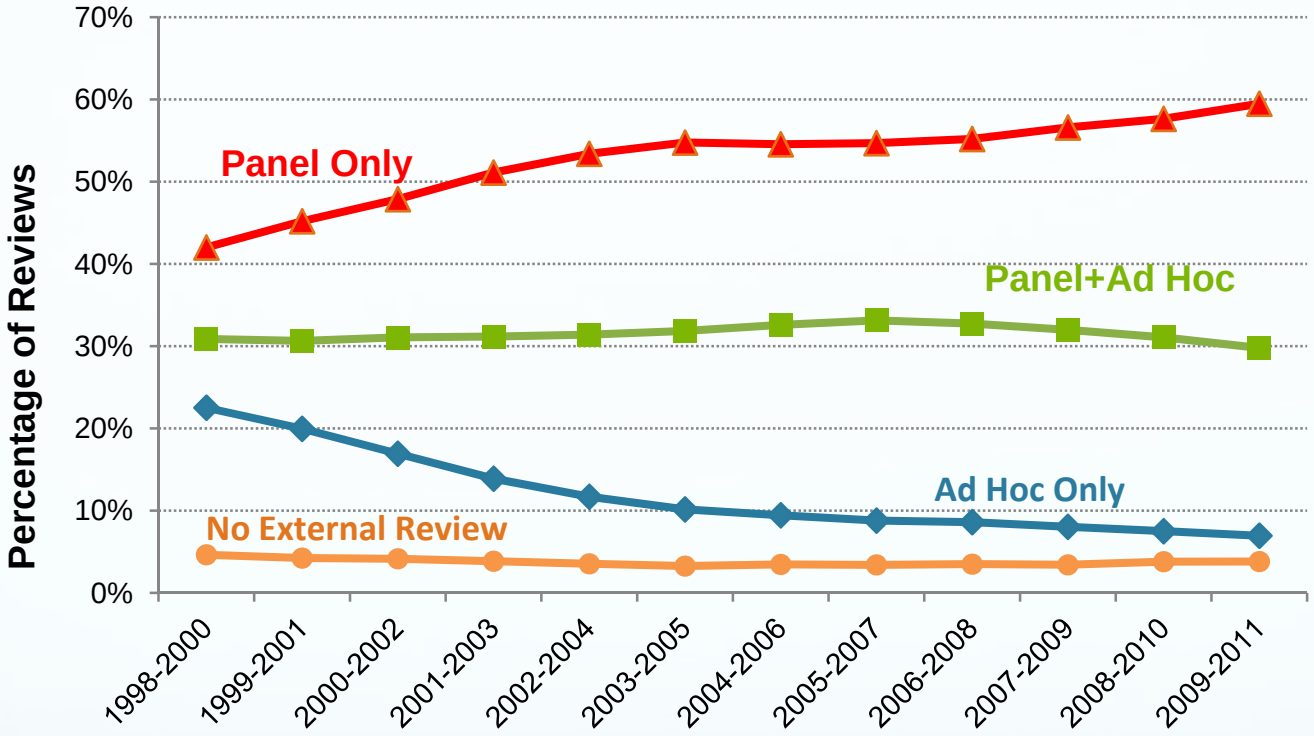
One possibility would be for NSF to engage more closely with institutions submitting proposals to NSF.

- What form of dialogue would be most useful? What information exchange would be most helpful to institutions?
  - **Data on an institution's proposal submission rate, success rate and participation in the merit review process?**
  - **A discussion of how explicit and implicit internal policies or perceived expectations may affect proposers and reviewers?**
  - **Sharing information on examples of internal mentoring programs?**
  - **?????**

Potential merit review pilot activities

- Increased use of virtual panels
- Asynchronous discussion (asynchronous panels)
- Review based on mechanism design theory
- Invited resubmission of declined ideas after revision
- Iterative review
- Greater use of accomplishment-based proposals
- Proposal screening by streamlined review
- Greater use of preliminary proposals in core programs

Review Methods



Greater reliance on panel meetings at NSF:

- Increases rate at which proposals can be reviewed & shortens time to decision; facilitates intercomparison, but
- Reduces participation in reviewer pool; increases reviewer time commitment needed; increases cost

Virtual Panels

Increase the use of virtual panels in place of face-to-face (F2F) panels?

POTENTIAL IMPACTS:
Broadens participation in reviewer pool; decreases reviewer time commitment; increases flexibility in panel implementation; cost savings

- Impacts depend on size of virtual panels used and size of panels being replaced – test by exploring several scenarios
- Technology and sociology suggest smaller virtual panels are optimal

Is there room to expand use of virtual panels?

Year	2005	2006	2007	2008	2009	2010	2011
# of proposals	11	76	277	254	281	514	443
# of virtual panels	2	10	20	22	35	51	42
% of proposals to panel	0.03	0.22	0.73	0.68	0.72	1.06	0.99

Table: Number of proposals reviewed by virtual panels (100% remote participants) over the past seven years.

	Virtual	Mixed	In-Person	TOTAL
Panels	42	302	1,605	1,949
Proposals	443	7,825	36,698	44,966
% of total:	0.99%	17.40%	81.61%	100%
Proposals/Panel	10.55	25.91	22.86	23.07
Panelists	245	3,160	15,460	18,865
Panelists/Panel	5.83	10.46	9.63	9.68
Proposals/Panelist	1.81	2.48	2.37	2.38

Table: Panel statistics from FY2011.

Is there room to expand use of virtual panels? - II

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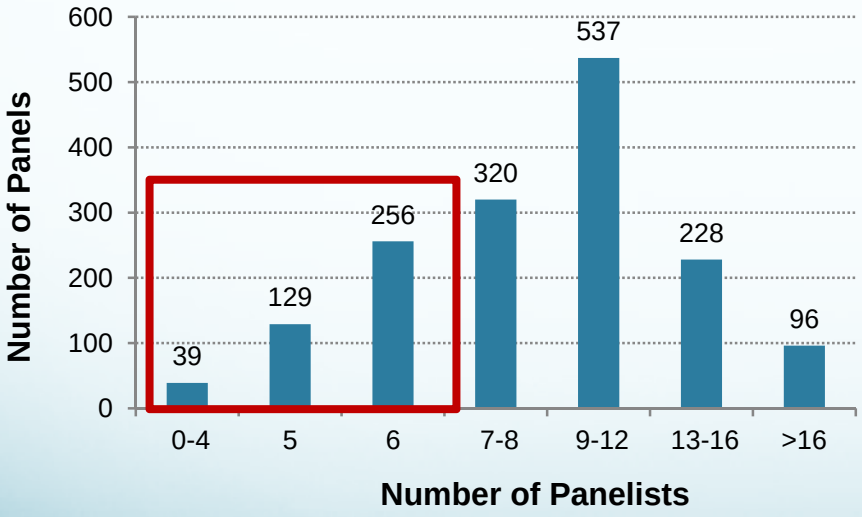

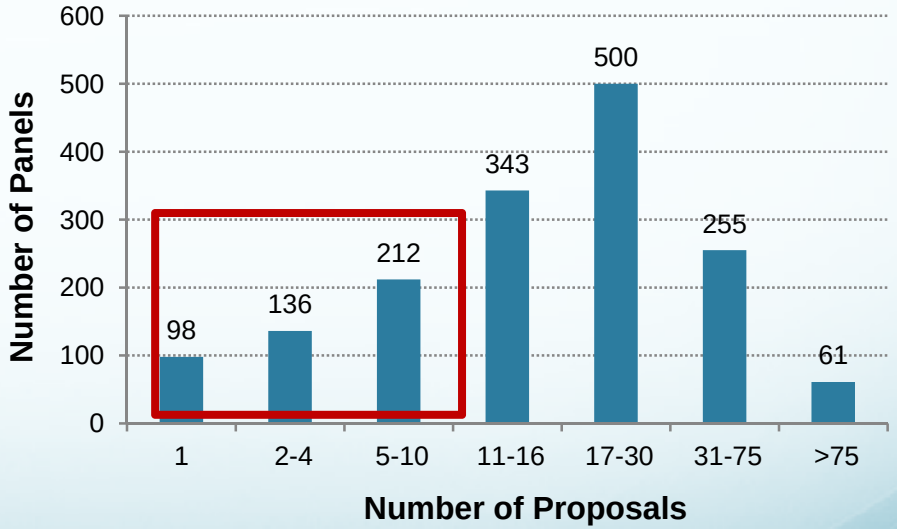

26% of panels are <7 panelists

28% of panels consider <11 proposals

Asynchronous reviewer discussion

- A different form of panel discussion

A set of reviewers is assigned to a proposal. Each submits an independent written review. Once a reviewer has submitted a review, he/she can see the other written reviews and begin a discussion of the merits of the proposal with the other reviewers on a secure web-site .

At the end of the discussion period, the scribe prepares a summary of the discussion.

POTENTIAL IMPACTS:
Broadens participation in reviewer pool; decreases reviewer time commitment; increases flexibility in panel planning; cost savings

An approach based on mechanism design theory

The idea (based on a Nobel-prize-winning theory) is as follows:

- Proposals to a program are organized into groups of 25 to 40.
- Each PI in the group is assigned to review a subset of proposals submitted to his/her group, avoiding usual conflicts-of-interest.
- Each PI reviews the assigned subset of proposals, providing a detailed written review and a score (Poor-to-Excellent) for each. The reviewer rank orders the proposals in his/her subset, placing the proposals in the order which he/she thinks the panel as a whole will rank them.
- The individual sub-lists of rankings are combined to produce a global ranking for the panel.
- Each PI's rankings are compared to the global ranking, and the PI's ranking is then adjusted in accordance with the degree to which his/her ranking matches the global ranking.
- The written comments and final ranking provide input to program officer's analysis.

Invited resubmission of the most promising declined ideas

Example:

- Proposals submitted for annual deadline are reviewed.
- The most competitive proposals are recommended for award; the remainder are declined.
- Those declined proposals that reviewers & Program felt had potential are invited to submit a revised proposal roughly six months after the main proposal deadline.

The Geography and Spatial Sciences Program will conduct this pilot.

Iterative review

An augmented form of ad hoc review.

- Proposals are sent out for *ad hoc* review.
- Where there are differing opinions of (e.g. technical feasibility, etc.) in the reviews, anonymous copies of the reviews are shared separately with all of the *ad hoc* reviewers.
- Reviewers are asked for comments on the differences

Greater use of accomplishment-based proposals and awards

Expands an existing mechanism (Accomplishment-Based Renewals) to make it easier for less experienced, but still accomplished, investigators to apply, and to accommodate collaborative proposals.

Goal: To provide another pathway for the submission of bold, potentially transformative proposals.

Screen proposals with a streamlined ad hoc review process

A two-phase review process:

- *Step 1:*
  - Recruit a cadre of reviewers who commit to providing up to 4 rapid reviews per year that include detailed feedback to PIs.
  - Use for rapid preliminary review (e.g. 2 *ad hoc* reviews per proposal).
  - Identify which proposals are not competitive.
- *Step 2:*
  - 40 - 60% of proposals advance to a full review.

POTENTIAL IMPACTS:
Decreases reviewer time commitment; cost savings; decreases dwell time for non-competitive proposals

Broader use of preliminary proposals

Require shorter, simpler preliminary proposals and only invite full proposals from those preliminary proposals that review well.

- Impacts depend on how the review of the preliminary proposals is implemented

POTENTIAL IMPACTS:
Can decrease or increase reviewer workload; can increase staff workload; can decrease or increase review costs

… *DEPENDS ON DETAILS OF IMPLEMENTATION*

Thank you