



# NSF Grants Conference NSF Policies & Procedures Update

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# Panelist

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**Ask Early, Ask Often!**



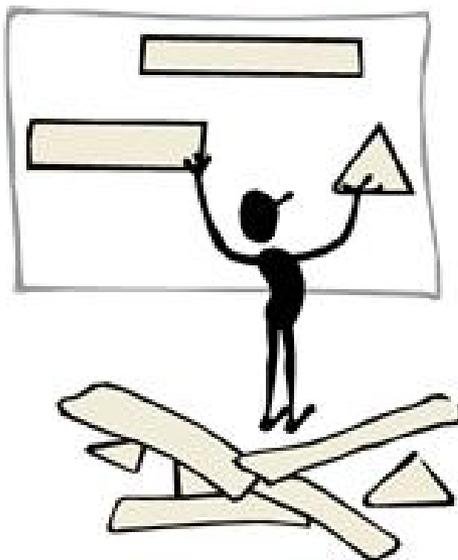
# Coverage

- **Update on revision of NSF Merit Review Criteria by NSB**
- **NSF Merit Review Working Group Process Activities**



WHERE DISCOVERIES BEGIN

# NSF Merit Review Criteria Revision





# NSB Task Force on Merit Review

- Established Spring 2010
- Rationale:
  - More than 13 years since the last in-depth review and revision of the review criteria
  - Opportunity to align review criteria with NSF's new Strategic Plan
  - Persistent anecdotal reports about confusion related to the Broader Impacts criterion, and inconsistency in how the criterion was being applied.



# Issues

- What are the strengths and weaknesses of the current criteria?
- How are the two merit review criteria used by PIs, reviewers, NSF staff?
- What is the role of the PI's institution?
- Have the criteria had an impact on the way PIs think about shaping their research projects?
- How can the outcomes of activities relevant to each criterion be assessed?



# Stakeholder Input

- Interviews
  - 20 NSF senior leaders (BIO, CISE, EHR, ENG, GEO, MPS, SBE, OCI, OIA, OISE, OGC, BFA)
  - Representatives of a small set of diverse institutions
- Surveys
  - NSF POs, DDs, AC members (NSF Officials)
    - ✓ 520 responses, 61% response rate
  - NSF PIs and reviewers
    - ✓ 3989 responses, 51% response rate
- NSF website
  - 611 people provided responses to one or more questions (>2200 total comments)



# Additional Sources of Data

- 195 Committees of Visitors reports (from 2001-2009)
  - What issues were raised related to the two review criteria?
- ~100,000 proposals submitted between 2006 and 2009
  - How did PIs define “Broader Impacts”?



# **Sec. 526 of America COMPETES Reauthorization Act of 2010 NSB Task Force on Merit Review**

- Instructs NSF to have a Broader Impacts review criterion to address several societal goals
- Further instructs NSF to develop and implement a policy for this criterion related to:
  - Strategies and approaches employed to address the Broader Impacts criterion
  - Assessment and evaluation
  - Institutional engagement and support for Broader Impacts related activities
  - Education of NSF staff and potential NSF-supported investigators about new policies



# Final Report

- Task Force used the input from the community to revise the description of the review criteria and underlying principles
- Presented the final report to the National Science Board on December 13, 2011
  - Background and Context
  - Conclusions
  - Recommendations
  - Implementation Guidance to NSF



# Final Report: Conclusions

- The Intellectual Merit and Broader Impacts review criteria together capture the important elements that should guide the evaluation of NSF proposals.
- Revisions to the descriptions of the Broader Impacts criterion and how it is implemented are needed.
- Use of the review criteria should be informed by a guiding set of core principles.



# Final Report: Recommendations

1. Three guiding review principles
2. Two review criteria
3. Five review elements



# Merit Review Criteria Guiding Principles

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects.



# Merit Review Criteria

When evaluating NSF proposals, reviewers should consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits would accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers are asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The intellectual Merit criterion encompasses the potential to advance knowledge; and
- **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

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 institution to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?



# Status and Next Steps

- NSB approved report on December 14, 2011
- Published on January 10, 2012:
  - <http://www.nsf.gov/nsb/publications/2011/meritreviewcriteria.pdf>
- Next Steps:
  - NSF will develop implementation plan
  - Revised criteria and principles will be included in the next revision of the Proposal and Award Policies and Procedures Guide (external), and the Proposal and Award Manual (internal)



WHERE DISCOVERIES BEGIN

# Merit Review Process Working Group





# Relevant Trends

- The number of proposals submitted is up
- The number of PIs submitting proposals is up

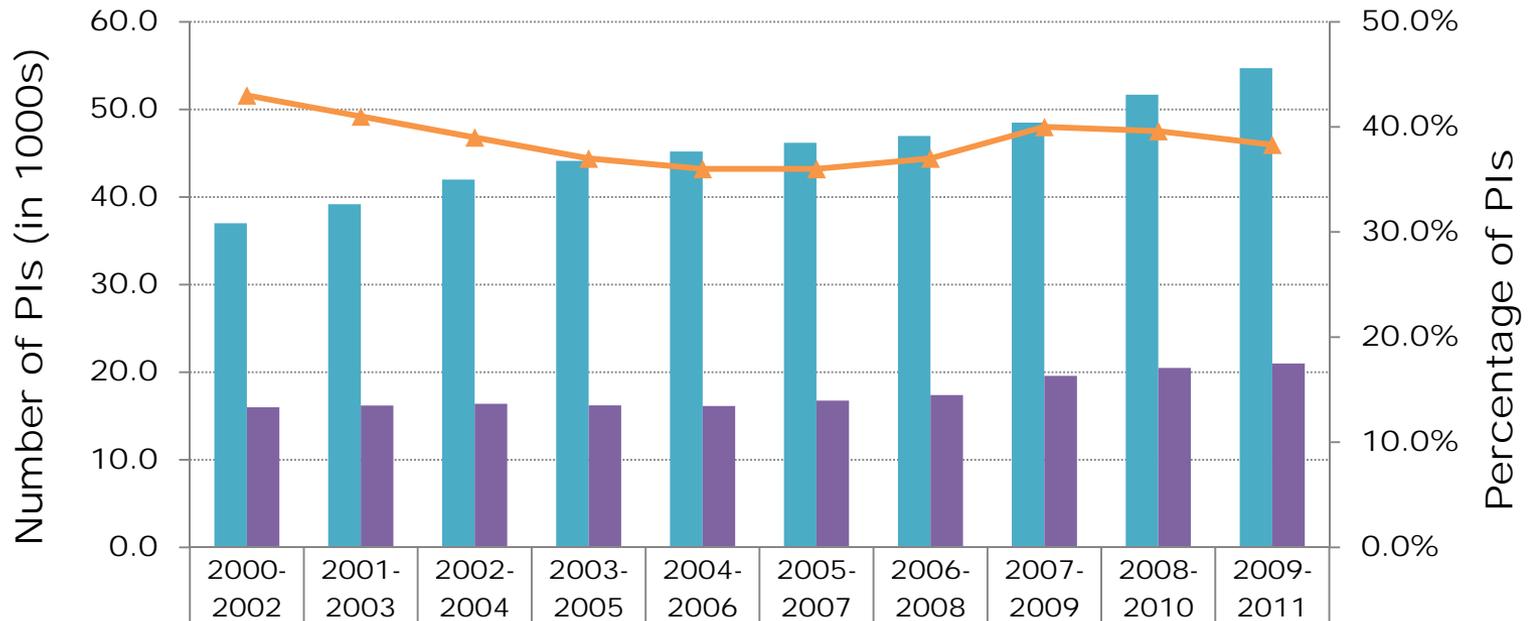
## ...and Consequences

The merit review process is under stress

- **PIs:**
  - The number of proposals submitted per PI before an award is rising
  - The proportion of PIs not receiving funding in three years is rising
- **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

PIs submitting research proposals per 3-year period



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%

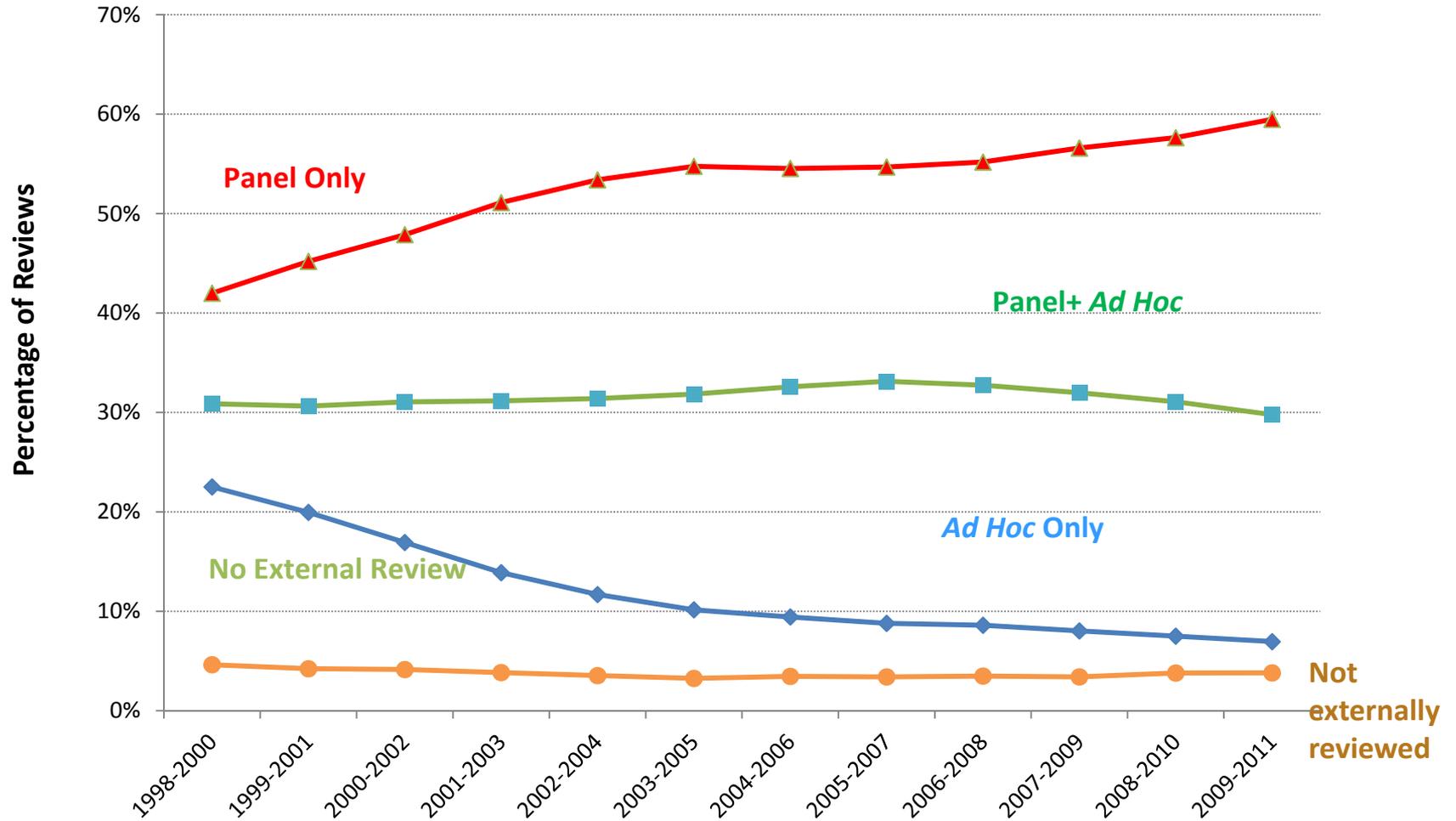
## Over the decade -

PIs applying: up 48%

PIs awarded: up 31%

PIs not funded: up 60%

# Review Methods





# Response

- Look for opportunities to:
  - Be receptive to potentially transformative ideas
  - Reduce the workload on the research community & NSF staff
  - Broaden participation in the review process
  - Take advantage of advances in information technology
- Collect ideas from research community and NSF staff
- Make quantitative and qualitative estimates of impacts:
  - Reviewer workload, NSF staff workload, Travel costs
  - Feedback to PIs, Broadening participation in the review process



# Response (cont'd)

- Discuss with NSF Staff and Advisory Committees
- Formulate provisional recommendations



# Provisional Recommendations

## Process Enhancement

- Increase the use of virtual panels from the current 1% to 5% or more
- Use a streamlined *ad hoc* review process to rapidly screen proposal submissions
- Make greater use of preliminary proposals for core programs
- Asynchronous panels
- Automated compliance checking



# Provisional Recommendations

## Demand Management

- Enhanced outreach to institutions
- Resubmission of declined ideas by invitation only



# Next Steps

- Engage divisions and programs interested in pilot activities
- Jointly develop implementation plans for pilots
- Continue to engage research community
- Complete detailed analysis of other potential merit review process enhancements
- Senior management review of recommendations
- Launch pilot activities
- Evaluate pilot activity impact



# For More Information

# Ask Early, Ask Often!

[nsf.gov/staff](https://www.nsf.gov/staff)

[nsf.gov/staff/orglist.jsp](https://www.nsf.gov/staff/orglist.jsp)

[nsf.gov/about/career\\_opps/rotators/index.jsp](https://www.nsf.gov/about/career_opps/rotators/index.jsp)