



NSF's Merit Review Criteria: Review and Revisions

A Presentation to the
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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.

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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?

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Sec. 526 of America COMPETES Reauthorization Act of 2010

- ▶ Instructs NSF to have a Broader Impacts review criterion to address several societal goals:
 - Increased economic competitiveness of the United States.
 - Development of a globally competitive STEM workforce.
 - Increased participation of women 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.
 - Increased national security.

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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 web site
 - 611 people provided responses to one or more questions (>2200 total comments)

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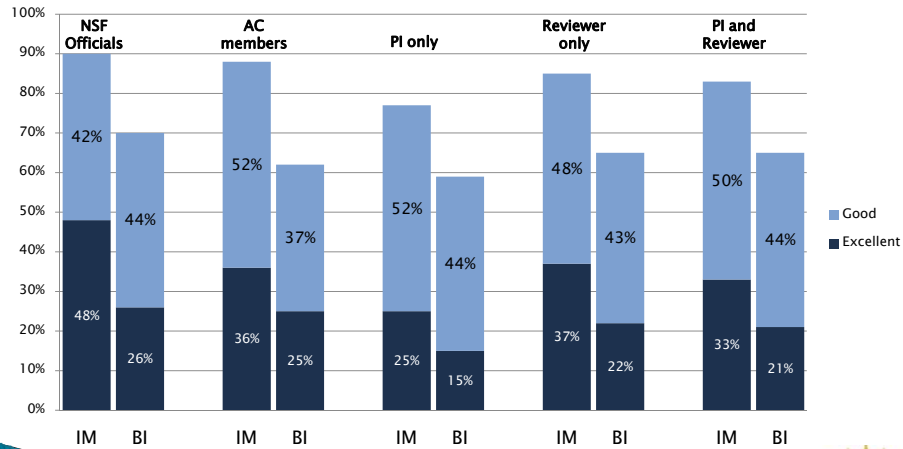
Additional Sources of Data

- ▶ 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”?

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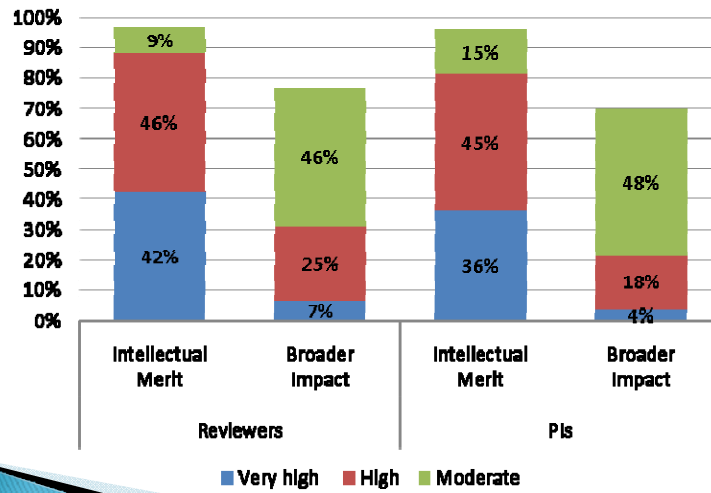
Rating NSF's Guidance on Intellectual Merit and Broader Impacts



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Rating PI and Reviewer Understanding of the Criteria



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Intellectual Merit Criterion

- ▶ Strengths:
 - Well-defined (mostly), and clearly understood
 - Ensures that high quality research is funded, and encourages creative work

- ▶ Weaknesses:
 - Inconsistent interpretation and application of two of the Intellectual Merit considerations:
 - “potentially transformative concepts”
 - qualifications of the proposer

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Broader Impacts Criterion

- ▶ Strengths:
 - Ensures the connection between scientific research and society

- ▶ Weaknesses:
 - Guidance is unclear on:
 - Expectations for nature of, and support for, proposed activities
 - How to review the proposed activities

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Additional Major Observations

- ▶ Intellectual Merit is given more weight than Broader Impacts during review and decision-making
- ▶ Current methods for assessing intellectual merit are adequate (publications, etc.), but more needs to be done to facilitate assessment of whether or not the goals of the Broader Impacts criterion are being realized.
- ▶ A large majority of stakeholders believed that institutions could do more to support the Pls' efforts related to meeting the Broader Impacts criterion.

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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.

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Final Report: Recommendations

1. Three guiding review principles

- Quality
- Societal benefit
- Meaningful assessment

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Final Report: Recommendations

2. Two review criteria

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

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Final Report: Recommendations

3. Five Review elements

- Potential to advance knowledge/benefit society
- Degree of creativity, originality, or potentially transformative nature
- Quality of proposed plan
- Qualifications of the PI/team
- Availability of resources

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Status of Implementation

- ▶ Revisions approved at December 2011 NSB meeting
- ▶ Internal and external communities have been notified (via a Staff Memorandum and Important Notice, respectively)
- ▶ NSF policy documents currently being revised
 - OMB clearance over the summer
 - Publication of revised documents in early October
- ▶ NSF e-Business systems to be revised late summer/early fall

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Status of Implementation

- ▶ FAQs, guidance documents, outreach materials for external stakeholders, and training materials for NSF staff currently being developed
- ▶ Revised criteria will be effective in early January, 2013

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