How Do I Review Thee? Let me Count the Ways
Review Criteria

- **Mandatory** criteria reviewers consider
  - Recent NSF criteria emphasizes *transformative* and *interdisciplinary* research
  - Recent NIH criteria emphasize *clinical*, *interdisciplinary*, and *translational* research
- Reviewers are provided a proposal scoring/rating form and instructed to *review* proposals based on how well the mandatory review criteria are met
- Each funding agency has its own review process
NIH Core Review Criteria

Also referred to recently as “scored criteria”

1. Significance
2. Approach
3. Innovation
4. Investigator
5. Environment
Does the project address an important problem or a critical barrier to progress in the field? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field? Is there a strong scientific premise for the project?
Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project? Are potential problems, alternative strategies, and benchmarks for success presented? If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed?

Have the investigators presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?

Have the investigators presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?

If the project involves human subjects and/or NIH-defined clinical research, are the plans to address 1) the protection of human subjects from research risks, and 2) the inclusion (or exclusion) of individuals on the basis of sex/gender, race, and ethnicity, as well as the inclusion (exclusion) of children, justified in terms of the scientific goals and research strategy proposed?
Innovation

- Does the application challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions? Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense? Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?
Are the PD/PIs, collaborators, and other researchers well suited to the project? If Early Stage Investigators or New Investigators, or in the early stages of independent careers, do they have appropriate experience and training? If established, have they demonstrated an ongoing record of accomplishments that have advanced their field(s)? If the project is collaborative or multi-PD/PI, do the investigators have complementary and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?
Will the scientific environment in which the work will be done contribute to the probability of success? Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed? Will the project benefit from unique features of the scientific environment, subject populations, or collaborative arrangements?
Some Additional...

- **Additional Review Criteria**
  - Protections for Human Subjects
  - Inclusion of Women, Minorities, and Children
  - Vertebrate Animals
  - Biohazards
  - Resubmission/Renewal/Revision Applications

- **Additional Review Considerations**
  - Rigor & Transparency
  - Budget and Period Support
  - Select Agent Research
  - Applications from Foreign Organizations
  - Resource Sharing Plans
Overall Impact

- Overall Impact is the synthesis/integration of the five review criteria that are scored individually and the additional review criteria, which are not scored individually.
- Reviewers will provide an overall impact score to reflect their assessment of the likelihood for the project to exert a sustained, powerful influence on the research field(s) involved, in consideration of the five core review criteria and additional review criteria (as applicable for the project proposed).
Are All Scores Equal?

- Studies to examine correlation between Core Review Criteria scoring and Overall Impact score
  - Preliminary 2010/11 NIGMS study examined correlation between individual criteria scores and Overall Impact score
  - April 2015 study from NIH CSR examined the correlation between individual criteria scores and Overall Impact score
  - June 2016 study from NIH OER examined the key criterion scores that drive impact score and funding outcomes

- Findings
  - All of the criteria are influential despite score range restriction good scores are necessary on all 5 Core Review Criteria for a good Overall Impact score, but...
    - Approach > Significance > Innovation > Investigator > Environment

- Conclusion: The quality of ideas matter more than reputation (good for new investigators!)
Weighted Review

Standard Selection Criteria:
- Importance of the problem (15 pts)
- Design of Research Activities (50 pts)
- Plan of Evaluation (10 pts)
- Project Staff (15 pts)
- Adequacy and Accessibility of Resources (10 pts)

An example of ED NIDDR Selection Criteria
Enhanced review criteria

- Critiques for each Core Review Criterion in a structured summary statement
- A paragraph in written critiques to explain factors that informed reviewer’s Overall Impact score

Applications restructured to align with review criteria
NSF Proposal Review

- Three guiding review principles
- Two review criteria
- Five review elements
- Rating
- Process
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.
When evaluating NSF proposals, reviewers should consider:

1. What the proposers want to do
2. Why they want to do it
3. How they plan to do it
4. How they will know if they succeed
5. 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
Elements considered in the review for both Merit Review Criteria:

- What is the potential for the proposed activity to
  - Advance knowledge and understanding within its own field or across different fields (Intellectual Merit);
  - Benefit society or advance desired societal outcomes (Broader Impacts)?
- 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? Does the plan incorporate a mechanism to assess success?
- How well qualified is the individual, team, or institution to conduct the proposed activities?
- Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?
Additional Solicitation Specific Review Criteria

- Augment the two standard NSB-approved Merit Review Criteria of intellectual merit and broader impacts
- Specific for the individual solicitation
- Not included for all solicitations
<table>
<thead>
<tr>
<th>NIH Core Review Criteria</th>
<th>NSF Review Elements – Intellectual Merit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance: ...project address an important problem or a critical barrier to progress in the field</td>
<td>Potential of the activity to advance knowledge and understanding, and benefit society</td>
</tr>
<tr>
<td>Approach: ...overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project</td>
<td>Well-reasoned, well-organized plan for proposed activities and mechanism to assess success</td>
</tr>
<tr>
<td>Innovation: ...challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions</td>
<td>Originality, creativity and transformative nature of proposed activities</td>
</tr>
<tr>
<td>Investigators: ...PD/PIs, collaborators, and other researchers well suited to the project</td>
<td>Qualifications of individual(s), team, or institution</td>
</tr>
<tr>
<td>Environment: ...scientific environment in which the work will be done contribute to the probability of success</td>
<td>Adequate resources to carry out proposed activities</td>
</tr>
<tr>
<td>NIH Overall Impact</td>
<td>NSF Review Elements – Broader Impact</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Likelihood for the project to exert a sustained,</td>
<td>The potential to benefit society and contribute to the achievement of</td>
</tr>
<tr>
<td>powerful influence on the research field(s) involved</td>
<td>specific, desired societal outcomes</td>
</tr>
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</table>
NEH Application Review Criteria

- Intellectual Significance
- Quality of Work; Feasibility of Work Plan
- Innovation
- Project Staff Qualifications
- Overall Value to Humanities Scholarship
The intellectual significance of the project for the humanities, including its potential to enhance research, teaching and learning in the humanities
The quality of the conception, definition, organization, and description of the project and the applicant’s clarity of expression

The feasibility of the plan of work
NEH Application Review Criteria

- The quality of innovation in terms of the idea, approach, method, or digital technology (and the appropriateness of the technology) employed in the project
NEH Application Review Criteria

- The qualifications, expertise, and levels of commitment of the project director and key project staff or contributors
The likelihood that the project will stimulate or facilitate new research of value to scholars and general audiences in the humanities, or use new digital technologies to communicate humanities scholarship to broad audiences
<table>
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<th>NIH Core Review Criteria (and Overall Impact)</th>
<th>NEH Application Review Criteria</th>
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<td><strong>Significance:</strong> ...project address an important problem or a critical barrier to progress in the field</td>
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</tr>
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<td><strong>Approach:</strong> ...overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project</td>
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<tr>
<td><strong>Investigators:</strong> ...PD/PIs, collaborators, and other researchers well suited to the project</td>
<td>Project Staff Qualifications</td>
</tr>
<tr>
<td><strong>Overall Impact:</strong> ...Likelihood for the project to exert a sustained, powerful influence on the research field(s) involved</td>
<td>Overall Value to Humanities Scholarship</td>
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VA Criteria for Review and Scoring

- **Significance** of the research
- Scientific **approach**, including preliminary data and appropriateness of experimental design
- **Feasibility** of the proposed studies, including the expertise of the PI and collaborators and the environment available for conducting the studies
- **Innovation**
- **Relevance** to the healthcare of veterans
### Eight key questions considered by reviewers of research grant proposals + associated review criteria terms used by 10 US federal funding agencies

<table>
<thead>
<tr>
<th>Key Question</th>
<th>Review Criteria Terms</th>
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<tr>
<td>Why does it matter?</td>
<td>Significance, Importance</td>
</tr>
<tr>
<td>How is it new?</td>
<td>Innovation, Novelty, Creativity</td>
</tr>
<tr>
<td>How will it be done?</td>
<td>Approach, Plan, Methodology, Objectives, Aims</td>
</tr>
<tr>
<td>In what context will it be done?</td>
<td>Environment, Resources, Populations, Facilities</td>
</tr>
<tr>
<td>What is special about the people involved?</td>
<td>Investigators, Organization, People, Researchers, Personnel, Partners, Collaborators, Staff</td>
</tr>
<tr>
<td>What is the return on investment?</td>
<td>Impact, Value, Relevance</td>
</tr>
<tr>
<td>How effectively will the financial resources be managed?</td>
<td>Budget</td>
</tr>
<tr>
<td>How will success be determined?</td>
<td>Evaluation, Assessment</td>
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Research grant proposal review criteria are remarkably **aligned across 10 US federal funding agencies**, despite the differences in their missions and the terminology each uses for its own review process.

**Only eight key questions** summarize the collective research grant proposal review criteria across all these federal agencies.

The eight key questions provide a **starting point for researchers, research administrators, and funders to assess the review criteria used by most, if not all, other research funding opportunities**.
Guide for Research Development Professionals

- Each funder is trying to achieve the same goal during the grant review process:
  1. Find those research projects that fit the funder’s mission, and
  2. Are worth its investment
- Through this lens, the review criteria used for research proposals across agencies are easier to understand and address
- May encourage new investigators to apply for funding, and seasoned investigators and research development offices to consider a diversified set of funding sources for their research portfolios.
ABSTRACT

While Elizabeth Barrett Browning counted 25 ways in which she loves her husband in her poem, “How Do I Love Thee? Let me Count the Ways,” we identified only eight ways to evaluate the potential for success of a federal research grant proposal. This may be surprising, as it seems upon initial glance of the review criteria used by various federal funding agencies that each has its own distinct set of “rules” regarding the review of grant proposals for research and scholarship. Much of the grantmanship process is dependent upon the review criteria, which represent the funders’ desired impact of the research. Since most funders that offer research grants share the overarching goals of supporting research that (1) fits within its mission and (2) will bring a strong return on its financial investment, the review criteria used to evaluate research grant proposals are based on a similar set of fundamental questions. In this article, we compare the review criteria of 10 US federal agencies that support research through grant programs, and demonstrate that there are actually only a small and finite number of ways that a grant proposal can be evaluated. Though each funding agency may use slightly different wording, we found that the majority of the agencies’ criteria address eight key questions. Within the highly competitive landscape of research grant funding, new researchers must find support for their research agendas and established investigators and research development offices must consider ways to diversify their funding portfolios, yet all may be discouraged by the apparent myriad of differences in review criteria used by various funding agencies. Guided by research administrators and research development professionals, recognizing that grant proposal review criteria are similar across funding agencies may help lower the barrier to applying for federal funding for new and early career researchers, or facilitate funding portfolio diversification for experienced researchers.

KEY REVIEW QUESTIONS

Eight key questions considered by reviewers of research grant proposals + associated review criteria terms used by 10 US federal funding agencies

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<th>NSF Review Elements</th>
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<td>Intellectual Merit – Potential of the activity to advance knowledge and understanding</td>
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<td>How is the research new?</td>
<td>Innovation – project challenges current paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions</td>
<td>Creativity, originality, and transformative concepts and activities</td>
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<td>How will it be done?</td>
<td>Approach – overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project</td>
<td>Well-reasoned, well-organized, rational plan for carrying out proposed activities and mechanism to assess success</td>
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<td>In what context will it be done?</td>
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CONCLUSION

We have demonstrated that research grant proposal review criteria are remarkably aligned across 10 US federal funding agencies, despite the differences in their missions and the terminology each uses for its own review process. Moreover, a set of only eight key questions summarizes the collective research grant proposal review criteria across all these federal agencies.

While the sheer number of non-federal funding opportunities makes a similar comparative analysis of their review criteria impractical, we suggest that the eight key questions emerging from our analysis provide a starting point for researchers, research administrators, and funders to assess the review criteria used by most, if not all, other research funding opportunities. This is reasonable given that each funder is trying to achieve the same goal during the grant review process: find those research projects that fit the funder’s mission and are worth its investment. Through this lens, the review criteria used for research proposals across agencies are easier to understand and address, which may encourage new investigators to apply for funding, and seasoned investigators and research development offices to consider a diversified set of funding sources for their research portfolios.

For the 10 US federal agencies included here, we hope that the analysis serves as a starting point to develop even greater consistency across the review criteria—perhaps even a single canonical, cross-agency set of review criteria—used to evaluate federal research grant proposals.

REFERENCES


Find the Grantsmanship Guide on Elsevier Publishing Campus at https://www.publishingcampus.elsevier.com (College of Skills Training | Research Funding | Grantsmanship Guide)

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Quick Guide

Grantsmanship Guide on Elsevier Publishing Campus at https://www.publishingcampus.elsevier.com

- College of Skills Training | Research Funding | Grantsmanship Guide
Peering into the Future: How Research Development Professionals Can Proactively Advance Faculty Grantsmanship Skills Through a Better Understanding of the Peer Review Process

• Susan Carter
• John Crockett
• Holly J. Falk-Krzesinski

This workshop will focus on providing both scholarly and practical information as well as interactive tools that Research Development (RD) professionals can use to help faculty, particularly junior faculty, understand the critical importance of the peer review process in grant development success. The workshop will help build grantsmanship skills as well as the ability to teach those skills to faculty, and further participants’ understanding of the peer review process.
Grantsmanship for the Research Professional

- Executive Education Style 2-dy Workshop Course
  - Grant Resources
  - Funders, Funding Opportunities & Finding Funding
  - Research Program Development, Proposal Planning
  - Review Process
  - Proposal Components, Focus on Narrative and Budget Sections
  - Proposal Submission
  - Post Award Primer
  - Team Science

- Spring, 2017 → Watch for dates soon!
  - School of Professional Studies, Philanthropy and Nonprofit Organizations Certificate Program
  - Northwestern University, Chicago Streeterville Campus
  - Tuition: $625.00
  - [http://sps.northwestern.edu/program-areas/professional-development/philanthropy/](http://sps.northwestern.edu/program-areas/professional-development/philanthropy/)
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