



An association of 62 leading  
public and private research universities

# UNDERSTANDING PEER REVIEW OF SCIENTIFIC RESEARCH

## Peer Review Facilitates Federal Support for High Quality Research

A critical factor in the success of America's national research system is that federal funds for university-based research are awarded primarily through peer review, which uses panels of scientific experts, or "peers," to evaluate the quality of grant proposals. In this competitive process, proposals compete for resources based on their scientific merits.

Peer review offers several important benefits to federal agencies, researchers, and the nation. The peer review process:

- Helps ensure that federal agencies support the best, cutting-edge research;
- Provides peer feedback to scientists to help them improve their research projects; and
- Provides public accountability by assuring that tax dollars are spent in the most effective manner.

## Harnessing the Best Scientific and Technical Expertise to Advance Science and Impact Society

The National Institutes of Health (NIH) and the National Science Foundation (NSF) offer two examples of how peer review works at the agency level. The procedures used by these two agencies for peer review are similar to those used by other agencies that use peer review to make research grant awards. Both NIH and NSF assemble review panels (also known as "study sections") of scientists chosen for their technical expertise in the research area being reviewed. These panel members are subject to conflict-of-interest and confidentiality-of-information policies aimed at ensuring an unbiased review process and restricting the use of privileged application information.

Serving on a panel is voluntary, unpaid service that scientists consider to be an important part of their contribution to the research enterprise.

Peer reviewers rank proposals based on the quality of the science, according to criteria specified by the funding agency. While NIH and NSF have slightly different specific criteria for review, the panels for both agencies consider whether the research will advance a particular area of scientific study, whether the approach is feasible, and whether the researcher or research team submitting the grant is qualified to conduct the research. At [NSF](#), peer review includes consideration of the broader societal impacts of the research. [NIH](#) uses a second level of review to judge the research proposals relative to public health priorities. This NIH review is conducted by an advisory council composed of scientists and members of the public chosen for their expertise, interest, or activities in matters related to health and disease.

Through this process, agencies ensure that they identify and give priority to funding for research projects that represent the best science, address broader societal needs, and help to achieve the agencies' missions.

Boston University  
Brandeis University  
Brown University  
California Institute of Technology  
Carnegie Mellon University  
Case Western Reserve University  
Columbia University  
Cornell University  
Duke University  
Emory University  
Georgia Institute of Technology  
Harvard University  
Indiana University  
Iowa State University  
The Johns Hopkins University  
Massachusetts Institute of Technology  
McGill University  
Michigan State University  
New York University  
Northwestern University  
The Ohio State University  
The Pennsylvania State University  
Princeton University  
Purdue University  
Rice University  
Rutgers, The State University of New Jersey  
Stanford University  
Stony Brook University - State University  
of New York  
Texas A&M University  
Tulane University  
The University of Arizona  
University at Buffalo, The State University  
of New York  
University of California, Berkeley  
University of California, Davis  
University of California, Irvine  
University of California, Los Angeles  
University of California, San Diego  
University of California, Santa Barbara  
The University of Chicago  
University of Colorado Boulder  
University of Florida  
University of Illinois at Urbana-Champaign  
The University of Iowa  
The University of Kansas  
University of Maryland, College Park  
University of Michigan  
University of Minnesota, Twin Cities  
University of Missouri-Columbia  
The University of North Carolina  
at Chapel Hill  
University of Oregon  
University of Pennsylvania  
University of Pittsburgh  
University of Rochester  
University of Southern California  
The University of Texas at Austin  
University of Toronto  
University of Virginia  
University of Washington  
The University of Wisconsin-Madison  
Vanderbilt University  
Washington University in St. Louis  
Yale University

## Exceptions to Peer Review

There are some instances when a competitive, peer review process is not the mechanism used in determining which research to fund. For example, the high-risk, high-reward research and the development-oriented research funded by agencies such as the Defense Advanced Research Projects Agency (DARPA) and the Department of Defense is usually not subject to typical peer review. In such cases, program officers -- who are themselves experts in their respective fields -- make decisions about which projects to fund in order to support a balanced portfolio of disciplinary and multidisciplinary research projects aimed at achieving the agencies' specific missions. There also are times when agencies award research funds for "inherently unique research" to a single researcher or team of researchers without competition selection because of special capabilities or need to respond to specific timelines.

At other times, research funding has been directed, or "earmarked," by Congress in law or through congressional report language. For example, for a number of historical reasons, large portions of research funding provided by the Department of Agriculture, as well as certain parts of Department of Defense-sponsored research, have been awarded through the explicit direction of Congress.

AAU respects the authority of Congress to set priorities for the investment of federal funds in areas of research and in other programs. Indeed, as representatives of the public, Congress should play a role in helping federal agencies identify broad priorities for research funding, as well as emerging research areas of national importance (such as bioterrorism or nanotechnology). However, the association is concerned that, in most instances, the allocation of funds by Congress for specific research projects without involvement or review by the scientific community harms both quality assurance and the priority-setting process of individual agencies. For this reason, AAU historically has discouraged its member universities from seeking congressional earmarks to support scientific research projects on their campuses.

### **Circumventing Peer Review for Ideological Purposes Undermines Science**

Just as important, the association strongly believes that Congress should not retroactively seek to rescind monies for specific grants. As detailed above, once areas of research and priorities are identified, the peer review system helps to ensure that the best scientific expertise is used when evaluating grant proposals. AAU believes that threats to defund individual grants and grant proposals for ideological reasons undermine the integrity of the peer review system, which is the foundation of our national scientific enterprise.

Moreover, basic research that may seem wasteful or unimportant at the time of the actual grant has often led to valuable scientific and technological advancements. History shows, for example, that a study of Gila monster venom led to the development of drugs to treat diabetes, research into green fluorescent proteins from jellyfish has been critical in the treatment of cancer and other diseases, and support for a new technological advance, such as the laser, can lead to countless applications from laser-guided weapons to blue-ray video players to a whole new means to perform corrective eye surgery. AAU strongly believes that after-the-fact political second-guessing of the peer review process will hamper basic research and impede future innovations and breakthroughs.

**Additional information about peer review in federal agencies is available at:**

- National Institutes of Health: [http://grants.nih.gov/grants/peer\\_review\\_process.htm](http://grants.nih.gov/grants/peer_review_process.htm)
- National Science Foundation: [http://www.nsf.gov/bfa/dias/policy/merit\\_review/](http://www.nsf.gov/bfa/dias/policy/merit_review/) and [http://www.nsf.gov/bfa/dias/policy/merit\\_review/resources.jsp](http://www.nsf.gov/bfa/dias/policy/merit_review/resources.jsp).
- Department of Energy's Office of Science: <http://www.er.doe.gov/grants/merit.asp>

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