

PEER REVIEW: ENSURING FEDERAL SUPPORT OF HIGH QUALITY SCIENCE

In an increasingly globalized economic environment, federal support for basic research underpins American leadership in the science and technologies that drive U.S. economic growth.

Since World War II, an implicit partnership, with distinct roles, has existed among government, industry, and the scientific and engineering community. U.S. federal agencies contribute to this partnership when they award grants to members of the scientific research community.

Agencies such as the National Science Foundation (NSF), the Department of Energy (DOE), the Department of Defense (DOD), and the National Institutes of Health (NIH), receive far more grant requests than they can accommodate with their budgets. Each agency uses a process called peer review to select the ideas that they fund. Peer review relies on the collective expertise of the scientific community to select research proposals with the highest merit. This process strikes a balance between awards that fund work that leads to steady progress and riskier investments that could lead to game-changing advances. An agency's peer review process may be tailored according to the agency's mission. Because NSF is the sole agency charged "to promote the progress of science," it is considered the benchmark for the principles and recommendations discussed here. Moreover, the NSF peer-review process is widely considered to be the world-wide gold standard for assessing the quality of scientific research.

At each federal funding agency, the scientific merit of research proposals is rigorously assessed by panels of fellow researchers in the field who are intimately knowledgeable about the latest developments. Also, many NSF program officers come directly from the scientific community and return to their research institutions at the end of two- or three-year rotations. The service performed by these grant proposal reviewers and NSF program officers is an integral part of our national science culture.

In addition to finding the best science, NSF requires researchers to evaluate the "broader impacts" of their research to the American public. Evaluating proposals on both intellectual merit and the potential for broader benefit to U.S. society increases the value of American research investments for all.

The public benefits most when research is determined by the scientific community to have technical merit. Every program involving public money must have oversight, and any management system can be improved; however, it is important to separate fiduciary oversight from scientific and technical evaluation.

Policy Recommendations

The American Chemical Society (ACS) urges policymakers to support scientific peer review processes at federal agencies that:

The American Chemical Society (ACS) Board of Directors Committee on Public Affairs and Public Relations adopted this statement on behalf of the Society at the recommendation of the Committee on Chemistry and Public Affairs. ACS is a non-profit scientific and educational organization, chartered by Congress, with more than 158,000 chemical scientists and engineers as members. The world's largest scientific society, ACS advances the chemical enterprise, increases public awareness of chemistry, and brings its expertise to state and national matters.

American Chemical Society, 1155 Sixteenth Street NW, Washington DC 20036, 202-872-4386, www.acs.org/policy

- Evaluate research proposals based on (1) intellectual and technical merit and (2) the ability to advance science while also focusing on the well-being of our society;
- Draw on the collective and diverse experiences of the scientific community by engaging scientists with different expertise and at different career stages throughout the review process, including proposal review, grant management, and administrative and advisory roles;
- Provide reviewers with freedom from political interference in their assessments of the scientific merit of research proposals; and
- Incorporate ethics rules and training on addressing implicit bias to ensure reviewers' objectivity, independence and integrity.

Additionally, ACS recommends that federal agencies and other stakeholders work together to:

- Periodically examine peer review systems to ensure their continued effectiveness;
- Implement methods to increase the efficiency of processing research proposal submissions as the number of submissions rises; and
- Develop metrics to assess the effectiveness of the use of "broader impact" criteria in evaluating proposals.