



science in the hope that societal benefits will result. In 1997, NSF added a “broader impacts” review criterion to address concerns about relevance: Justify research in terms of societal outcomes.

Over the past decade our nation’s concern with accountability has increased, and in response, the NSF recently issued new draft criteria for the review of submitted proposals (1). The new plan will require researchers to identify the broader good of their research by selecting from a list of national priorities. No doubt, scientists who complained about the vagueness of the “benefits to society” clause in the former criterion will welcome the proposed changes as providing much-needed clarity and direction to the idea of “broader impacts.” But specifying impacts raises three potential problems.

First, the list focuses on economics and national security, but excludes protecting the environment and addressing other social problems. Aside from the consequences of neglecting these areas, this new focus may undermine the attractiveness of STEM disciplines to more idealistic students who are interested in meeting human needs rather than foster-

We join with Liveris, Porter, and the like-minded thinkers mentioned in the News story in their call for more meaningful government incentives to make manufacturing in the United States a logical choice. Targeted incentives can be an investment not only in the future of the economy, but in the future of individual Americans as well.

PATRICK CONNELLY* AND BRIAN PATRICK QUINN

Vertex Pharmaceuticals, Cambridge, MA 02139, USA.

*To whom correspondence should be addressed. E-mail: patrick_connelly@vrtx.com

References

1. A. Grove, “How America can create jobs,” *Bloomberg Businessweek*, published online 1 July 2010 (www.businessweek.com/magazine/content/10_28/b4186048358596.htm).
2. A. N. Liveris, *Make It in America: The Case for Re-Inventing the Economy* (Wiley, Hoboken, NJ, 2011).

3. M. E. Porter, M. R. Kramer, *Harv. Business Rev.* **89**, 62 (2011).

4. P. R. Connelly, B. P. Quinn, P. Hurter, J. Condon, P. Mueller, *Pharm. Outsourcing* **11**, 16 (2010).

NSF’s Struggle to Articulate Relevance

PUBLIC SCIENCE TODAY FINDS ITSELF CAUGHT between competing demands: Researchers need autonomy to pursue questions wherever they lead, whereas funders demand that research meet societal needs. The National Science Foundation (NSF) offers a case study of the balancing of scientific autonomy and societal accountability. NSF is charged with funding basic (i.e., nonmission) research. Yet Congress funds basic

ing economic competitiveness. Second, under the proposed new criteria, applicants and reviewers are restricted to the provided list of national needs, which will complicate efforts to respond to new challenges as they develop. Third, addressing these national needs is now supposed to happen “collectively.” This reopens the question of whether each individual proposal must address broader impacts. The new criterion thus replaces vagueness regarding what counts as a broader impact with vagueness regarding who is responsible for addressing broader impacts.

The new criteria are not without merit. For example, the guidelines on how to implement proposed broader impacts are improved. Once one identifies the national goal to be pursued, the new broader impacts criterion focuses on logistical questions that should be asked in peer review.

The proposed changes in the merit review criteria move too far in the direction of accountability, at the cost of scientific creativity and autonomy. The set of principles (in terms of national goals) also suffers from excessive detail at the cost of flexibility. Of

course, revising the criteria is a perennial process of renegotiation as cultural values change, and these are only draft criteria and principles. NSF invites comments until 14 July. Both the scientific community and the science policy community need to make their voices heard.

ROBERT FRODEMAN*
AND J. BRITT HOLBROOK

Center for the Study of Interdisciplinarity, University of North Texas, Denton, TX 76203–5017, USA.

*To whom correspondence should be addressed. E-mail: frodeман@unt.edu

Reference

1. National Science Board, “NSB/NSF seeks input on proposed merit review criteria revision and principles” (http://nsf.gov/nsb/publications/2011/06_mrtf.jsp).

CORRECTIONS AND CLARIFICATIONS

Reports: “Realizing all-spin-based logic operations atom by atom” by A. A. Khajetoorians *et al.* (27 May, p. 1062). The following errors were introduced during proofs. On page 1063, the third complete sentence should read, “In the next step, the spin lead is built atom-by-atom by subsequently adding Fe atoms with an interatomic distance $d = 0.923$ nm, where the interatomic exchange coupling is antiferromagnetic ($|J| > 0.1$ meV) (Fig. 2, A to E) for spin leads with lengths of

up to six atoms.” On the same page, the third sentence of the second complete paragraph should begin, “Given that the exchange interaction between each spin lead and its island J_{is} dominates, and that the mutual interaction between the end atoms in both leads is smaller than J_v , which is....” The caption above Table 1 should read, “Possible logical operations as a function of the relative orientation of biasing field and tip magnetization, and of the parity of each spin lead.” On page 1063, third column, second paragraph, the equation in the third sentence was incorrect. The correct equation is $B_{crit} = -J_{\alpha} + J_{\beta}/m \approx -0.05$ meV/3.5 $\mu\text{B} = -0.25$ T.

News Focus: “New work reinforces megaquake’s harsh lessons in geoscience” by R. A. Kerr (20 May, p. 911). The story gave incorrect URLs for three *Science* papers it cited. The correct URLs are www.sciencemag.org/content/early/2011/05/18/science.1206731 (Simons), www.sciencemag.org/content/early/2011/05/18/science.1207020 (Ide), and www.sciencemag.org/content/early/2011/05/18/science.1207401 (Sato). The online HTML version has been corrected.

Education Forum: “Inquiry-based writing in the laboratory course” by C. Moskowitz and D. Kellogg (20 May, p. 919). Two similar sentences appear in the first column on page 920. One was mistakenly included when a correction was made. The correct sentence is: “Now, imagine that students are given, at random, either contaminated or uncontaminated reagents, but they do not know who received which.”

Letters: “Counting India’s wild tigers reliably” by K. U. Karanth *et al.* (13 May, p. 791). The photo credit should have been “Pallava Bagla.”

Learn how current events are impacting your work.

ScienceInsider, the new policy blog from the journal *Science*, is your source for breaking news and instant analysis from the nexus of politics and science.

Produced by an international team of science journalists, *ScienceInsider* offers hard-hitting coverage on a range of issues including climate change, bioterrorism, research funding, and more.

Before research happens at the bench, science policy is formulated in the halls of government. Make sure you understand how current events are impacting your work. Read *ScienceInsider* today.

www.ScienceInsider.org

ScienceInsider

Breaking news and analysis from the world of science policy

