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Stimulating Science: One Year After the Recovery Act

JULIE PALAKOVICH CARR

A year ago, as the US economy was on the brink of meltdown, Congress and President Obama enacted the *American Recovery and Reinvestment Act of 2009* (ARRA; PL 111-5). The $787-billion economic stimulus promised a new future for America, a future that not only brought economic growth and jobs but also addressed society's most pressing issues: education, human health, infrastructure, and clean energy. The act included more than $24 billion for federal science programs, much of which was designated for research and development (R&D). These funds were intended to create or save jobs by directly supporting researchers and student fellows and spurring the manufacturing of scientific instrumentation and equipment, as well as initiating the repair and construction of research facilities. One year later, stimulus funds have been used to address a backlog of scientific needs and to usher in a new age of science. The question now, however, is: What will happen to our scientific enterprise in 2011, when the ARRA funds have been spent?

The stimulus outlined ambitious goals for federal science agencies. The National Science Foundation (NSF) aimed to support 40,000 researchers, educators, postdoctoral scholars, and students with its $3 billion of ARRA funding, including $2 billion for "high-risk, potentially transformative research proposals" that were already in hand. The National Institutes of Health (NIH) planned to create or save 50,000 jobs with its $10.4 billion in ARRA funds, half of which has already been spent. Congress directed other agencies to address deferred projects, such as research facility maintenance and management activities, that have resulted from years of stagnant or declining budgets. The Agricultural Research Service, NOAA (the National Oceanic and Atmospheric Administration), the US Geological Survey, the NIH, and others will collectively spend more than $1.2 billion for federal research facility repairs and construction.

Addressing past budget shortfalls is also the goal at the NSF and NIH, where much of the stimulus funding for R&D is supporting quality research proposals that had gone unfunded because of empty agency coffers. The NSF, whose agency-wide grant proposal success rate has hovered around 22 percent for years, has already surpassed its goal to award 4000 additional grants in 2009 and 2010. Even with the bolus of cash, however, some scientists still view funding at the NIH in short supply, after dealing with a 20 percent proposal success rate for much of the past decade.

For example, researchers submitted more than 20,000 applications for about 200 to 400 NIH Challenge Grants. This high demand for grants may spell disaster in 2011 when ARRA funds have been allocated, warns Francis Collins, director of the NIH. Collins told *Science*: "It's likely to be a pretty tough year...not only because one has to worry about what the NIH base [budget] can be, but a large number of Challenge Grants that didn't get funded are going to come back as R01s [NIH's basic research grants]. So the number of applications is expected to be quite high."

Others are concerned about the future of the young researchers and graduate students who are supported by the stimulus. The NSF plans to fund at least 2400 new investigators and 220 professional science master's students, the NIH directed approximately $100 million to recruit up to 117 new faculty at academic institutions, and the National Institute of Standards and Technology (NIST) and the Department of Energy's Office of Science (DoE Science) also funded research fellowships. "While this generous increase in funding is very promising, we need continued financial support not only for young investigators, but also to bolster the entire US research enterprise," said Stacy L. Gelhaus, chair of the National Postdoctoral Association Board of Directors.

For the agencies included in the America COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) Act of 2007 (NSF, NIST, and DoE Science), prior congressional pledges offer greater hope for the future. The COMPETES Act authorized a doubling of these agencies' budgets over a 10-year period, a goal the president has committed to meet by 2016. Other science agencies, however, may once again struggle in a post-ARRA world, especially if annual appropriations are not adjusted to support investments spawned by the stimulus.

"The issue becomes not just what are we investing in, but how are we spreading out the investments," said Nadine Lymn, director of public affairs at the Ecological Society of America. "The potential pitfall is that if sustained and predictable funding doesn't come through once ARRA ends, graduate students and other young researchers will be hit hard, and advances in research needed to address critical areas such as climate change and infectious disease will once again be curtailed."

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