

## SCIENCE POLICY

# Priorities Needed for Nano-Risk Research and Development

Nanotechnology observers are split over the best way to ensure that the up-and-coming industry remains safe for both people and the environment

A broad array of nanotechnology experts agree that the United States needs to spend more money on understanding potential health and environmental dangers of exposure to materials engineered on the scale of a few clumps of atoms. But just how that research should be prioritized and organized is a topic of increasingly fierce debate.

The potential adverse impacts of nanotechnology sprang to the fore again at a sometimes-contentious hearing of the U.S. House Science Committee on 21 September. At the hearing, leaders of the Nanotechnology Environmental and Health Implications (NEHI) working group—an interagency panel that coordinates federal funding on health and environmental risks of nanotechnology—released a long-overdue report outlining research needed to buttress regulation of products in the field. But critics both inside and outside Congress blasted the report as a jumbled wish list. “The government needs to establish a clear, prioritized research agenda and fund it adequately. We still haven’t done that, and time is a-wasting,” says committee chair Sherwood Boehlert (R-NY).

There is certainly plenty riding on how nanotechnology is regulated. More than 200 nanotechnology products are already on the market, including sunscreens and cosmetics, lightweight bicycle frames, and car wax, and they accounted for more than \$32 billion in sales last year. A recent market survey by Lux Research, a nanotechnology research and advisory firm in New York City, predicts that by 2014, a whopping \$2.6 trillion worth of manufactured goods will incorporate nanotechnology. “The nanotechnology industry, which has enormous economic potential, will be stymied if the risks of nanotechnology are not clearly addressed and understood,” Boehlert says.

That is already happening, says Lux Research Vice President Matthew Nordan. At the hearing, Nordan said that Lux has learned through its private consulting work that some Fortune 500 companies are already backing out of nanotechnology research because of real and perceived risks of nanomaterials and uncertainties over how they would be regulated. Venture-capital funders and insurers have also pulled their services for some clients for the same reason, Nordan says, although he didn’t offer specifics.

To stem this tide, Nordan and other experts argue that nanotoxicology research funding should be increased dramatically. According to figures from the U.S. National Nanotechnology Initiative, federal agencies currently spend a combined \$38.5 million annually on environmental, health, and safety research on nanotechnology.

Last year, however, researchers at the Woodrow Wilson International Center for Scholars’ Project on Emerging Nanotechnologies in Washington, D.C., concluded that only \$11 million went to “highly relevant” research focused on understanding and dealing with the risks of nanomaterials (see table). At a congressional hearing last year, nongovernmental experts called for raising funds for such studies to between \$50 million and \$100 million a year (*Science*, 9 December 2005, p. 1609). Both the NEHI report and another report released on 25 September by the National Research Council echoed calls for expanding research in the field.

But there is far less agreement on how that money should be spent and coordinated. “Nanotech [environmental health and safety] research in government agencies, academic

institutions, and industry is being performed in an ad hoc fashion according to individual priorities,” Nordan says. That scattershot approach has left broad gaps between what the agencies are pursuing and what is needed to tune regulations to products already on the market, argues Andrew Maynard, chief scientist of the Wilson Center’s Project on Emerging Nanotechnologies. For example, Maynard says, carbon-based nanomaterials are incorporated into only about one-third of nanotech products. Yet the vast majority of nanotoxicology studies focus on those materials, while ignoring broad classes of other materials already on the market.

To avoid such discrepancies, agencies need a more centralized

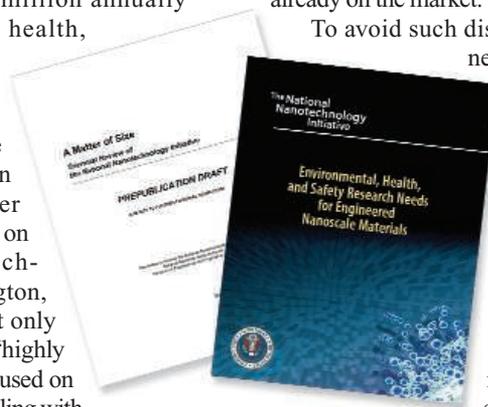
**Chorus line.** Two new reports call for increased funding for nano-safety studies.

top-down research approach, Nordan and Maynard argue. “What is missing is not [an] ingredients list but a specific game plan for accomplishing this research,” Nordan says.

But NEHI leaders and other agency brass say a federal priorities list is coming and maintain that the current coordination scheme is the best way to implement it. “The coordination that is taking place is working,” argues Celia Merzbacher, a member of the President’s Office of Science and Technology Policy as well as the co-chair of the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the National Science and Technology Council. Furthermore, she adds, “our approach achieves the buy-in of the agencies.” In addition to the NEHI working group, she notes, there is already a full-time National Nanotechnology Coordination Office (NNCO) within NSET. “We don’t need another coordination office,” she says. But Nordan counters that coordinating bodies such as NEHI and NNCO have no authority to mandate priorities and can’t allocate funding.

With the strongest calls for reform still coming from outside government, a shakeup of nanotechnology research looks unlikely anytime soon. At the hearing, Boehlert did argue that “current coordinating mechanisms clearly are inadequate.” But Boehlert is retiring at the end of his current term on 31 December. And it remains to be seen whether other congressional science leaders will emerge to pick up the baton.

—ROBERT F. SERVICE



## U.S. Federal Nanotech Risk R&D

(Fiscal Year 2006; in \$ millions)

Agency	NNI (est.)	“Highly Relevant” R&D (Project on Emerging Nanotech)
NSF	24.0	2.5
DOD	1.0	1.1
DOE	0.5	0.0
NIH	3.0	3.0
NIOSH	3.07	1.9
DOC	0.9	0.0
USDA	0.5	0.0
EPA	4.0	2.3
DOJ	1.5	0.0
<b>Total</b>	<b>\$38.47</b>	<b>\$10.8</b>

**Stopgap.** Little nano-risk research is conducted by agencies that oversee health and environmental regulations.

## Priorities Needed for Nano-Risk Research and Development

Robert F. Service

*Science* **314** (5796), 45.

DOI: 10.1126/science.314.5796.45

### ARTICLE TOOLS

<http://science.sciencemag.org/content/314/5796/45>

### RELATED CONTENT

<file:/content/sci/314/5796/news-summaries.full>

### PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.