RESPONSE

Comment on *A Framework Convention for Nanotechnology?*

by David Rejeski

In June 2004, representatives from 25 countries and the European Union (EU) met in Alexandria, Virginia, for an international dialogue on the responsible research and development of nanotechnology. The participants called for the creation of institutional mechanisms to foster an ongoing dialogue, the exploration on new governance tools and structures for nanotechnology oversight, the development of data-sharing mechanisms, and the need to expand the dialogue well beyond the scientific community to include industry and civil society actors.[1]

This meeting was followed by a preparatory meeting in Brussels in 2005, a second meeting in Japan in 2006, and a third meeting in Brussels in March 2008. Along the way, attempts were made to develop a rather straightforward, high-level international code of conduct governing the responsible development of nanotechnology, but no binding code or agreement has emerged after four years of discussions. I mention this to illustrate the often long and tortuous path needed to bring countries together around a common set of challenges.

The idea put forward in the article *A Framework Convention for Nanotechnology?*[2] is a fascinating one. The article hits the right themes in calling for a flexible, adaptive, and innovative approach to nanotechnology regulation on an international scale. But to move this idea forward, we need to recognize the deeper cultural and bureaucratic barriers to achieving such a framework convention and also ask whether this is the most effective option, especially given the rapid pace of nanotechnology commercialization.

Nanotechnology is an area where the desire for international coordination and better governance runs up against the desire for competitive advantage and the control of expanding global markets. Over 25 nations have national nanotechnology initiatives. Many, like the United States, have turned nanotechnology into what some have termed a "national prestige technology," a surrogate indicator of technological leadership in the global economy. Despite an annual federal investment of over $1 billion in nanotechnology research and development (R&D), Congress was recently told by the President's Council of Advisors on Science and Technology that "other countries are aggressively chasing the U.S. leadership position."[3] If we do not speed up, we will lose the nanotechnology race to the Chinese, or Heaven forbid, the South Koreans, who could end up cloning a whole army of nanotechnology scientists. When you wrap the national flag around a technology, regulation, any regulation, becomes more difficult. As we have seen so clearly with climate change and trade issues, simplistic political arguments pit regulation and coordinated global action against innovation, jobs, and forays into the shrinking American pocketbook.

There is no indication that governments are either timely or innovative in thinking about nanotechnology oversight despite early rhetoric about the need for "responsible" development. Most countries are taking a wait-and-see approach, assuming that existing regulations will deal with nanotechnology, even if new materials emerge with radically different properties (which is, after all, the goal of much nanotechnology R&D). The U.S. Environmental Protection Agency's (EPA's) recent decision to treat nano-scale materials like their bulk counterparts under the Toxic Substances Control Act is a missed opportunity to create a more innovative and adaptive oversight system for 21st-century technologies. The U.S. regulatory apparatus is fundamentally broken, and recent failures to protect the public from lead in toys, antifreeze in toothpaste, rat poison in pet foods, and *E. coli* in hamburger meat raise serious questions about how the U.S. government can deal with more exotic materials in the nanotechnology pipeline. Not surprisingly, polls indicate low and declining public trust in the ability of government and industry to manage the risks of emerging technologies like nanotechnology.[4] Nonexistent or lax oversight of workers, the environment, and products in countries like China raise additional concerns of unsafe nanotechnology-based products flowing into the global marketplace and across our borders.

It is important to keep in mind that addressing safety issues around nanotechnology at this point in time is a piece of cake compared to what is coming. As nanotechnology and biotechnology converge and as scientists begin to put together systems of nanoparticles with specific functions, and then systems of systems, the behaviors will become more complex and risks more difficult to assess.

All of this is happening at warp speed. Government is the bureaucratic tortoise chasing the technological hare. A global public- and private-sector investment of over $12 billion annually in nanotechnology R&D guarantees a rapidly accelerating flow of nanotechnology-enabled products into the marketplace in areas ranging from cosmetics to drugs and food packaging. Even as products flood the marketplace, our understanding of the potential risks of nanotechnology to humans and the environment remains highly uncertain and is unlikely to keep up with the challenges of risk assessment and management. Governments face a vexing paradox: the more they delay a coordinated discus-

David Rejeski directs the Project on Emerging Nanotechnologies at the Woodrow Wilson International Center for Scholars.

1. *See* Meridian Institute, *International Dialogue on Responsible R&D*, http://www.meridian-nano.org/international.php (last visited June 10, 2008).

2. Kenneth W. Abbott et al., *A Framework Convention for Nanotechnology?*, 38 ELR (ENVTL. L. & POL'Y ANN. REV.) 10507 (Aug. 2008) (a longer version of this article was originally published at 36 ELR 10931 (Dec. 2006)).

3. *Nanotechnology: Where Does the U.S. Stand?: Hearing Before the Subcomm. on Research of the House Comm. on Science*, 109th Cong. 19 (2005) (statement of E. Floyd Kvamme, Co-Chair, President's Council of Advisors on Science and Technology).

4. Project on Emerging Nanotechnologies, *Poll Reveals Public Awareness of Nanotech Stuck at Low Level*, http://www.nanotechproject.org/news/archive/poll_reveals_public_awareness_nanotech/ (last visited June 10, 2008).

sion about nanotechnology oversight, the harder oversight will become.

So how could the framework convention called for in the article come about? First, it could grow from a strong bilateral commitment by the EU and by the United States (by far the largest players in nanotechnology R&D) regarding nanotechnology oversight and responsible development. The European Commission recently developed a voluntary code of conduct for responsible nanotechnology research that covers seven general principles, including sustainability, precaution, inclusiveness, and accountability, and is urging Member countries to adopt this code.[5] However, given the emphasis on the precautionary principle, it is unlikely that the United States would support this effort at the moment. Certainly, the recent history of U.S. positions on international conventions (from the Kyoto Protocol to the Geneva Convention), raises doubts concerning U.S. willingness to enter into any binding agreements. But, longer term, the possibility exists and should be pursued. A future EU-U.S. agreement governing nanotechnology could be further expanded and sanctioned within the larger body of the Organization for Economic Co-operation and Development countries as an interim step toward an international framework.

Second, industry could push the process along. Fearing a disaggregation of the global market through the emergence of distinct regulatory regimes, businesses could put pressure on governments to harmonize their approach. In the United States, a number of municipalities and states, worried by the lack of federal action, have begun to move forward with plans for nanotechnology oversight.[6] An uneven playing field of regulations and standards could have large trade implications, especially for transnational firms.

The third option is global action through a series of accidents involving nanotechnology. This would be unfortunate, but the last 50 years of environmental and public health progress tells us that government action is often precipitated by disaster. The chances of such an accident with nanotechnology are high because of what Princeton historian Ed Tenner once described as the "tendency of advanced technology to promote self-deception."[7] When new technologies emerge, hubris often trumps humility and suddenly scientists, engineers, and entrepreneurs actually believe they can predict and control outcomes in complex physical and biological systems. Collective euphoria over the promises of any new technology can quickly lead people to put faith in desired outcomes and undermine the critical analysis that is crucial to the early warning of impending disasters. This combination of optimism and arrogance creates a situation where important information about the risks and threats are lost, distorted, or ignored because "managing the message" and maintaining the march to market becomes more important than managing risks.[8]

One final option is to declare nanotechnology a missed opportunity and move on to try to get in front of the next technological wave that will sweep across our commercial shores—synthetic biology. Given the more obvious and troubling dual use implications of synthetic biology, the field may get policymakers' attention earlier.[9] Also, because a majority of synthetic biology research is being conducted in the EU and in the United States, the area provides an easier target for negotiated agreements.[10]

As the article notes in its conclusion, "[t]he key is to establish an institutional and procedural framework *before* the problems arise. For nanotechnology, then, the time to act is now."[11] The question is whether society has already missed this opportunity. To paraphrase Adlai Stevenson: "We don't see the writing on the wall until our backs are up against it."

5. Leigh Phillips, *EU Wants Code of Conduct for Nanotech Research*, EUObserver.com, Feb. 11, 2008, http://euobserver.com/9/25636 (last visited June 10, 2008).

6. Municipalities that have implemented, or are considering, nanotechnology oversight measures include Berkeley, California, and Cambridge, Massachusetts. Recently, a proposal to require reporting of nanotechnology activities by firms was floated in the state of Wisconsin. *See* Nathan J. Comp, *Wisconsin First in Country to Eye Mandatory Nanotechnology Registry*, Dane101.com, Feb. 11, 2008, http://www.dane101.com/current/2008/02/11/wisconsin_first_in_country_to_eye_nanotechnology_registry.

7. Edward Tenner, *When Systems Fracture*, Harv. Mag., Nov./Dec. 2001, at 26, 27.

8. David Rejeski, Dir., Project on Emerging Nanotechnologies, Woodrow Wilson Ctr., Presentation at Harvard Univ. Workshop on Disaster Prevention: Nanotech Safety 101 or How to Avoid the Next Little Accident (Apr. 27, 2006), *available at* http://www.nanotechproject.org/publications/archive/nanotech_safety_101_how_to.

9. Steven M. Maurer & Laurie Zoloth, *Synthesizing Biosecurity*, Bull. Atomic Scientists, Nov. 2007, at 16, *available at* http://thebulletin.metapress.com/content/g428752x47720025/fulltext.pdf.

10. European Commission 6th Framework Programme, NEST-New and Emerging Science and Technology, SynBiology: An Analysis of Synthetic Biology Research in Europe and North America: Final Report on Analysis of Synthetic Biology Sector (2006) (FP6-2003-NEST-B4 Project 015357), *available at* http://www2.spi.pt/synbiology/documents/news/D11%20-%20Final%20Report.pdf.

11. Abbott et al., *supra* note 2, at 10514 (emphasis added).