Shifting the Agenda of Science and Technology

As David Orr points out, the research agenda in the United States—as well as in many other countries that have followed the U.S. lead—is largely tied to considerations of relatively short-term profits and short-term military advantage (short-term especially relative to the timeframe of conservation biology). The Pentagon's continued sponsorship of much research at the frontiers of many fields—often pursuing a narrow definition of national security as the possession of faster, more powerful weapons than anyone else—is one major factor, as is the increased dependence of universities on corporate support. Many academic scientists, engineers, and their institutions have become as intent about cashing in on their own bright ideas as any corporate sponsor would be. That poses its own potential for conscious and unconscious bias and for shortsightedness in the conduct of research.

The resulting focus on short-term competitive advantages, whether in war or in the marketplace, does often seem to shove to the end of the line broader concerns about how the world's research capacity can best serve the public interest. That means the neglect of the very social and ecological innovations that will be necessary to increase real, long-term national security for today's small world.

Orr has outlined a sensible plan for shifting our public agenda for science and technology to the most pressing needs of humanity and other species. Perhaps the most useful comments to add to his proposal would be specific examples of how innovative experiments related to this urgent work are already underway. Taking note of them, it is all the more possible to imagine a future in which such social advances have taken firm root.

Reinvigorating Scientific Ethics

Rutgers University recently created the nation's first university-based Center for Responsible Innovation. The director, David H. Guston, has proposed such centers as a model that could be widely replicated at other universities. Each center, he suggests, would engage "in externally funded, cooperative research on the ethical, legal, and social implications" of its own host university's research portfolio.

"If it is hard to say 'no' to the incremental commercialization of universities," Guston says, "because each new bit is not entirely unprecedented and because the negative consequences of each new bit is not entirely unprecedented and because the negative consequences of each new increment cannot be as clearly discerned as the positive one, then at least universities can say 'yes' to the reflexive study of the interaction of innovation and society."

If other universities follow Rutgers' lead, he suggests, this would create "a kind of distributed capacity for technology assessment" in the public's interest that could combine "historical research, public opinion and communication, traditional technology assessment, and interactions between the lay public and active researchers." This would also allow "the possibility of intervention in the innovation process by public values before the innovation is reified as a market product." Such centers could also reach out beyond the university "to local, state, and national decision-makers, and to the public generally," including focused media strategies to reach out to and seek input from the broadest public possible. The idea that every research campus needs its own Center for Responsible Innovation seems especially timely, given the dramatic social and environmental impact of research and development today.

Educating for Critical Thinking about Science and Technology

The Alliance for Childhood, a non-profit group for which I am a consultant, has urged parents, educators, and policy makers to rethink the way schools now approach technology literacy in much the same way that Orr calls for teaching students to think critically about science itself. Too often, schools have been expected to train students merely to adapt to whatever high-tech products the market supplies. Given the dramatic possibilities of advances across such areas as nanotechnology, bioengineering, and robotics, traditional education is far too narrow.

Instead, the Alliance for Childhood is preparing guidelines, to be released this fall, for a far more thoughtful approach that would prepare students to be active participants in democratic decisions about science and technology policy instead of passive consumers. The Alliance's working definition for a new technology literacy is "The mature capacity to participate creatively, critically, and responsibly in making technological choices that serve democracy, social justice, and ecological sustainability."

1

Democratizing Science and Technology Policy

In recent decades, scientists and public-interest groups in Europe, Japan, the United States, and elsewhere have been experimenting with new models for broadening public participation in decisions about controversial science and technology policy issues. One of the most promising to emerge is the consensus conference, or, as it is known in the United States, the citizen panel. This democratic innovation just got a significant boost from a new U.S. law authorizing nanotechnology research and development programs.

Citizen panels involve small committees of ordinary citizens who come together to examine important social, ethical, and environmental issues related to research and technology. They are carefully selected in much the same way that juries are chosen in cases of law—but with greater commitment to representing diverse life experiences. Also, only citizens with no financial or ideological stake in the topic are eligible. The panels study and discuss background documents, develop an agenda of major public issues to address, hear expert testimony and arguments about technical applications and consequences of research as presented by various sides, deliberate on their findings, and write reports with their recommendations. The panelists present their report at a national press conference, and their reports are widely disseminated to the public.

This process gives policy makers and everyone else a much better sense of where the common ground lies among citizens who do not have a direct political or economic stake in the issue under consideration—which is, after all, usually the majority of the public. That capacity has been almost entirely lacking in decision-making processes in the United States.

The best time to get the public involved is as early as possible—before major decisions and their consequences for average American families and communities are set in stone. That is why one small provision in the new U.S. law that authorizes nanotechnology research and development programs is so significant. It was proposed at a congressional hearing last year by Langdon Winner of Rensselaer Polytechnic Institute, who is also president of the Loka Institute. Loka is a nonprofit organization that advocates for greater public participation in science and technology decisions. The provision was supported by a broad coalition coordinated by the Loka Institute and the International Center for Technology Assessment. It requires that "public input and public outreach" be integrated into the federal nanotechnology program "by the convening of regular and ongoing public discussions, through mechanisms such as citizens' panels, consensus conferences, and educational events, as appropriate."

This is apparently an unprecedented opportunity in the movement for greater democratic participation in the making of science and technology policy. It appears to be the first time U.S. law has included the use of such direct methods for incorporating the deliberations of ordinary citizens, in an ongoing way, in the policy-making process for a major technology—let alone at such an early phase in the development of a major new technology.

Redirecting Research to the Most Pressing Needs

The growth of community-based research in many countries around the world, including the United States, is yielding powerful evidence that when ordinary citizens team up with professional researchers they have their own valuable expertise to contribute. The active participation of the members of communities affected by the research issue at hand has also proven a vital way to make sure that the resulting new knowledge and its technical applications really benefit those communities and the local ecologies that sustain them, whether the issues are health, environmental pollutants, or economic development.

Under this collaborative model, community members are involved in every step of the process, including setting the research agenda, designing the study, conducting the research, interpreting the results, and—most important from the community's perspective—making sure the results are acted upon to address the community's problems. Such collaborative methods for planning and conducting research and for assessing technologies have a powerful potential to shift the benefits of science and technology to the most pressing human needs. It has proven especially effective in empowering citizens who traditionally have been politically marginalized because of race, income, or age.

For these reasons, the new focus on community values has great potential to help redeem science. Loka's vision statement says, "As members of communities, we are not consumers, customers, or clients whose behavior is studied and managed by powerful outside forces. In communities, we are families, neighbors, and citizens, who recognize the necessity of sharing power and sharing responsibility. To give communities a strong voice in science and technology policy is to refocus science and technology on the most urgent needs of our families, neighbors, and fellow citizens. That can greatly strengthen communities and also breathe new compassion, creativity, and responsibility into research, science, and technology."

Colleen Cordes

The Loka Institute, 660 Pennsylvania Avenue SE, Suite 302, Washington, D.C., 20003, U.S.A., email ccordes@erols.com