

Scientists to assess societal implications of nanotechnology

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How will rapid technological change influence democracy, affect our privacy, and even change human identity itself? The National Science Foundation has awarded \$6.2 million to explore such questions at the new Center for Nanotechnology in Society at Arizona State University. Center researchers will work side by side with scientists who are making nanotechnology a reality to anticipate and understand the societal consequences of this new area of innovation.

The ASU center is the largest in a network of newly funded NSF activities on nanotechnology and society, including a second center at University of California-Santa Barbara and additional projects at Harvard University and the University of South Carolina. The network will support research and education on nanotechnology and social change, as well as provide educational and public outreach activities and international collaborations.

"The Center for Nanotechnology in Society at ASU will be devoted to interdisciplinary studies of nanotechnology with a real social commitment," said ASU President Michael Crow. "It will help us determine the impact of nanotechnology on society and it will allow us to see how society affects the course of nanotechnology research."

Mihail Roco, NSF's senior advisor for nanotechnology, said the new nanotechnology centers and projects come at an important time. "The nanotechnology field has been evolving rapidly since 2000, with technological, economic, social, environmental and ethical implications

that could change the world," he said.

Nanotechnology is the manipulation of molecular-sized materials to create new products and processes. It encompasses contributions from fields such as physics, chemistry and biochemistry, molecular biology, and engineering, with potential applications in areas as diverse as drug delivery and discovery, environmental sensing, manufacturing, and quantum computing. The potential benefits of the technology are great, but so are the potential drawbacks from misuse or unintended consequences.

The Center for Nanotechnology in Society at ASU will develop a new model for understanding the interactions of technology and society to encourage informed discussions and improve policy choices and technological outcomes for everyone, according to David Guston, an ASU professor of political science and the principal investigator at the center.

"Nanotechnology promises insights and innovations that could revolutionize whole sectors like manufacturing, energy and health care," Guston said. "At the same time, it raises profound questions about privacy and security, human identity and enhancement, environmental and health risks, and societal and economic equity."

"We will help scientists, technologists and citizens develop a better understanding of where scientific and social values come from, what they mean and how they shape the direction that nanotechnology takes," Guston added. "As a result, informed discussions and deliberations can enhance both the responsiveness of nanotechnology research to societal needs, and improve the quality of nanotechnology outcomes."

The center is a collaboration of the Consortium for Science, Policy and Outcomes and the Biodesign Institute at ASU. CSPO director and co-

principal investigator, Dan Sarewitz, said the center "is an opportunity to put into practice a new model of cooperation between the social sciences and humanities on one hand and natural sciences and engineering on the other."

George Poste, director of the Biodesign Institute at ASU and co-principal investigator for the center added that "by encouraging natural scientists and social scientists to become more fluent in one another's areas of knowledge, we help ensure that nanotechnology and other emerging technologies not only fulfill their promise to benefit humanity, but do so in ways that reflect and respect social values."

Other ASU co-principal investigators are Marilyn Carlson of the Center for Research on Education in Science, Mathematics, Engineering and Technology, and Anne Schneider of the School of Justice and Social Inquiry.

The center also will feature important collaborations between ASU and the University of Wisconsin, Madison; Georgia Institute of Technology, Atlanta; North Carolina State University, Raleigh; University of Colorado, Boulder; Rutgers University, New Brunswick, N.J.; and other universities, private and public sector groups and individual researchers.

The center will develop a research program called "real time technology assessment" (RTTA), which will map the research dynamics of nanotechnology, monitor the changing values of the public and researchers, engage groups in discussions concerning nanotechnology and its possible future, and assess the influence of these activities on the researchers. "Only by pursuing the sort of program offered by RTTA can society promote the learning necessary to move beyond our historical tendency to react to technologies after they permeate society," Guston said. "As technologies become more powerful, we need to be able to make better decisions, at an earlier stage, about the directions

that they are taking."

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