

## Could, Would, or Should?

### Societal Dimensions of Nanoscale Science & Technology

Interested Agencies: CPSC, CSREES, DOE, DOL, FDA, NASA, NIH, NSF

Nanotechnology is a science in motion. Anticipating the societal impact of nanotechnology requires balancing uncritical expectations and fears with values and issues raised by ethical, legal, and societal discussions regarding its development and applications.

Potential applications of nanotechnology are expected in a wide range of fields, from agriculture and food, biomedical applications, electronics, energy, environmental remediation, and material sciences to computing and other technologies. However, uncertainty surrounding some future applications and their various potential impacts could hamper development of nanotechnology.

The research challenge will be to identify and, to the extent possible, quantify potential societal developments (social, economic, workforce, educational, ethical, and legal) that could result from discoveries in nanotechnology. Research on the processes of innovation, diffusion, and adjustment will generate information on potential societal impacts. Additionally, modeling tools, such as scenario analysis and multiagent modeling, can be used to assess potential impacts and resulting societal interactions. This provides information concerning potential impacts to policy makers, business, and the public, allowing for the development of beneficial applications of nanotechnology, while reducing and managing any potential unintended consequences. Scenario analysis is effective in identifying issues and researching hypotheses and thus can be an effective tool for theoretical analysis, while multiagent modeling is akin to scenario analysis, but is carried out through computer simulation.

It could prove interesting to compare the history of nanotechnology with the history of other technologies, such as the Internet, genetically modified organisms, aircraft, stem cells, and computers, to draw lessons that might be relevant. Alternative histories, for instance, can be built using such familiar technologies as the automobile. How might today's society approach its introduction were it being developed now? How would society attempt to avoid unintended impacts?

