

David H. Guston
Center for Nanotechnology in Society
Consortium for Science, Policy & Outcomes
Arizona State University

- **Sec 2(b)(10):**
 - (a) establish societal implications research program
 - (b) require NSECs address societal implications
 - (c) integrate societal concerns w/ nano R&D for benefit of all
 - (d) provide for public input

"The conferees are aware of concerns that insufficient attention and study has been directed toward the ethical dimensions of nanotechnology research. The conferees direct the OSTP to conduct such an analysis and report to the Committees no later than March 31, 2006, on ethical questions raised by the National Nanotechnology Initiative.... The conferees direct OSTP to work with agencies receiving funds under this Act...to set aside a portion of the funding to analyze and report on the ethical issues generated from the research and development of nanotechnology. The conferees expect OSTP to follow the pattern established for the human genome project, allocating three percent of funding to ethical

- **Awards made Fall 2005**
- **NSEC/Center for Nanotechnology in Society at Arizona State University**
\$6.2 million
- **NSEC/Center for Nanotechnology in Society at UC Santa Barbara**
\$5 million
 - **Project at Harvard/UCLA (\$1.7 M)**
 - **Project at University of South Carolina (\$1.4 M)**

- **Arizona State University**
- **University of Wisconsin-Madison**
- **Georgia Tech**

- **North Carolina State University**
- **Rutgers University**
- **University of Colorado, Boulder**

- **Conduct fundamental and problem-oriented research on the societal implications of nanotechnologies;**
- **Expand -- through undergraduate, graduate, and post-doctoral training -- the community of scholars with the skills to create new insight into these societal dimensions of NSE;**
- **Engage publics, policy makers, business leaders, and NSE researchers in dialogues about the goals and implications of NSE, and use this process to build a network committed to making NSE socially beneficial and addressing NSE-related societal conflicts; and**
- **Build partnerships with NSE laboratories to introduce greater reflexiveness in the R&D process, so that problems may be addressed as ideas are being generated, evaluated, and developed, rather than after products enter society and the marketplace.**

- **Boundary Organizations**
 - Negotiate the contingent character of the science/politics boundary
 - Provide space that legitimates and facilitates production of boundary objects and standardized packages
 - Involve the participation of principals on both sides of the boundary, along with professionalized/specialized mediators
 - Exist at the frontier of relatively distinct social worlds and keep distinct lines of accountability to each community
- **Boundary Organizations include**
 - Offices of Technology Transfer (Guston 1999)
 - Bioethics Advisory Boards (Kelly 2003)
 - Health Effects Institute (Keating 2001)
 - Agricultural Extension (Cash 2001)
 - European Environmental Agency (Scott 2000)
 - Sustainable Pennsylvania Program (Beratan et al 2004)
 - Decision Center for Desert City (ASU)
 - Science Policy Assessment & Research on Climate (CU/ASU)

- **Real-Time Technology Assessment**
 1. **Research and Innovation Systems Analysis (RISA)**
 2. **Public Opinion and Values (POV)**
 3. **Deliberation and Participation (D&P)**
 4. **Reflexivity Assessment and Evaluation (RAE)**

- **Thematic Research Clusters**
 1. **Freedom, Privacy, & Security (FPS)**
 2. **Human Identity, Enhancement, & Biology (HIEB)**

- **RTTA 1 RISA**
 - **Research Program Assessment**
 - **Public Value Mapping**
 - **Workforce Assessment**
- **RTTA 2 POV**
 - **Public Opinion**
 - **Media Influence**
 - **Scientists' Opinion**

- **RTTA 3 D&P**
 - **Scenario Development Workshops**
 - **Innovation Space**
 - **Critical Corps**
 - **National Citizens' Technology Forum**
- **RTTA 4 RAE**
 - **Reflexivity Assessment**
 - **Boundary Organizations**

– Research Program Assessment

- Data-mining, interviews, etc.
- To ID core thrusts and actors

– Public Value Mapping

- Conceptual development
- To connect research to promised public values

– Workforce Assessment

- Supply & demand analysis
- To assess regional nano workforce

– Public Opinion

- Longitudinal surveys, linked to themes**
- To assess changes in public opinion**

– Media Influence

- Experimental science news stories**
- To assess media influence**

– Scientists' Opinion

- Surveys of nano researchers**
- To assess & compare scientists' values**

- **Scenario Development Workshops**
 - Deliberative exercise among experts
 - To provide plausible technological futures
- **Innovation Space**
 - User-centered research & design course
 - To create new products/scenarios
- **Critical Corps**
 - Critical theory
 - To engage critically nano products & scenarios
- **National Citizens' Technology Forum**
 - Six inter-linked citizens' panels
 - To deliberate on nano issue of their framing

– Reflexivity Assessment

- Intensive interviews w/ nano researchers
- To understand change in Identity, Knowledge, and Practice

– Boundary Organizations

- Comparative case studies
- To assess ability of CNS-ASU to bridge “ways of knowing” nano

- **To develop theory and explore cases of surveillance and sensing nanotechnologies, including issues of effectiveness, potential ubiquity and embeddedness, and impacts on practices of surveillance and on the individuals and communities subject to surveillance.**

- **To investigate the historical, philosophical, cultural, and political dimensions of the interactions between human biology and human values in the context of new nanotechnologies**

- **Undergraduate**
 - HON/BIO 394 Perspectives on Nanotechnology
 - POS 426: Elements of Public Policy
 - Learning Community (Sp 07)
 - InnovationSpace
 - Honors Theses
- **Graduate**
 - Science, Technology & Societal Outcomes
 - (PHD+)

- **CNS-ASU is a co-sponsor of ASU's chapter of The Triple Helix, a national undergraduate print journal of science, society and law.**
- **CNS-ASU is a sponsor, through its graduate fellows and assistants, of the new Science Café**
- **Collaborative proposal writing with various technical and societal groups on campus**

- **Web address: <http://cns.asu.edu>**
- **CNS-ASU and its research, education, and outreach activities are supported by the National Science Foundation under cooperative agreement #0531194.**

Any opinions, finding, and conclusions are those of the author and do not necessarily reflect the views of the National Science Foundation.