



The Center for Nanotechnology in Society at Arizona State University

Overview

The Center for Nanotechnology in Society at Arizona State University (CNS-ASU) combines research, training, and engagement to develop a new approach to governing nanoscale science and engineering (NSE) and other emerging technologies.

The 21st Century Nanotechnology Research and Development Act, signed into law in 2003 (Public Law 108-153), mandates integrating research on societal, ethical, and environmental concerns with nanotechnology research and development to ensure that NSE advances “bring about improvements in quality of life for all Americans.”

CNS-ASU responds to this directive by envisioning and developing ways to anticipate the transforming power of emerging technologies and govern them appropriately. Using the methods of “real-time technology assessment,” CNS-ASU seeks to enable its vision of anticipatory governance through enhanced foresight capabilities, engagement with lay publics, and integration of social science and humanistic work with NSE research and education.

The CNS-ASU mission is to:

Research the societal implications of nanotechnology and emerging technologies

Train an interdisciplinary community of scholars with new insights into the societal dimensions of emerging technologies

Engage the public, policy-makers, business leaders, and researchers in dialogues about the goals and implications of emerging technologies

Partner with cutting-edge laboratories to cultivate greater reflexiveness in the research and development (R&D) process

CNS-ASU is a Nanoscale Science and Engineering Center (NSEC), funded by the National Science Foundation (NSF) in October 2005 with a five-year, \$6.2 million award. NSF renewed the Center's work for a second five years with a \$6.5 million award that commenced in October 2010. With major partners at Georgia Tech and the University of Wisconsin-Madison, CNS-ASU is the largest center for the social study of emerging technologies in the world.

Decades before the most important outcomes of nanotechnology and other emerging technologies fully unfold, complex social relations are beginning to take shape. CNS-ASU probes the hypothesis that a greater ability for reflexivity—that is, social learning that expands the range of available choices—can help guide the directions of knowledge and innovation toward socially desirable outcomes, and away from undesirable ones. Towards this end, we believe:

Foresight and anticipation are crucial, even while prediction is impossible.

All governing requires some orientation toward the future. But what kind of perspective, and which future? We cannot predict the research or the societal outcomes of NSE and other emerging technologies. Nevertheless, CNS-ASU explores ways of making futures tractable through the rigorous development of scenarios and the study of how we can deliberate about futures using tools ranging from prototypes and models to games and science fiction.

Public engagement in research and innovation strengthens its societal value.

Knowledge and society are “co-produced” through the interaction of scientists and non-scientists in a variety of settings. Non-scientists should not simply be educated in technical facts and concepts, but also engaged early on in discussions about scientific research and whether it might advance important societal goals. From large-scale deliberations to informal science settings, CNS-ASU designs and tests new forms of public engagement to generate opportunities for true dialogues about emerging science and technology.

Integration of societal perspectives in laboratories increases the opportunity for informed deliberation and reflective choice.

CNS-ASU does not determine which outcomes are desirable or undesirable, nor does it impose agendas on NSE researchers. Rather, CNS-ASU believes greater reflexivity will expand the realm of informed deliberation and increase the opportunity for conscious choice, thus enhancing the quality of research outcomes. CNS-ASU helps scientists, technologists, and citizens develop a greater capacity to understand where scientific and social values come from, what they mean, and how they may be related to decisions about emerging science and technology.



research education outreach

Societal-level outcomes require “intellectual fusion” across disciplines.

Research that best contributes to socially desirable outcomes cannot be focused purely on one scientific discipline or intellectual approach. Knowledge from across the natural sciences and engineering, the social sciences and the humanities, as well as the professions of law and policy, design and architecture, and business and journalism, are all necessary to comprehend the complexity of the real world – as is knowledge from the general public, including participation from under-represented communities.

CNS-ASU develops ensembles that draw together foresight, public engagement, and integration of technical and societal concerns to help build the capacity to govern NSE and other emerging technologies even as they are initially explored in the laboratory.

Research

CNS-ASU has two types of integrated research programs, along with integrated activities in education and outreach.

First, its methods-oriented Real-time Technology Assessment (RTTA) programs are:

RTTA 1: Research and Innovation Systems Assessment, which uses bibliometric and patent analyses to understand the evolving dynamics of the NSE enterprise.

RTTA 2: Public Opinion and Values, which uses surveys and quasi-experimental media studies to understand changing public and scientists' perspectives on NSE.

RTTA 3: Anticipation and Deliberation, which uses scenario development and other techniques to foster deliberation on plausible NSE applications.

RTTA 4: Reflexivity and Integration, which uses participant-observation and other techniques to assess the Center's influence on reflexivity among NSE collaborators.

Second, its thematic research clusters (TRC), which pursue fundamental knowledge and create linkages across the RTTAs, are:

TRC 1: Equity, Equality and Responsibility, which explores ways in which NSE research interacts with ideas of social and economic equity, responsible innovation, and development.

TRC 2: Urban Design, Materials, and the Built Environment (“Nano and the City”), which investigates visions of the nano-enabled city of the future through links among NSE, the built environment, social structures, and sustainability.

Education

CNS-ASU is extensively involved in formal and informal educational activities, from undergraduate teaching to graduate student and post-doctoral training and mentoring. We help scientists, policy makers, and the public better assess emerging technologies through immersive experiences in classrooms, laboratories and science museums.

Many of these activities are tightly integrated with research and outreach to build broader societal capacity for anticipatory governance. CNS-ASU is recognized as a national leader in educating science and engineering graduate students in the societal aspects of NSE. Our “Science Outside the Laboratory” two-week immersion program for doctoral students in Washington, DC. helps scientists better understand how their work is used and affects the world.

Our Informal Science Education program simultaneously informs the public about new scientific findings and their societal aspects and trains students in how to engage the public in conversations about research. CNS-ASU has an outstanding record in preparing students for and placing them in careers in research and teaching, as well as in professional positions in the public and private sectors.

Outreach

CNS-ASU is committed to scholarly dialogue and exchange with a variety of audiences. We work closely with the Nanoscale Information Science Education Network (NISE Net) to bring ideas about the societal dimensions of nanotechnology to broad public audiences. CNS-ASU sponsors a monthly Science Café for the general public at the Arizona Science Center. These informal discussions bring together members of the community in dialogue with scientists to explore the technical and societal aspects of emerging technologies.

CNS-ASU also designs and pilots large-scale public engagement activities – such as the National Citizens' Technology Forum on Human Enhancement and Nanotechnology and FutureScape City Tours – that encourage citizens to anticipate the plausible role that emerging technologies may play in their lives.



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Visit our website to learn more about CNS-ASU research, education and outreach programs.

cns.asu.edu

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