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CNS–UCSB

Center for Nanotechnology in Society

NSF SES 0531184

New Methods for Public and Other Stakeholder Participation

W. Patrick McCray, Co-PI

NSEC: Center for Nanotechnology in Society at UCSB

NSF NSE PI Meeting, Dec 6-8, 2010

CNS-UCSB Mission: Nanotechnology Origins, Innovations, and Perceptions in a Global Society

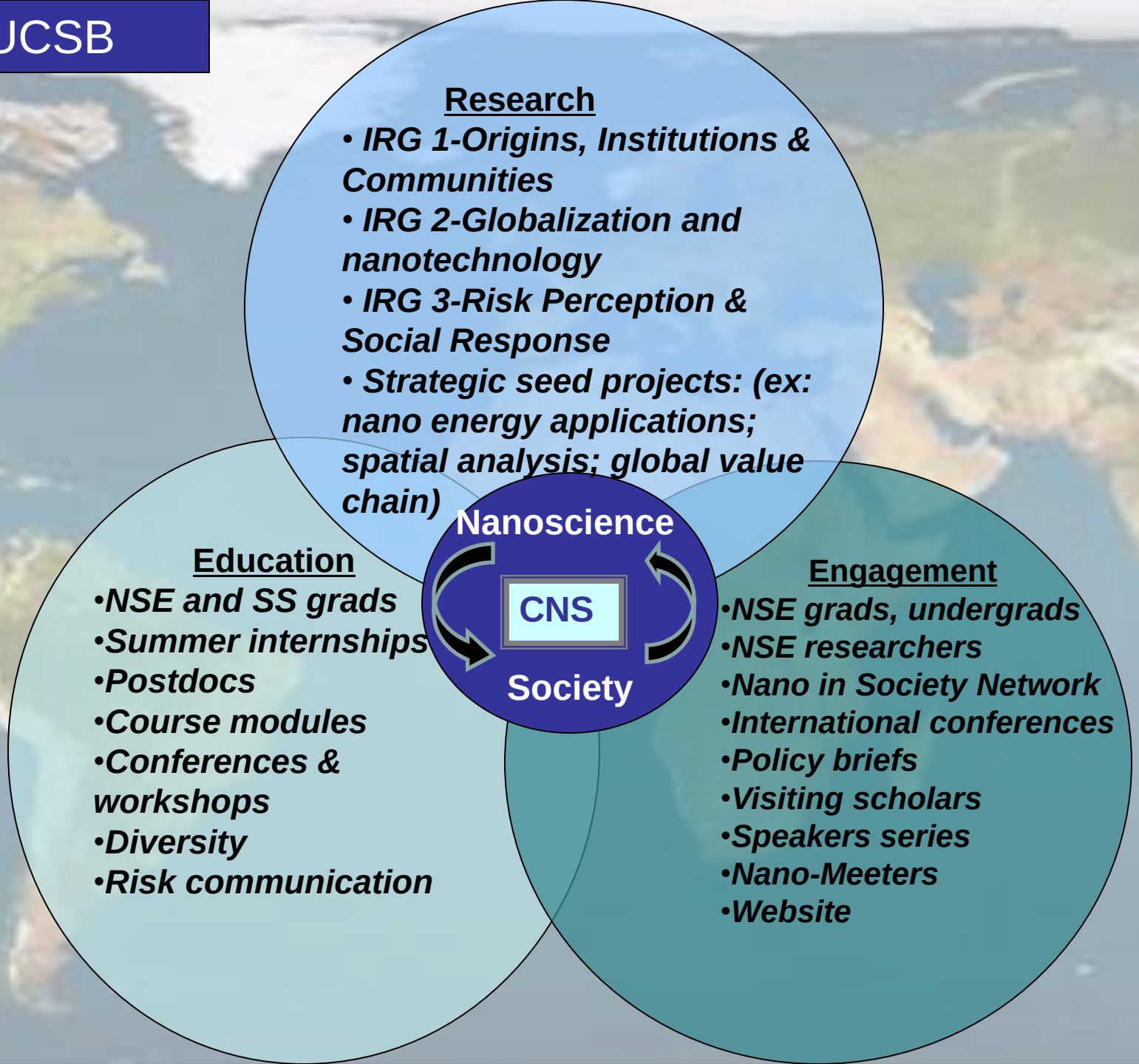
CNS challenge: How can nanotechnology mature into a transformative technology, in our rapidly changing international economic, political & cultural environment?

- Requires many methods, new approaches
- Unprecedented opportunity to provide guidance, show value of understanding social issues

Key factors we focus on:

- Scientific & technological processes
- Safe creation, development & commercialization of nano-products
- Acceptance by diverse publics ←→ incorporation of public concerns
- Global and transnational processes

CNS-UCSB


Research
• IRG 1-Origins, Institutions & Communities
• IRG 2-Globalization and nanotechnology
• IRG 3-Risk Perception & Social Response
• Strategic seed projects: (ex: nano energy applications; spatial analysis; global value chain)
Education
•NSE and SS grads
•Summer internships
•Postdocs
•Course modules
•Conferences & workshops
•Diversity
•Risk communication
Nanoscience
CNS
Society
Engagement
•NSE grads, undergrads
•NSE researchers
•Nano in Society Network
•International conferences
•Policy briefs
•Visiting scholars
•Speakers series
•Nano-Meeters
•Website

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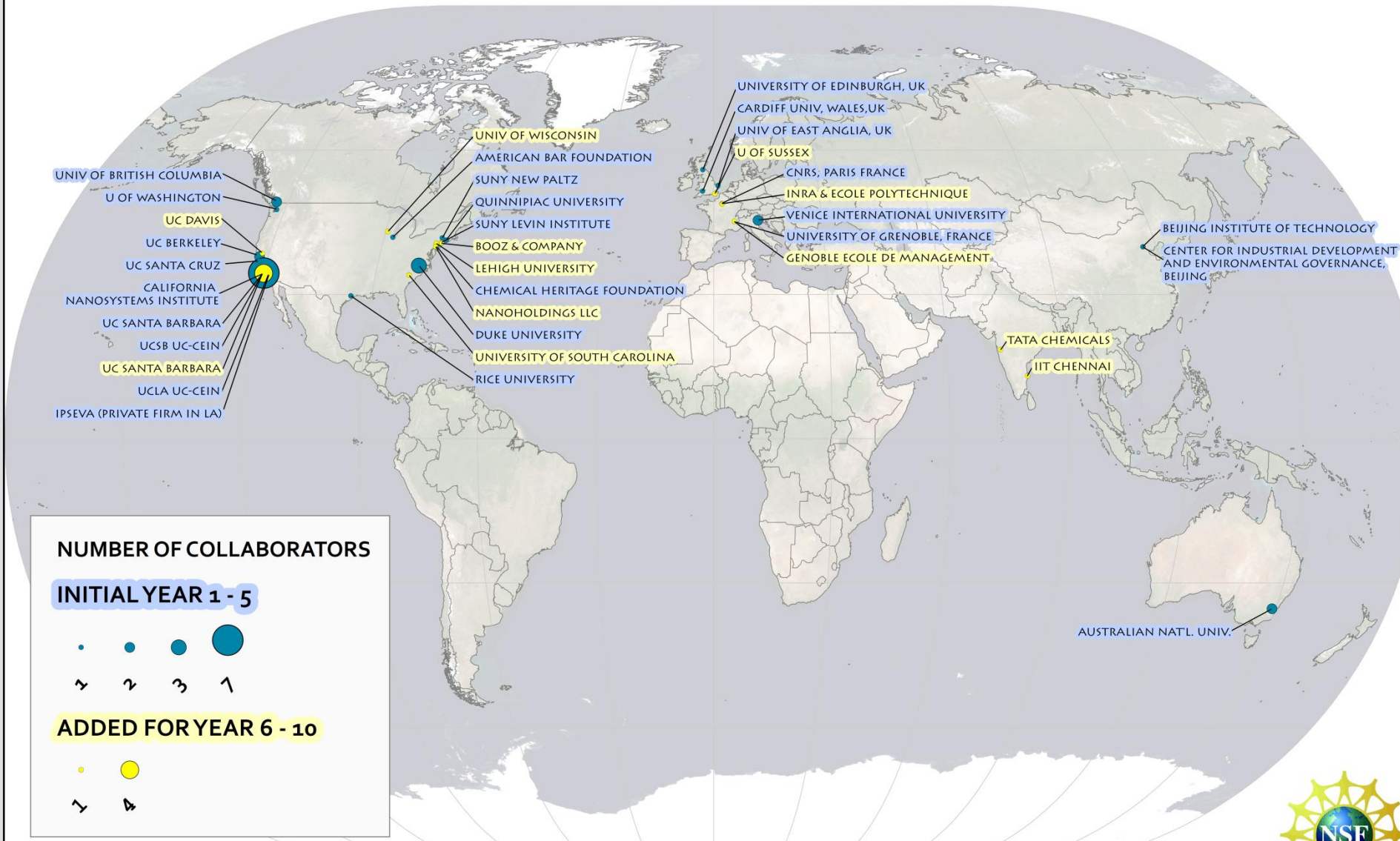
CNS–UCSB RESEARCH COLLABORATIONS

Center for Nanotechnology in Society



MAP MADE BY INDY HURT

CNS Tools for Outreach & Engagement

- Speakers series
- Website
- Conferences and Workshops
- Blog
- NanoDays community events
- Weekly Clips
- Policy Presentations
- Nano-Meeter (science café)
- Newsletters
- Public Presentations
- Podcasts
- Distribution Database
- Media outreach

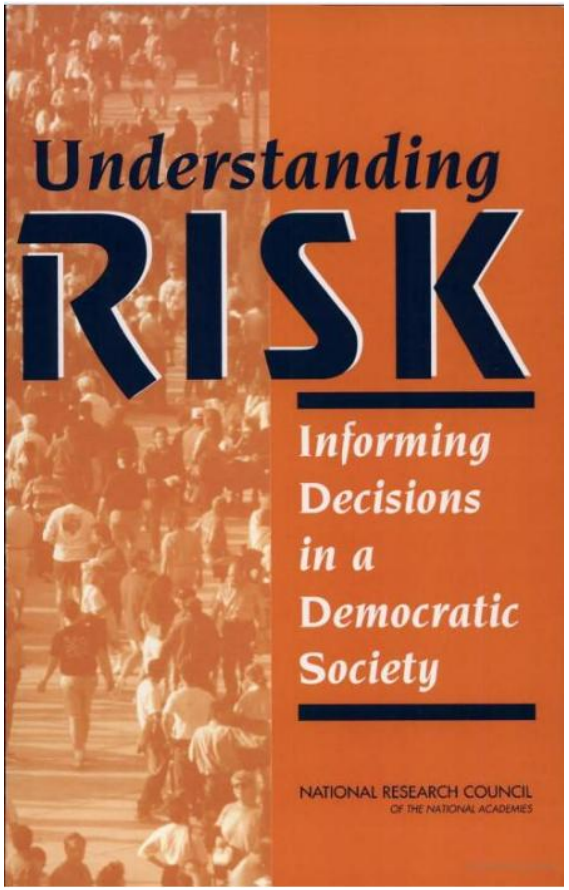
Who are the Stakeholders in Nanotech Development?

- Who are the key stakeholders?—**multiple parties**: funding agencies, scientists, toxicologists, EH&S personnel, industry, regulators, insurers, public and public interest groups; media
- Public research is “upstream”: low awareness/high reactivity. No one ‘public’—diverse and important to engage and address across difference
- International/global context—CNS-UCSB has been global from inception, leading globalization and value chain research key
- No universal approach—must be tailored to each

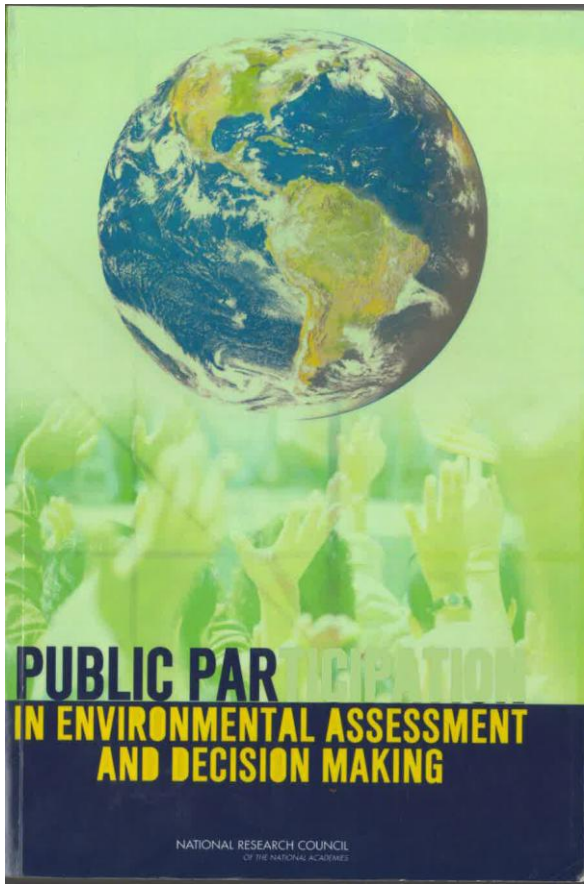
Multiple methods for gaining understanding of a broad range of stakeholders

- Qualitative social science—interviews, small group dialogue, on-line forums, participant-observation—deeper, contextual, cultural domains, values, narratives, identities, experiences
- Quantitative social science—phone, web, & mail surveys, experimental research— broader, more shallow, representative samples, or experimental
- More: Comparative historical case analyses; life histories of leading NSE scientists; content analysis of policy, media and other documents; archival research
- Collaborative, interdisciplinary, international (different toolkits, expertises), environmental and health experts, include NSE students
- New media as important vehicle

Engaging Diverse Publics: Part of much broader deliberative turn in US and abroad



Stern & Fineberg (1996)



Dietz & Stern (2008)

Engaging Diverse Publics

Application Matters: 2007 Cross-National US-UK Energy-Health Deliberations

1. Benefits Rather than Risks Continue to Frame Nano Risk Perception

2. Cross-National Differences: subtle and contextual

3. Different Application: Different Perceptions

4. The Social Trumps the Technological in the Discussion of 'Risk'

Pidgeon, N., Harthorn, B., Bryant, K. & Rogers-Hayden, T. (2009) Deliberating the risks of nanotechnologies for energy and health applications in the United States & United Kingdom. *Nature Nanotechnology* 4 (2): 95-98.

Engaging US Publics: Trust as a Factor

Trust enhancing

- Independent consumer watchdog will investigate complaints against industry
- Industry mostly complies with new regulations to register nano products
- Program established to provide consumer health guidelines for nano products
- Environmental group calls for a complete ban on selling nano products

Trust decreasing

- People get sick from a nano product but it's still sold
- Study on ENM safety is found to rest on fake data
- Industries refuse to voluntarily report ENM toxicity
- Government declares no need for nano safety regulations
- A company is fined for failure to register nano products

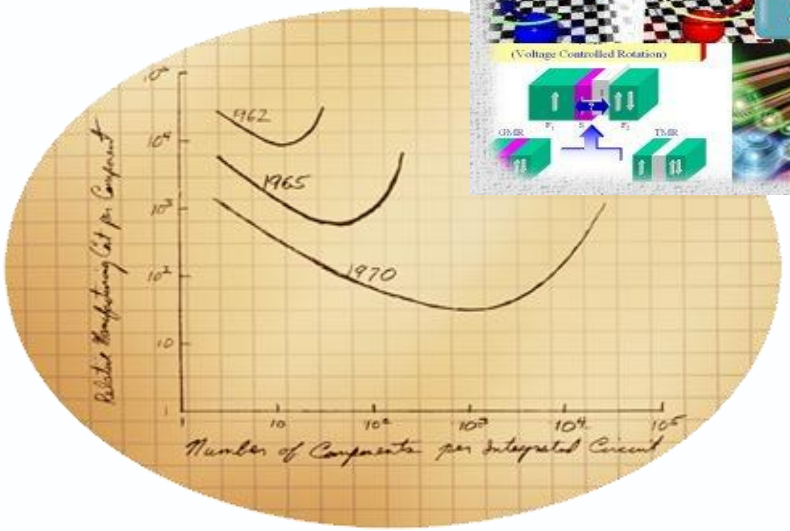
Satterfield, Conti, Harthorn & Pidgeon 2010 under review, from 2008 CNS-UCSB IRG 3 survey research

Engaging experts: members of the NSE community

- **Firsthand accounts of origins, institutions and communities:**
  - Invaluable map of networks, motivations, and experiences in the early history of nanotechnology
- **Methods**
  - Broad, international sample
  - Policy makers, VCs, scientists, technologists, regulators
  - Background research, audio-recordings, multiple interview sessions, transcription
  - 2-3 per project year
  - Permanent deposit at Chemical Heritage Foundation

Engaging experts: From Microelectronics to Nanoelectronics

Spintronics



Moore's Law, 1965

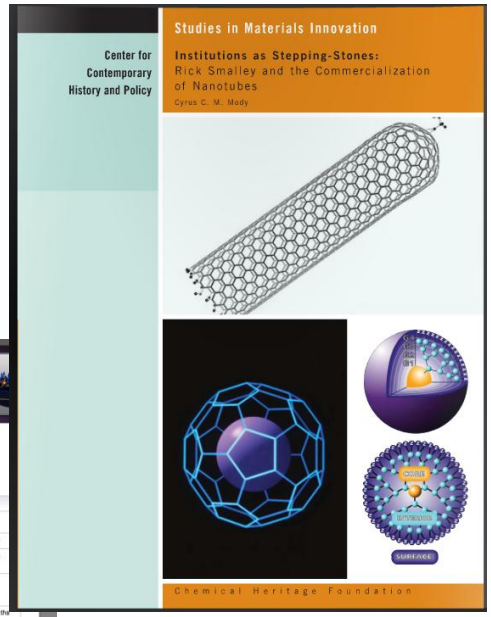
Memory Storage Technologies

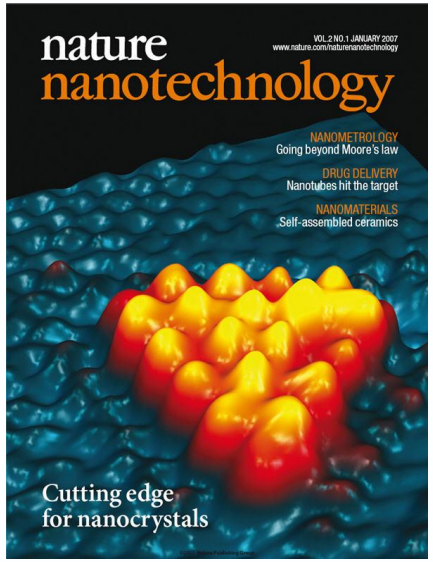
Engaging experts: Scientists, engineers, members of "nano & society" community

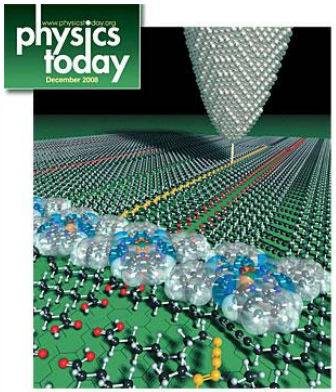
The larger world of nano

Cyrus C. M. Mody

Research in the social sciences and humanities can help scientists and policymakers to better understand the nanotechnology enterprise and to make it more transpa







Assembling international science in Japan

The Long History of Molecular Electronics:

Microelectronics Origins of Nanotechnology

Hyungsub Choi & Cyrus C.M. Mody

commentary

How spintronics went from the lab to the iPod

W. Patrick McCray

The commercial success of products based on giant magnetoresistance is often cited as a reason for supporting basic physics research. The reality is more complex, given the range of bodies, including IBM and the US military, involved in developing new technologies based on this Nobel-prize-winning discovery.

Engaging experts: nanotoxicologists

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UC CEIN Center for Environmental Implications of Nanotechnology

about | research | education/outreach | people | places | resources | events | publications

Research

Prof. Barbara Herr Harthorn

IRG 1

IRG 2

IRG 3

IRG 4

IRG 5

IRG 6

IRG 7

IRG 7: Risk Perception of Potential Environmental Impacts of Nanotechnology

Leader: Barbara Herr Harthorn

The aim of this group is to address more specifically the societal implications of emerging nanotechnoloy toxicological information and data, thinking about how various sectors of the public, such as NGOs, industry, and media perceive the environmental threats of nano-enabled materials.

The group's efforts will involve interacting with CEIN scientists to understand their work and which materials they are focusing on, and developing survey instruments to gauge public perceptions of threats.

The group will also engage with science journalists to develop "socially sustainable environmental risk communications." In essence that means developing modes of communication that address the concerns scientists and various elements of the public have about the risks of nano-enabled products, including helping such stakeholder groups to understand where there should be concerns and where there need not be concerns.

7-1 Comparative Historical Analysis of Environmental Risk Controversies

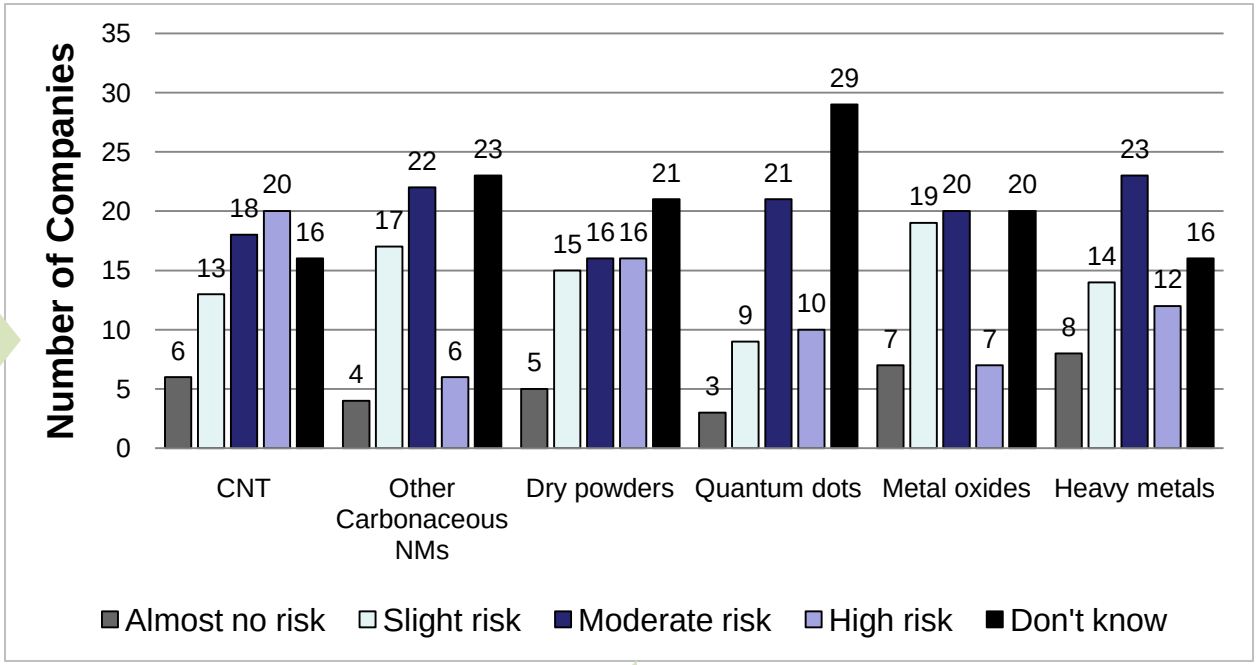
7-2 Risk Assissment and Nanomaterial Regulation

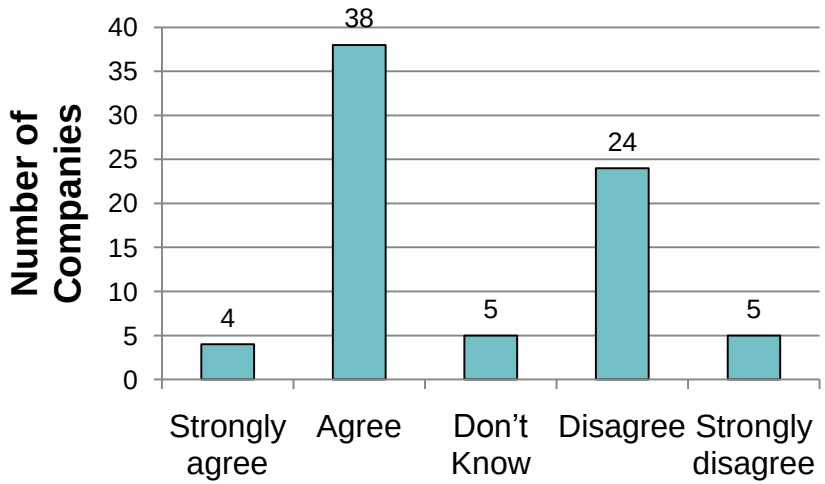
7-3 Environmental Risk and Emerging Regulation in Nanomaterials: An Inventory and Survey of Industry Perceptions and Practices, 2009 - 2010

7-4 Environmental Risk Perception

Engaging industry: Global nanotech industry

Industry views on risk of ENMs to environment and health





Industry views: "Voluntary reporting approaches for risk management are effective for protecting health and the environment."

Engeman, Baumgartner, Carr, Fish, Meyerhofer, Holden & Harthorn 2010 in prep

Engaging Students: Education at CNS

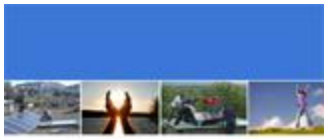
"Working with my mentor has opened many doors for me personally and professionally. I have gotten funding and publications…that I probably wouldn't have otherwise."
– a social science graduate fellow, Fall 2008

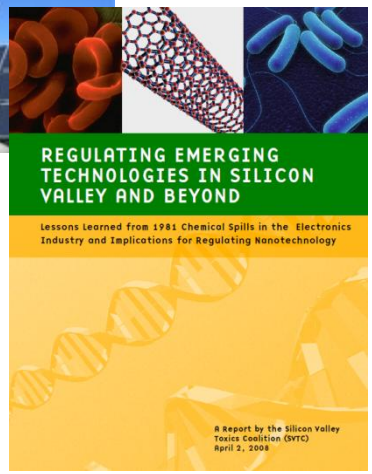
"magic"
- 2008 Site Visit Team

Diverse community
- 40% women, 27% underrep., 43% first generation grads.
- open recruitment, collaboration with campus programs
- 12 disciplines represented

"I have learned how the work of scientists and engineers impacts greater society, societies' reactions to such work, and the limited understanding scientists have of this."
– a science & engineering fellow, Fall 2008

Engaging NGOS: In the US





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Regulating Emerging Technologies to Protect Workers, Communities and the Environment

How will manufacturing, recycling and disposal of nanotechnologies potentially impact the environment, the health of workers and communities' health? Sheila Davis, Executive Director of the Silicon Valley Toxics Coalition (SVTC), will discuss lessons learned from the environmental crisis caused by the electronics industry and how these lessons can be applied to the regulation of nanotechnology and other emerging technologies.

Over the past 10 years, Sheila Davis has played a valuable role at SVTC and in shaping environmental policy in the high-tech industry. She is one of the co-founders of the Computer TakeBack Campaign and sits on its steering committee. In 1996 she researched and developed the first electronic recycling legislation to reach the California Governor's desk and in 1999 spearheaded the first pilot programs in the country to collect and recycle electronic waste from the residential curbside. Sheila's research, advocacy and policy development led to a successful ban on hazardous electronic waste from the California municipal landfills and the subsequent passage of the first electronic recycling legislation in the nation. Sheila holds a Bachelor's Degree from the University of California and served as a journalist, state legislative aide and community development specialist before joining the staff of SVTC.

Sheila Davis
Executive Director of the
Silicon Valley Toxics Coalition

Wed., Dec. 1
1:00 - 2:30pm
MultiCultural Center Lounge

NSF

CNS UCSB

Co-sponsors include:
Center for the Study of Work, Labor, and Democracy
MacArthur Chairs for Human Rights in the Workplace
Department of Feminist Studies

CNS-UCSB Speaker Series
893-3995 or cns@cns.ucsb.edu

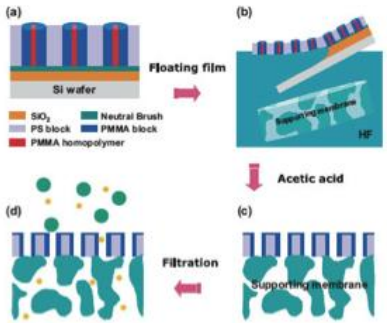
Emerging Technologies/Emerging Economies:

(Nano)technology for Equitable Development

CNS-UCSB • 2009 CONFERENCE • November 4-6 • Washington DC

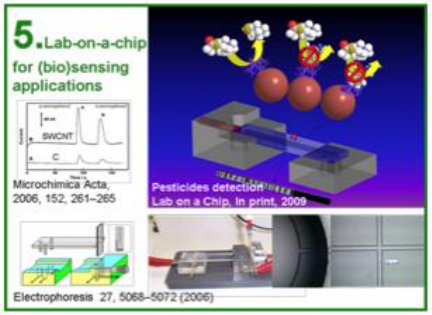
Home | Description/Abstract | Registration | Conference Programming | Contact

Energy/Environment



Water

Food Security

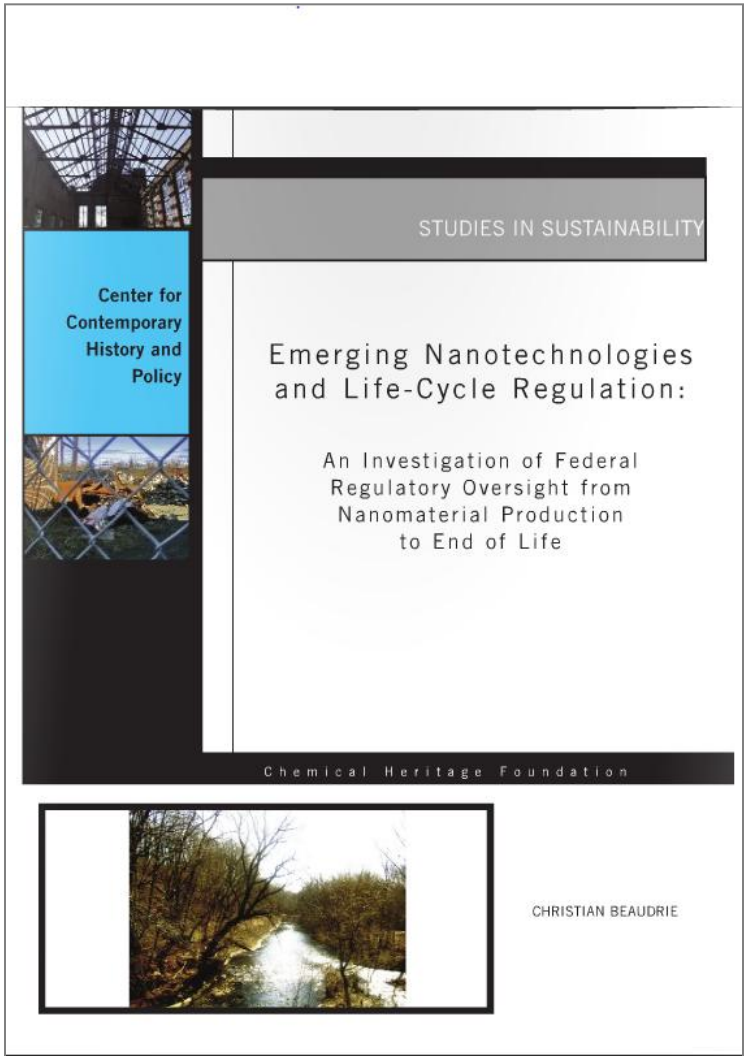


Health

- 75 leaders from NGOs, gov't, private sector, science, engineering, academia, from China, India, Brazil, Mexico, other developing countries, the US and EU
- Facilitated by Meridian Institute
- Plenary panels, breakout groups around four themes ➔ problem-solving, networking
- Keynote address at National Press Club by Federal CTO Aneesh Chopra
- Woodrow Wilson Center on the Hill: "The Road to Copenhagen" with moderation by Dave Rejeski, and introduction by Senator Ron Wyden.

CNS UCSB | Woodrow Wilson International Center for Scholars | UC SANTA BARBARA engineering | the INSTITUTE for ENERGY EFFICIENCY | CENTER FOR BIOLOGICAL AND ENVIRONMENTAL NANOTECHNOLOGY CBEN RICE UNIVERSITY | UCSB SOCIAL SCIENCES | Meridian Institute Connecting People to Solve Problems | NSF

Engaging Regulators



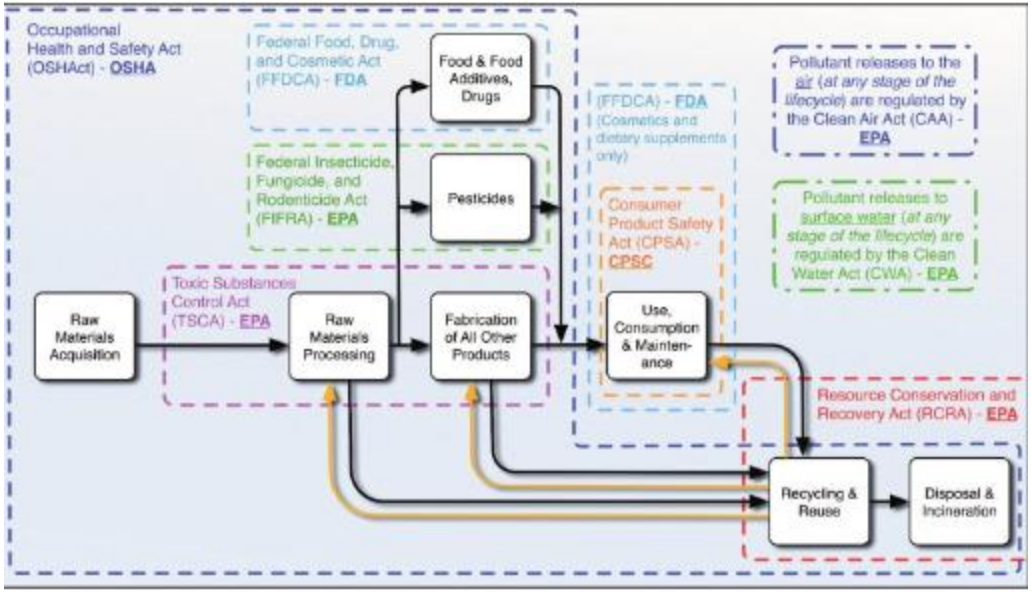


Figure 7. Collection of regulations across the life cycle of a nanomaterial

UCCEIN

Engaging Policy Makers

- Feb 2010: Director Harthorn and Rice Univ collaborator Mody testified on Societal Implications research, Working group of the President's Council of Advisors on Science and Technology (PCAST)

President's Council of Advisors on Science and Technology

THE NATIONAL PRESS CLUB

Nov 4, 2009: US CTO Aneesh Chopra speaks at CNS event on nanotechnologies for developing economies

March 24, 2009: IRG 3 co-leader Pidgeon was an invited witness to the UK House of Lords in their discussion of nanotechnology and food

www.parliament.uk

Policy Makers Need Historical Context

- Value of "applied history of science and technology" for policy

- Understanding current and future state of emerging technologies requires understanding diverse institutions and communities from which they emerged.

- Path dependency matters…Research that only considers success stories, paths that can be directly traced to the present creates dangers for policy makers


science progress

home about issues

INNOVATION

Unintended Consequences

What Ten Years of the National Nanotechnology Initiative Can Teach Us About Federal R&D

SOURCE: Andrey Rogach

Semiconductor nanocrystals, which emit different colors based on the size of the particles, as shown in the rainbow above, are useful for researching technologies ranging from fluorescent labels to novel light sources.

By W. Patrick McCray | Monday, March 22nd, 2010 | Share This | Print

2010 essay connecting history of sci/tech to policy

Multi-stakeholder participation adds value to NSE

- New challenges call for new methods and new uses of existing methods
- All these stakeholders have roles to play in responsible development
- Systematic research by trained social scientists and scholars → far better basis for understanding motives, concerns, interests, and actions of diverse players
- →Early warnings re: differences among key stakeholders that could lead to conflicts downstream
- Participation changes participants, and there is no substitute

Thank you. Questions?

Acknowledgements

This work is funded by NSF through cooperative agreement # SES 0531184 to the Center for Nanotechnology in Society at UCSB; and grant # SES-0824024 to co-PIs Appelbaum, Harthorn, Hawker, and McCray. Also funded by NSF & EPA through cooperative agreement #EF 0830117 to the UC Center for Environmental Implications of Nanotechnology. Views expressed here are those of the authors and do not necessarily reflect the views of the NSF or EPA.