

Innovation and Advances in Governance of Nanotechnology

New Research in Anticipatory Governance of Nanotechnology

National Science Foundation
2011 NSF NSE Grantees Meeting

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NSEC/Center for Nanotechnology in Society at Arizona State University



- **Research** the societal implications of nanotechnologies
- **Train** a community of scholars with new insight into the societal dimensions of nanoscale science & engineering (NSE)

- **Engage** the public, policy makers, business leaders, and NSE researchers in dialogues about the goals and implications of NSE
- **Partner** with NSE laboratories to introduce greater reflexiveness in the R&D process



Anticipatory Governance at CNS-ASU

Anticipatory Governance

Provides strategic vision

1. Foresight

All governance requires a disposition toward future

2. Engagement

Crucial normatively, strategically, pragmatically

3. Integration

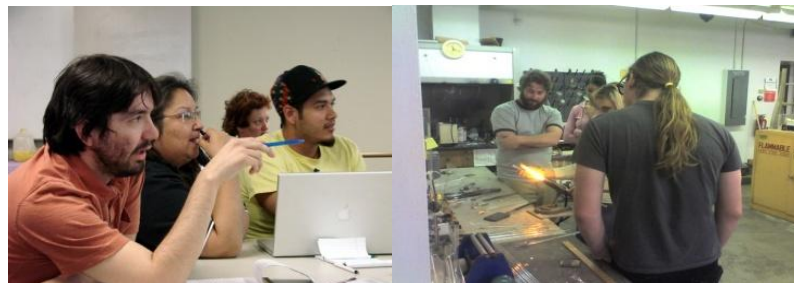
Scientists know things we don't, and vice versa

4. Ensemble-ization

Because none of these works in isolation

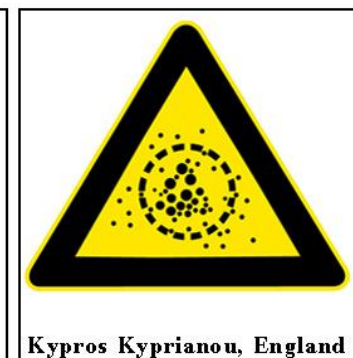
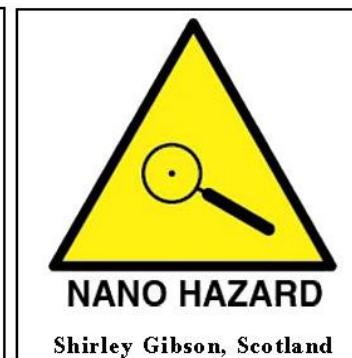
A broad-based capacity extended through society that can act on a variety of inputs to manage emerging knowledge-based technologies while such management is still possible.

Anticipate: from *ante-* and *capere*, “to take [into possession]” “beforehand”; related to capable and capacity and not a synonym for “expect,” “predict,” or “foresee”



Anticipatory Governance – Not Government

- Not “do” or “ban”
 - “Science finds, genius invents, industry applies, man adapts”
 - Moratoriums proposed by ETC Group and Friends of the Earth
- Wide array of mechanisms
 - Regulation
 - Licensing/restrictions
 - Liability/indemnification
 - Intellectual property
 - R&D funding & tax credits
 - Testing
 - Treaties
 - Public Understanding of Science
 - Informal Science Education
 - Public engagement
 - Public action
 - Priming
 - Routinization
 - Codes of conduct
 - Standards
 - Laboratory decisions



Four Warrants for Anticipatory Governance

1. **Stop-gap**: until we have prediction
2. **Fail-safe**: in case we can't get prediction
3. **Priority-setting**: capacity to predict may not be comprehensive and doesn't tell us how to deploy that capacity
4. **Generality**: prediction in some areas (nano) doesn't imply prediction in other emerging technologies (syn bio)

Anticipatory Governance – Not a New Idea, Just a New Capacity



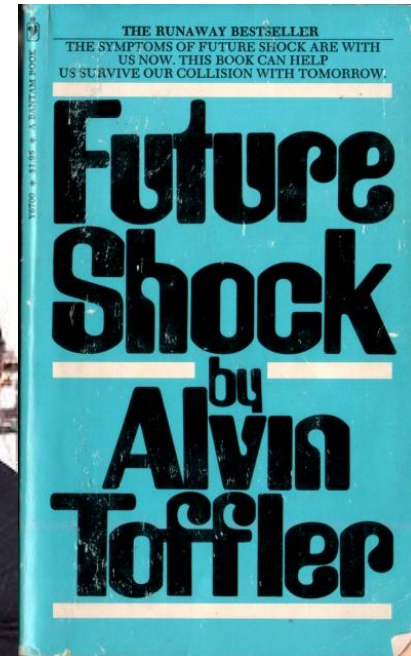
“Competent social scientists should work hand-in-hand with natural scientists, so that problems may be solved as they arise, and so that many of them may not arise in the first instance.”

Detlev Bronk

Pres., JHU

Pres., NAS

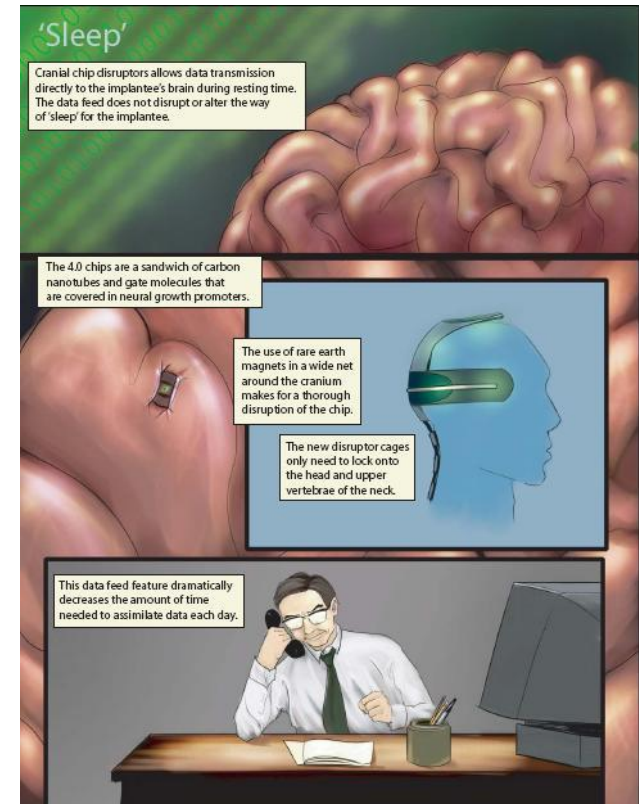
Pres., Rockefeller U



“anticipatory democracy”

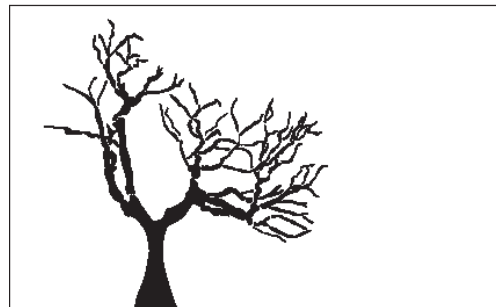
RTTA 3: Anticipation and Deliberation

- NanoFutures
- National Citizens' Technology Forum (NCTF)

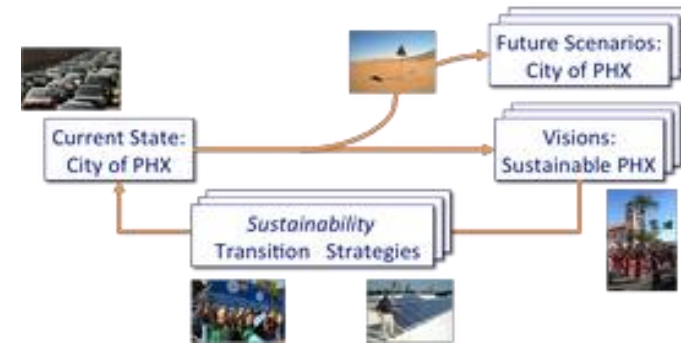


Three Strands of Anticipation Research

- Visioning
- Future Artifacts and Deliberation
- Plausibility



Sustainable Anticipatory Governance



Sustainable Anticipatory Governance

VISIONING



City of St. Paul Climate Adaptation Scenarios

The Future of Medical Diagnostics



Scenarios Matrix

		Value to Society	
		HIGH	LOW
Responsibility for Health	Individual		
	Institutional		



Solar to Fuels

Report on Interdisciplinary Workshop

Arizona State University, Thursday 4th March 2010, 10am-2pm

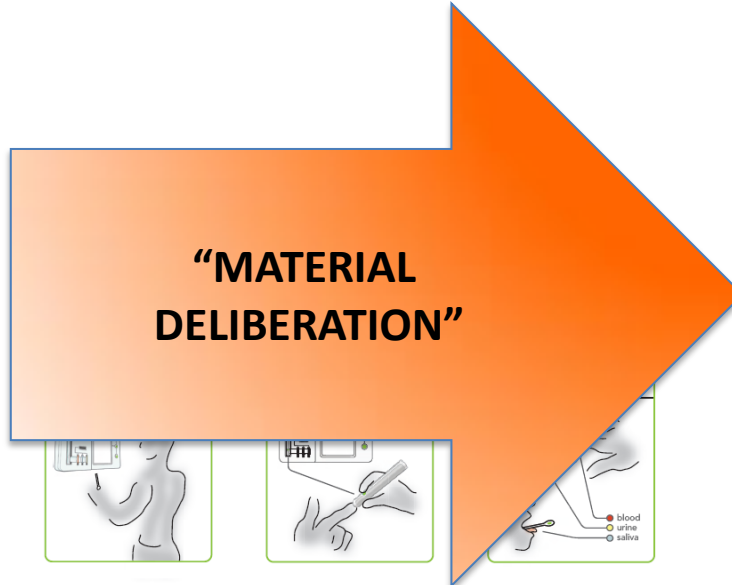
Sarah Davies, Cynthia Selin and Becky Allen

The Center for Nanotechnology in Society, Arizona State University

Anticipatory Governance Visioning Workshop



FUTURE ARTIFACTS & DELIBERATION



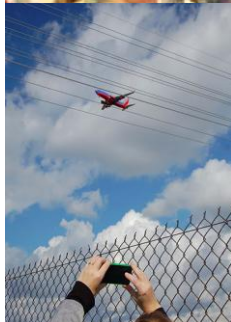
EMERGE:
 SCIENTISTS AND
 ARTISTS IMAGINE
 THE FUTURES

**MAKING AND
 HACKING:**
 EXPLORING
 DELIBERATIVE
 PRACTICES
**MEDIATING
 FUTURES**

Nano Education article (2010)



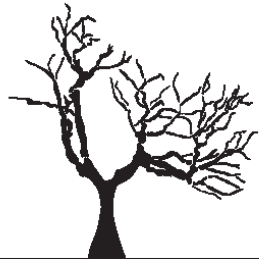
FINDING FUTURES



PLAUSIBILITY



International Workshop on Plausibility, Tempe, AZ (2009)
CNS-ASU *vodcast* on Plausibility (2009)

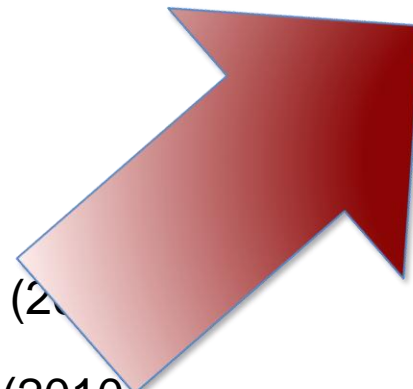


NanoFutures v.2
Survey on Plausibility

Special issue:

*International Journal of
Foresight and Innovation*
(call, 2011)

Writing workshop,
Ispra, Italy with the Joint
Research Centre (2012)



Technology in Society article (2010)
Science and Engineering Ethics article (2010)

Society for the Social Studies of Science (2010)

Society for Risk Analysis panel (2010)

Society for the Study of Nanotechnology and Emerging Technologies (2010)

CNS-ASU Leadership and Staff

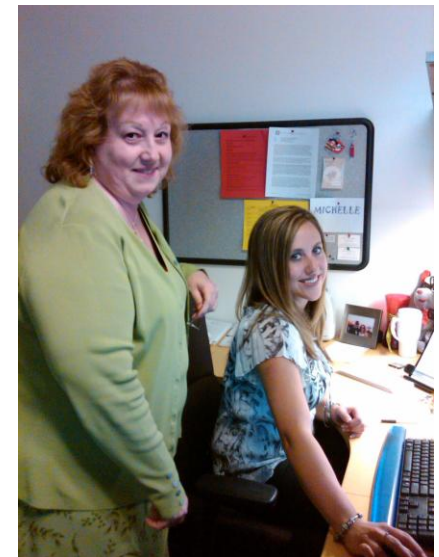


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Assistant directors J. Wetmore, C. Selin, E. Fisher

Staff:
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and
E. Curran
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Thanks!

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