Public Meeting on Research Needs Related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials

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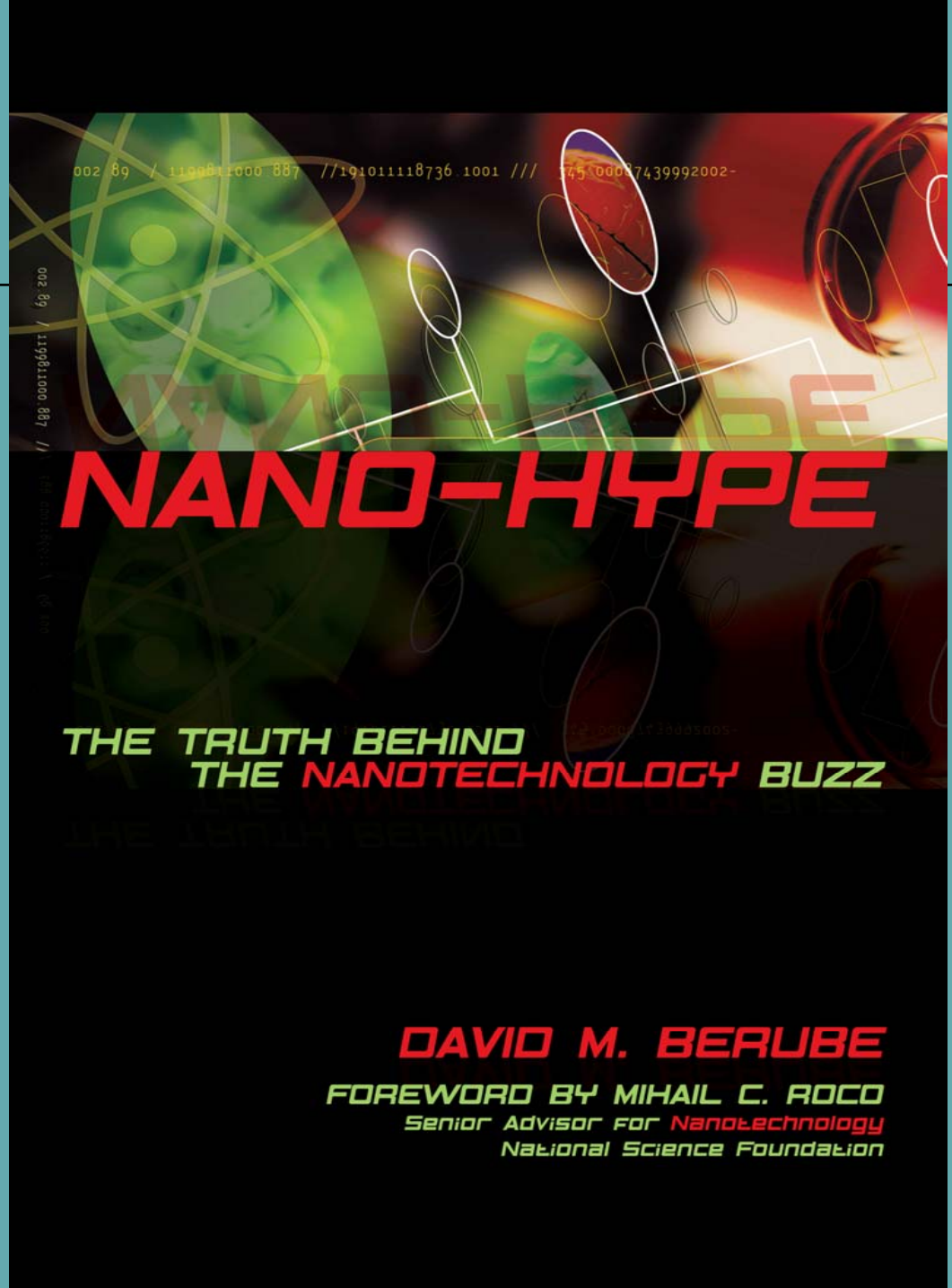
NanoESH Research Needs Assessment meeting in Bethesda, MD on January 9-10, 2007.

NANOHYPE:
The Truth Behind the Nanotechnology Buzz

Prometheus Books
2006

Over 100 pages of references



NEW ARTICLES, CHAPTERS & VENTURES

- **NBLJ** (next issue) - A modified liability regime and minor legislative initiatives for regulation.
- **Nano Perceptions** (next issue)– Magic Nano story.
- Wiley-Interscience (ed. Lin) – Rhetoric of Stakeholding.
- ICON – Media Alert.

GRANT HISTORY

- 2 NIRTs – Data, images, and public outreach ($1.5m).
- 1 CNS node (w ASU, UCSB, UCLA, Harvard, etc.) – Outreach, images, mental modeling ($1.3m).
- 1 NUE – undergrad. minor in nanoscience studies ($200k)
- 1 NIRT application – Intuitive Toxicology *or* I-TOX – ($1.4m).

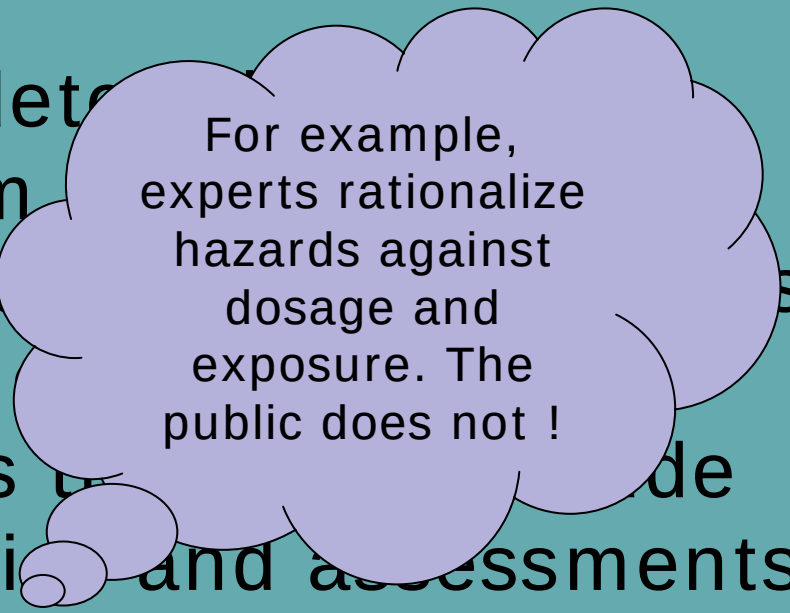
MAJOR QUESTIONS

1. What is the quality of the available information?
2. Who are the experts?
3. What are the uncertainties and sources of ignorance?
4. How precautionary do we wish to be, and how should that be reflected in the methodological choices of our investigations?
5. Is the available or foreseeable scientific information in this case of a high enough quality to include it into the policy process at all, and are there other sources of information of adequate quality, for example traditional, craft and lay knowledge?
6. And who should make all these judgments?

DEFINITIONS of ITOX

…[L]aypersons dete… differently from … example, intui… to the assignm… involves biases u… de both probabiliti… and assessments of hazards quantified by empirical research."

NanoHype 2006, p. 302.



FIRST LEVEL TENSIONS

PUBLICS

Public sphere considerations and representative democracy.

STAKEHOLDERS

1. As consumers.
2. As potential movement factors.
3. As taxpayers.

NEW CONCEPTS

- **Post-post enlightenment science** (350 years after alchemy, etc.) beliefs-values returning to science decision-making.
- **Post normal science** includes 1. uncertainty analysis and management, 2. integration of different sources of knowledge across the lay-expert divide, and 3. lay participation in the form of extended peer review.
- **Third culture intellectuals** (Snow's Two Cultures) – science literature has become popularized.
- **Science literacy** – deficit model fails.
- **Metaphorical visions** – GMOs and food products from ***cloned animals***.

SECOND LEVEL TENSIONS

EXPERTS (expert model)

Experts use risk assessment – hazard against probability.

LAYPERSONS (mental model)

Laypersons use intuition and values in constructing their hazard and probability estimations.

Technical information is decoded by the public using an algorithm that was not used by the experts when encoding the information. Research tends to support the conclusion that the public has a more multidimensional risk perception when many *qualitative factors* enter into their determinations.

Physical scientists and engineers, and policy scientists assume more and better research will calm the public. ***Not necessarily true.***

TRADITIONAL RISK ALGORITHMS IGNORE INTUITION & PERCEPTION

$$R = f(H,O)$$

Low-probability-high-consequence events matter!

INTUITIVE TOXICOLOGY (I-TOX)

- Sandman variables (voluntary-involuntary…).
- Dread (carcinogenicity, mutagenicity…).
- Outrage (ire and indignation, highly susceptible populations…).
- Stigma – (shame and dishonor, function of past experience and degree of trust…).

I-TOX HAZARD/OCCURRENCE BIASES

1. Affect bias – probability as a function of emotion.
2. Affiliation bias (trust) – probability favor associations: industry, government, academic.
3. Alarmist bias – probability favors high alarm.
4. Availability bias – probability as a function of recall.
5. Informational bias – probability favors social information generated often by highly visible or mediated anecdote.
6. Proportionality bias – probability favors reduced proportion rather than number of people assisted (child in the well, missing mountain climbers).

THIRD LEVEL TENSIONS

Risk communications research
(see blog – **nanohype.blogspot**
11/11 & 12/31 postings)

- Risk carries a negative valence (*kiken).*
- Communicating risk (regardless of valence) increases alarm (high-voltage lines & cell phones).
- Rumor or false information as effective as verified and valid information (data, testimony, etc.).
- Playing with words and images is insufficient (framing theory weak).
- Negative communication is more difficult to correct than positive information and disasters sell newspapers and increases viewer-ship (misguided outreach).

SARF - ADDITIONAL HAZARD/OCCURRENCE VARIABLES

- Mediation by news (trust is over-rated – there are no culturally independent forms of trust).
- Defined - social amplification of risk denotes the phenomenon "/…/ by which information processes, institutional structures, social-group behavior and individual responses shape the social experience of risk, thereby contributing to risk consequences" (Kasperson 2000, 37).

NEW SARF CONCERNS, Part 1

- General.
  - Cable, satellite.
  - Internet, broad band.
- WWW formats.
  - Wikipedia.
  - Blogs and vlogs.
  - Podcasting and Vpodcasting.
  - IPTV sliver-TV (YouTube).

NEW SARF CONCERNS, Part 2
GRAY LITERATURE

Grey literature is literature that is not available through the usual bibliographic sources. As an example, scientific grey literature comprises newsletters, reports, working papers, theses, government documents, bulletins, fact sheets, conference proceedings and other publications distributed free, available by subscription, or for sale.

(see New York Academy of Medicine Grey Literature - http://www.nyam.org/library/grey.shtml).

IMPLICATIONS

1. Because of the open texture of scientific argument, such arguments can be prolonged indefinitely (i.e., criticize methodology).
2. Uncertainty is manipulated politically, to accelerate or defer major initiatives, e.g., fear mongering and transference.
3. Wrong-headed efforts at public outreach can have strong contagion and cascade effects.

Samuel Johnson
“Road to hell…”
John Ray (1670)
"Hell is paved with good intentions."
Saint Bernard of Clairvaux
(1091-1153) -
"Hell is full of good intentions or desires."

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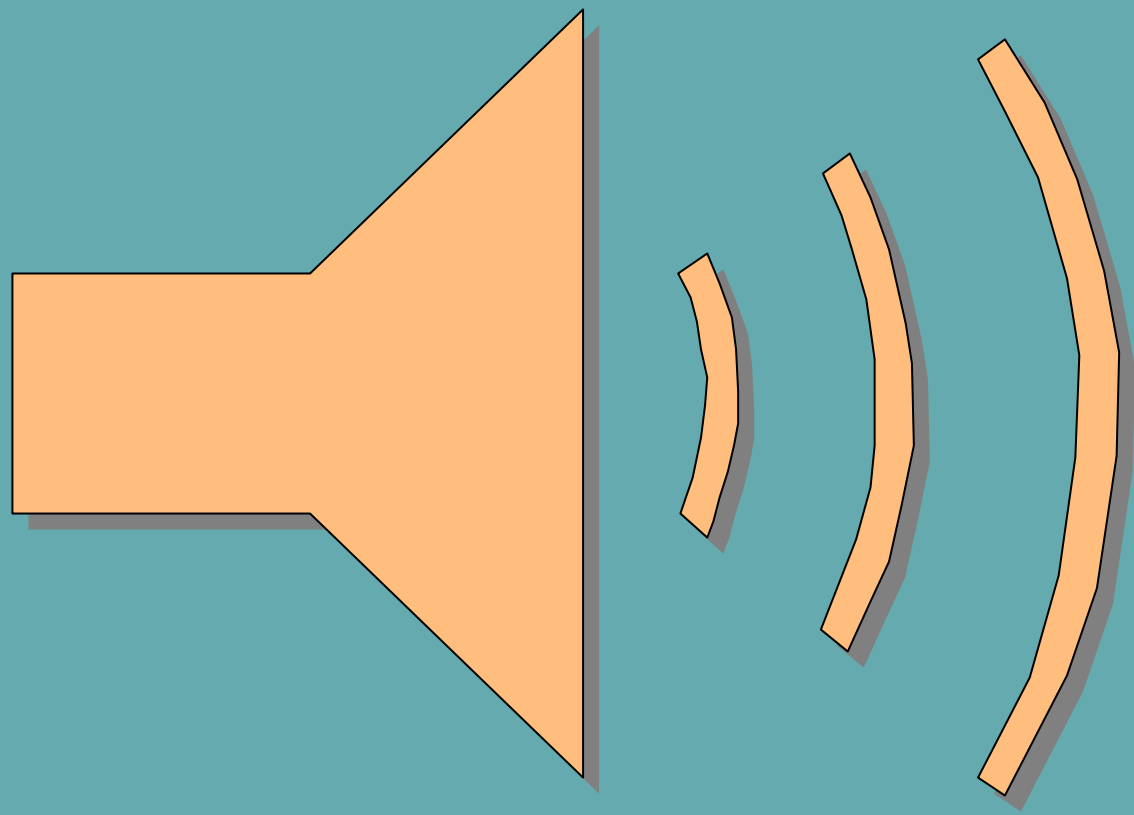
All opinions expressed within are mine and do not necessarily reflect those of the National Science Foundation, the University of South Carolina or the International Council on Nanotechnology.



Risk communication like chemistry and toxicology is not for amateurs!