

# Nanotechnology Oversight: The Big Picture

## Grand Challenges for ELSI Community

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NIRT: Evaluating Oversight Models for Active Nanostructures and Nanosystems:  
Learning from Past Technologies in a Societal Context  
SES-0608791

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# NIRT Research Goals

1. Assessment of oversight in 6 historical case studies **utilizing *criteria schooled by consensus (lit. collection & analysis, expert elicitation, consensus)***:
  - drugs
  - medical devices
  - ***chemicals in the environment***
  - chemicals in the workplace
  - gene transfer research (“gene therapy”)
  - ***genetically engineered organisms in the food supply***
2. Application of oversight lessons to nanobio (mapping, consensus)
3. Development of oversight models for nanobio products and research (scenario analysis, consensus)

***RAs—Adam Kokotovich and Pouya Najmaie***

# The Big Picture

What constitutes “good oversight” for emerging and convergent technologies?  
(nano-bio, phase 2, active nanostructures)

## Novelty of Approach

Comprehensive, multi-method and multi-perspective to evaluating oversight—  
Integrated Oversight Assessment

## Maturation of Methodology

How can this approach serve as a model for emerging technologies more generally?

## Integration of quantitative and qualitative approaches

Incorporation of criteria that are value- (non-utilitarian), science-, economic- and risk-based

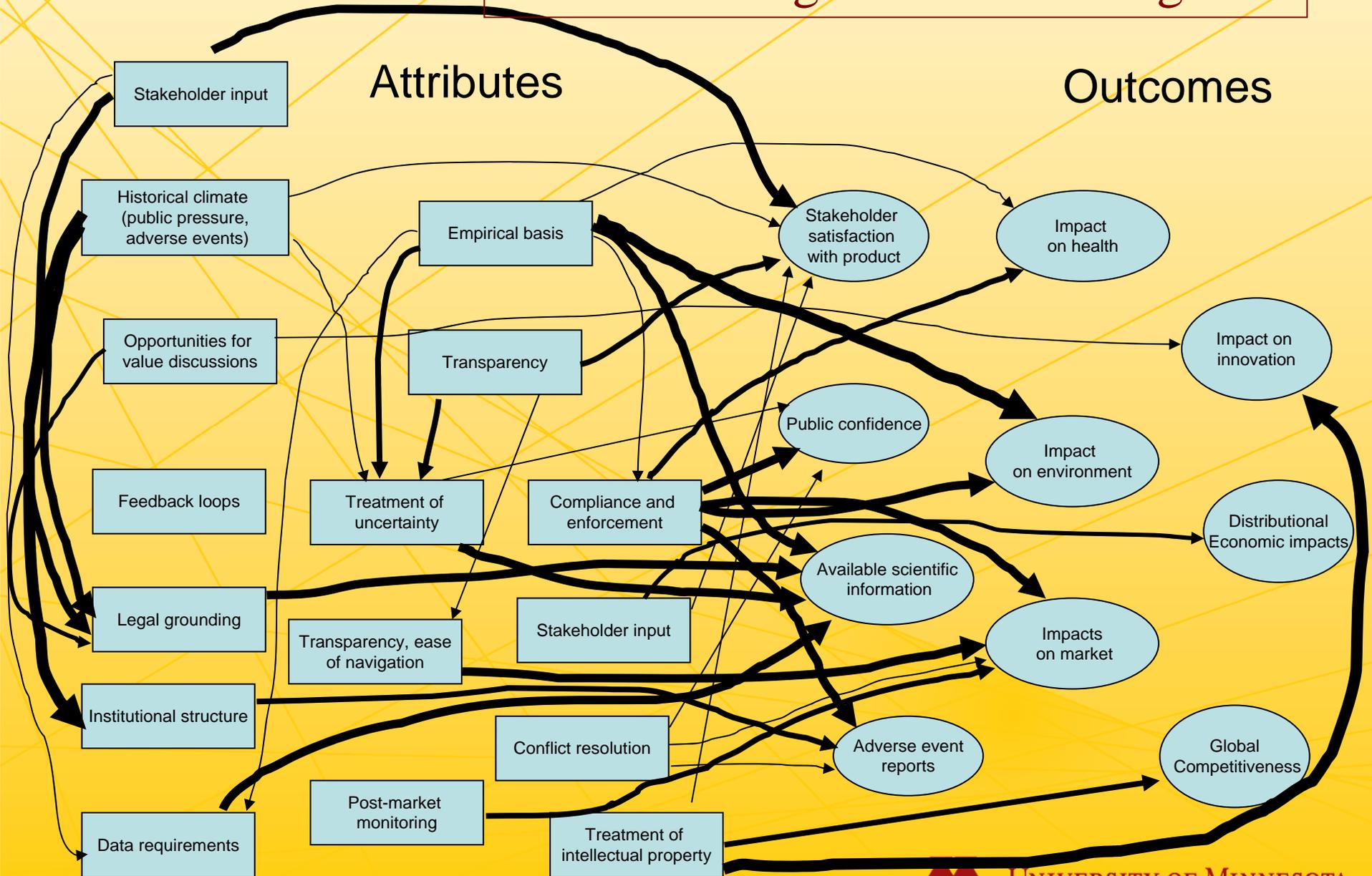
Expert elicitation

Public participation & input

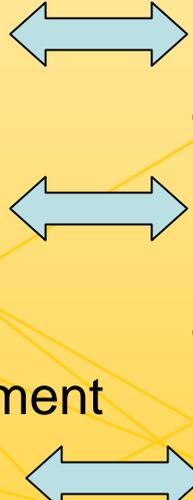
# Influence Diagrams for Oversight

## Attributes

## Outcomes



# Pros and Cons

- Novel approach to studying oversight models
  - Combines qualitative and quantitative approaches
  - Multi-perspective criteria—values to use of risk assessment
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- Novel approach to studying oversight models
  - Combines qualitative and quantitative approaches
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**The above pros and cons make this methodology difficult—  
An experiment in progress!**

**Extremely important to connect to other NSF funded, “oversight” groups  
Integration of our methodologies  
(U of VA, NEU, U of WI, etc.)  
Time and funding?**



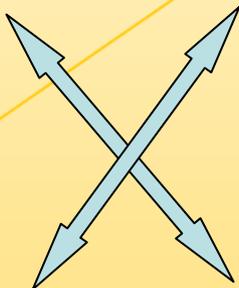
# Getting the public side.....

- Collaboration with Science Museum of MN “nano-forum” events—NISE network
- Vet oversight criteria with public
- Vet case studies and application to nanotechnology
- Challenges with how exactly to do this...
- Dual goals—informal education vs. social science/policy research



# Novel approaches to oversight analysis

- Bottom up
  - Inventory of R&D in agrifood nanotechnology (tech assessment)
  - Case studies (convergence!)
  - Oversight issues



- Top down (NSF-NIRT)
  - Multiple criteria to evaluate historical models
  - Relationships between attributes and outcomes
  - Application to Nanotechnology
  - Scenario analysis for specific products

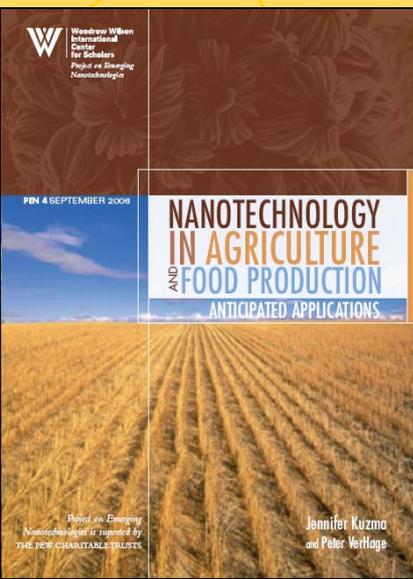
Upstream Oversight Assessment

Integrated Oversight Assessment

- Convergence?
- Comprehensiveness?
- Relevance?

- Practical implications, yet grounded in theory and with academic rigor

- Help to fill “gap” between decision makers and ELSI academic work



# Challenges to our community

Better define--What is the problem?  
(policy sciences)

Our research is relevant to decision-makers in government and industry

We should better translate and communicate the results of this work to decision makers in academe and industry.

Not just peer-reviewed pubs



Upstream decision-maker engagement

Industry wants to know how to develop nano responsibly-

But significant conflicts with IPR and CBI.

Government wants to know how to oversee nano responsibly

But significant political realities

- Can we come up with a comprehensive framework for ELSI-sensitive technology deployment?



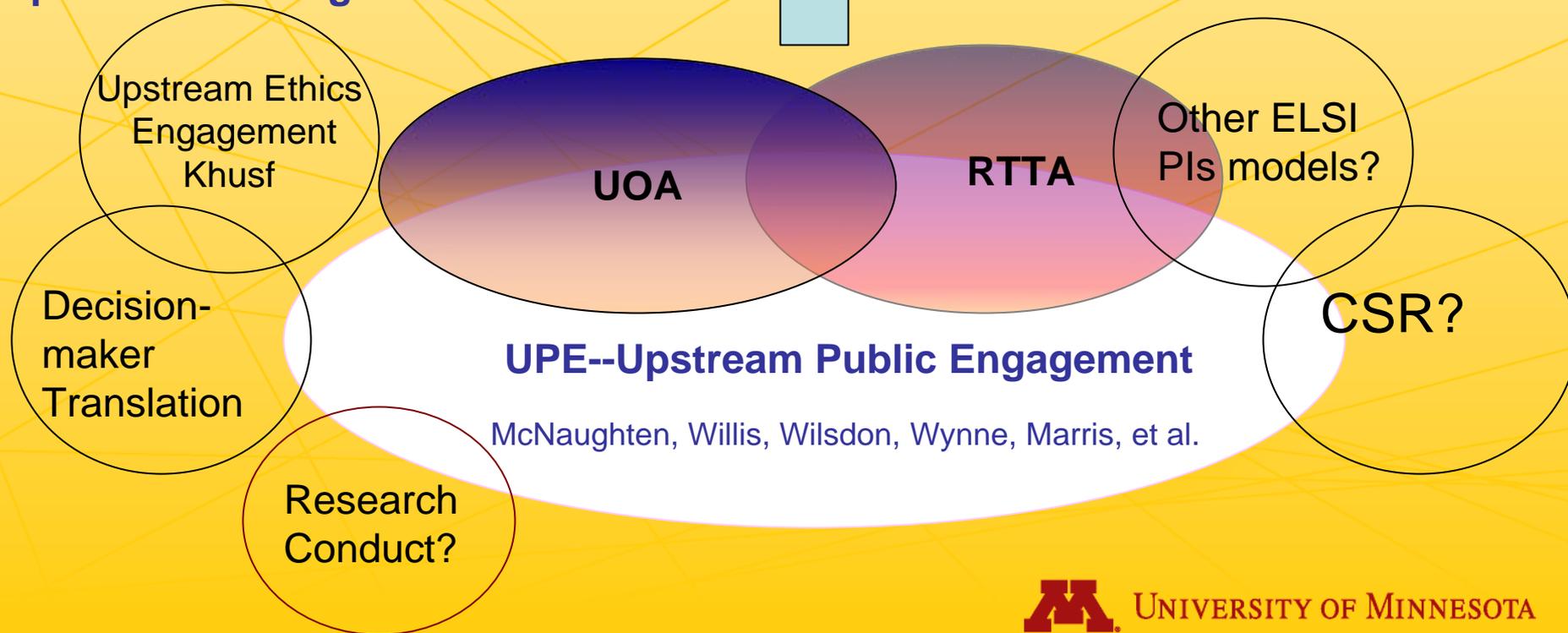
# Anticipatory Governance

Identify and address regulatory and non-regulatory oversight issues associated with new technological products long before they are marketed so that system is prepared—Kuzma et al., UMN

Integrate natural science and engineering investigations with social science and policy research from the outset—Guston and Sarewitz, ASU

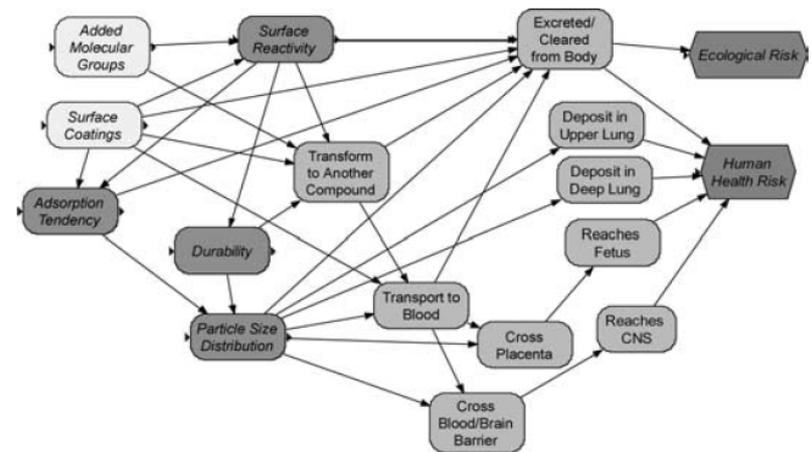
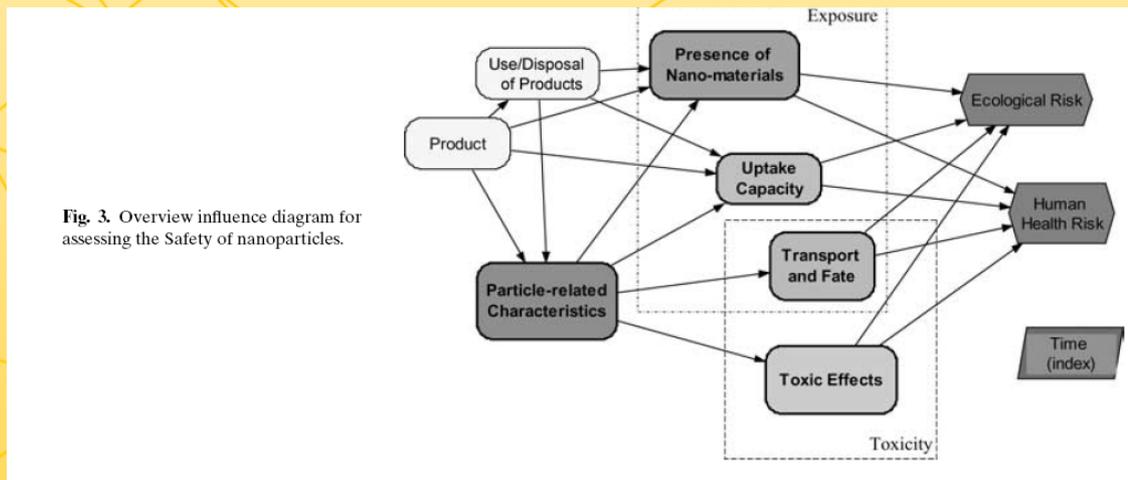
## Upstream Oversight Assessment

## Real Time Technology Assessment



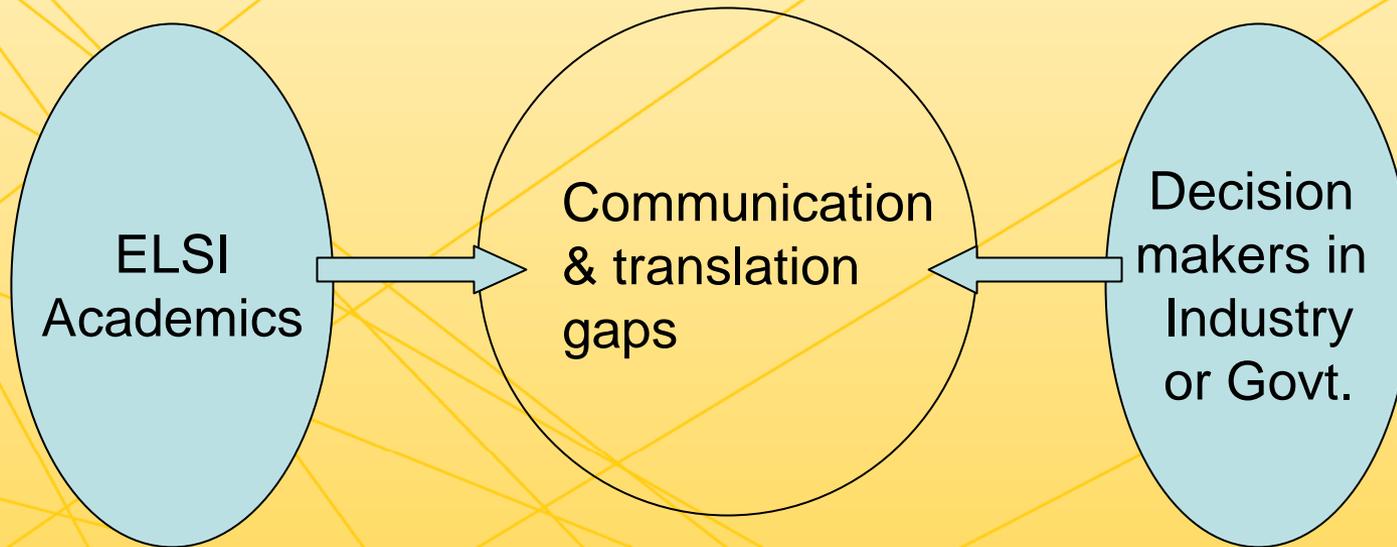
# Can we do this for ELSI?

- Risk analysis frameworks--Many being developed



(Morgan, Risk Analysis 2005)

# Gaps & Grand Challenges



- **Grand challenges for ELSI community**

- Continue to do good academic disciplinary and multidisciplinary research
- Help to fill communication gaps
- Unified framework for our complementary work translated for decision makers and industry
- How (methods), who, where, when (now!), what exactly?