

Teaching a course on ethics in nanoscience: some rights-based issues

AAAS Science and Human Rights Coalition
Washington D.C., July 17, 2012

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MSEG 443 Ethics in Nanoscience

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Supported by these grants:

NSF NUE “Connecting Nanotechnology and Alternative Energy Approaches through Undergraduate Education in Engineering” (0939283), 2009-2013

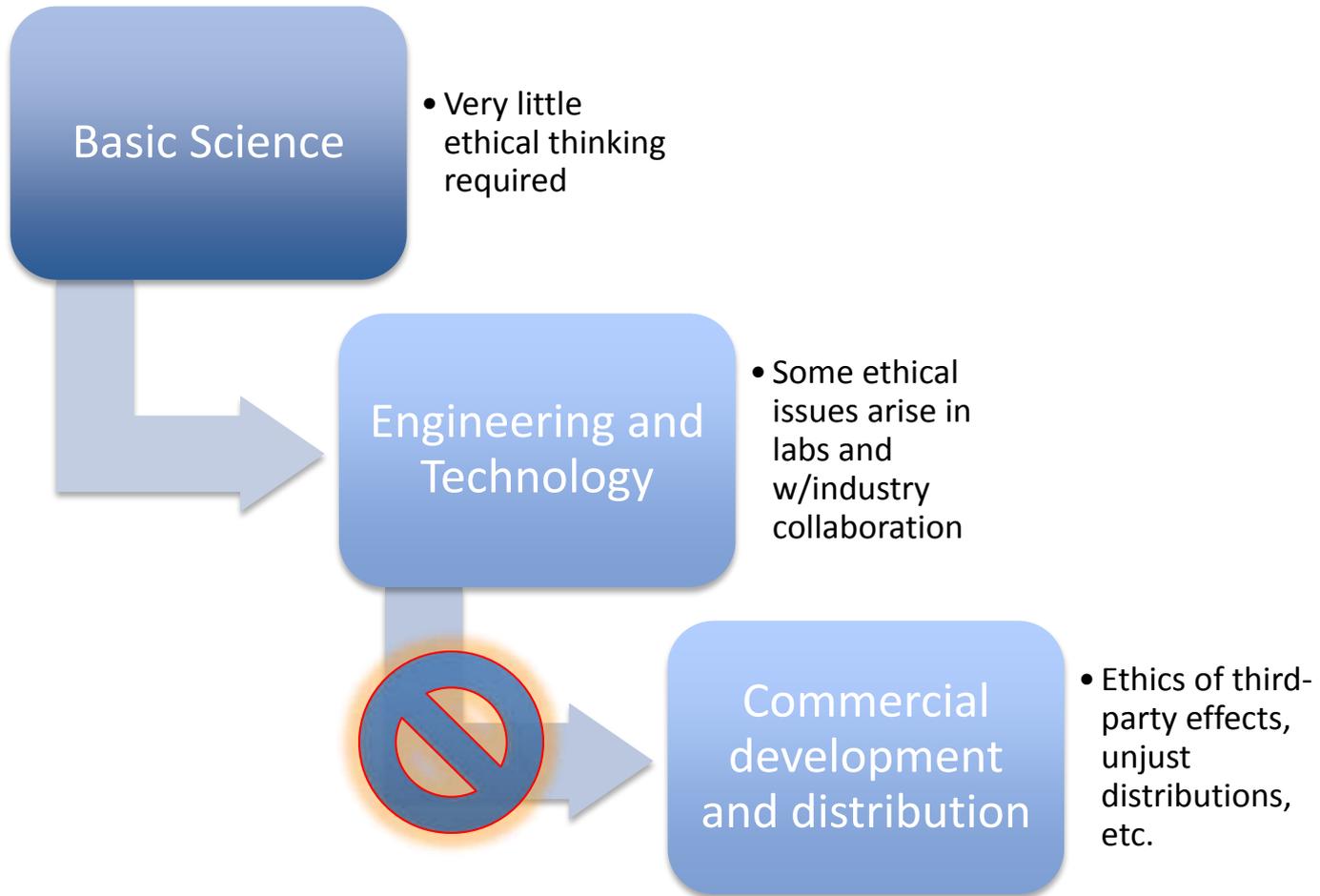
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NSF OISE “U.S.-Pakistan Workshop on Environmental Nanotechnology & Ethics” (1063995), 2011

5 Major Components of MSEG 443

- Basic ideas of nanoscience
- Recent developments in nanoscience
- Theories of ethics and applied (e.g., environmental, business, research) ethics.
- Case studies
- Workshop in Nanoethics

The basic issue: what is the filter between science/engineering and commercial development and distribution?



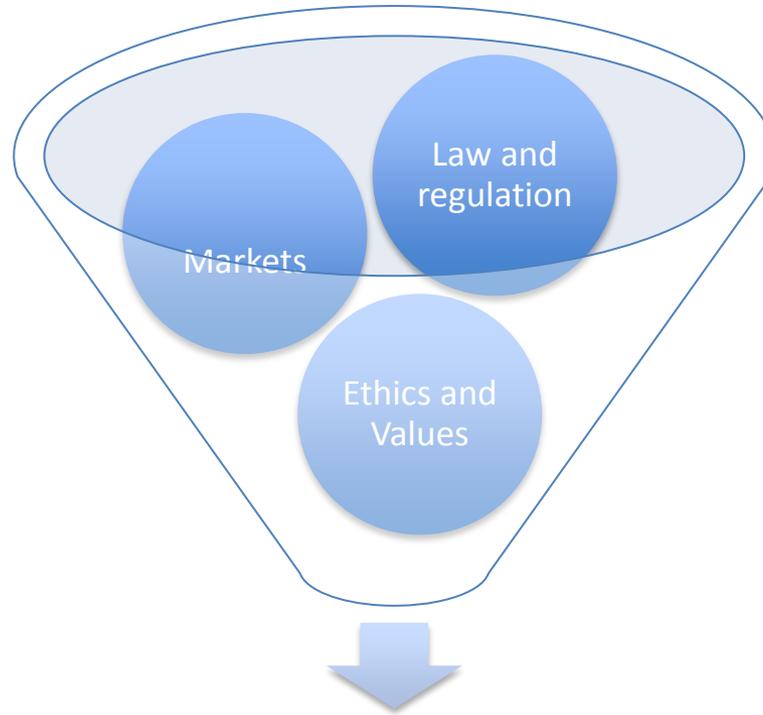
What makes up these “filters”?
How do they vary?
What gets through and what gets stopped?



consumer and insurance
markets

Regulations, taxes,
incentives, IP,
potential lawsuits

Ethics: individual/social &
cultural rights, future humans
the environment, etc.



Production and Distribution

The benefit of early consideration of ethics: to help us choose *good* technologies and distribute them appropriately

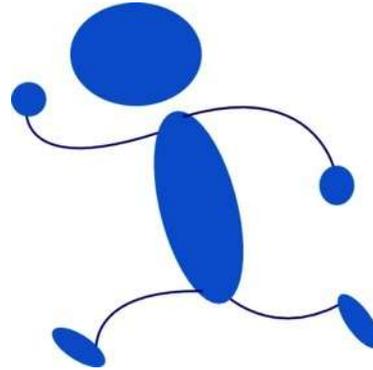
Some human rights considerations for nanotechnologies

- Could individual privacy rights be harmed by NT surveillance devices?
- If scarce resources are used to deliver nonessential goods (e.g., physiological/cognitive human enhancement), are basic needs/rights ignored?
- Will NT pollution from production/consumption be left for future generations to clean up?
- Could NT for environmental remediation cause more environmental stress—and who's remediation counts more ?

What ethical responsibilities do scientists and engineers have?

- Our state of partial ignorance: not much is known about important factors for NT development: NP fate, transport, life-cycle, reactivity, toxicity.
- Ought implies can! Moral obligations on scientists apply only to the extent that they *can* know enough to protect the public.
- Willful ignorance is not a good excuse! Effects on human health and environment must be researched along with basic science and engineering.

An analogy for thinking about risk and precaution:



Nanotechnology has much promise to create profits and provide solutions for energy, water, medicine, IT, and other needs.

We know very little about the “worst-case scenario” for NT.

The choice between “go slow” and “go fast” must consider public perception and acceptance.

Some benefits of NT seem trivial—but profitable!

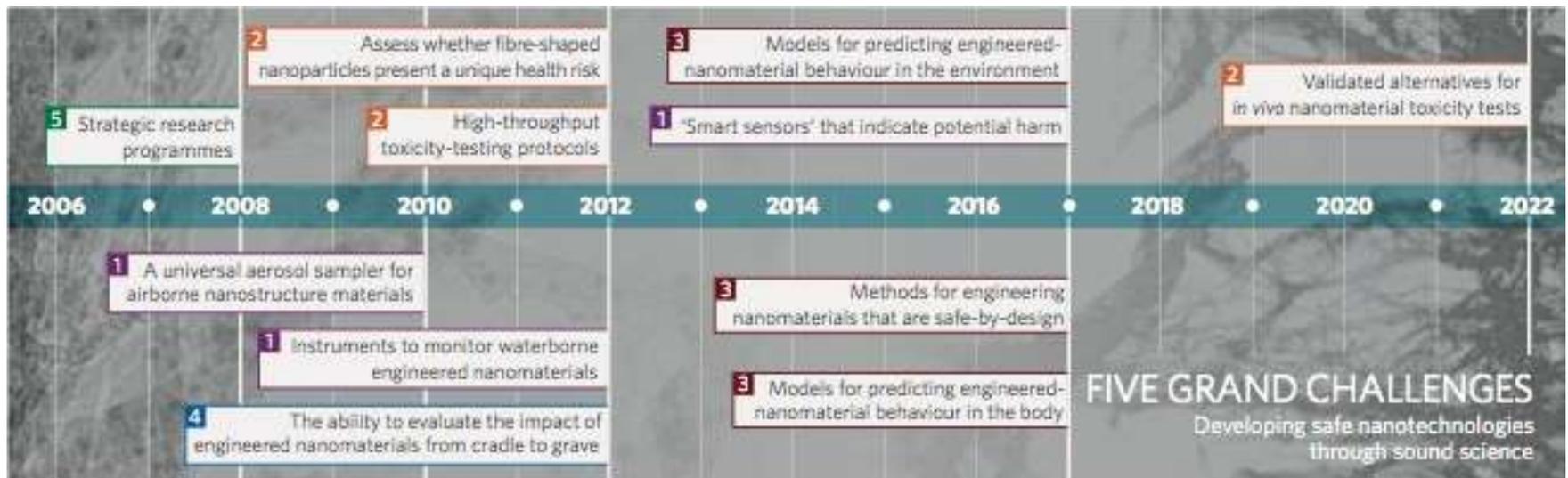


Falling behind in the “grand challenges” of safe nanotechnology

Nanotechnology is a reality now, and our ability to produce ever-more sophisticated materials, processes and products by engineering at the nanoscale will only increase over the coming years. Yet our understanding of the potential environmental, safety and health impacts of these emerging technologies is rudimentary at best.

Andrew Maynard, “Research on environmental and safety impacts of nanotechnology: what are the federal agencies doing?” (Testimony before the U.S. House of Representatives Committee on Science, 9/26/11)

Maynard, et al. “Safe handling of nanotechnology” *Nature* 2006



Special thanks to my colleague Ismat Shah



and to UD and Iowa colleagues
from the 2011 UAE and
Pakistan
Nanotechnology conferences





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The College of Arts & Sciences, in collaboration with the Delaware Environmental Institute (DENIN), is proud to launch the new Center for Science, Ethics, and Public Policy (SEPP) at UD. Since the founding in 2007 of the SEPP program at the Delaware Biotechnology Institute, participating faculty have sponsored educational, research, and outreach initiatives both on and off campus.

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This work is supported in part by the National Science Foundation grant EPS-0814251