

Do you "do" nano?

**The politics of getting
nanotechnology right**

Nanotechnology in context

Lecture 3 of 3

Andrew D. Maynard

Chief Science Advisor, Project on Emerging Nanotechnologies

Woodrow Wilson International Center for Scholars (in partnership with the Pew Charitable Trusts)



Graffiti protesting the establishment of nanotechnology laboratories, on the Bastille fortress in Grenoble, France

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Nanotechnology & Sunscreens



a consumer guide for avoiding nano-sunscreens

August 2007

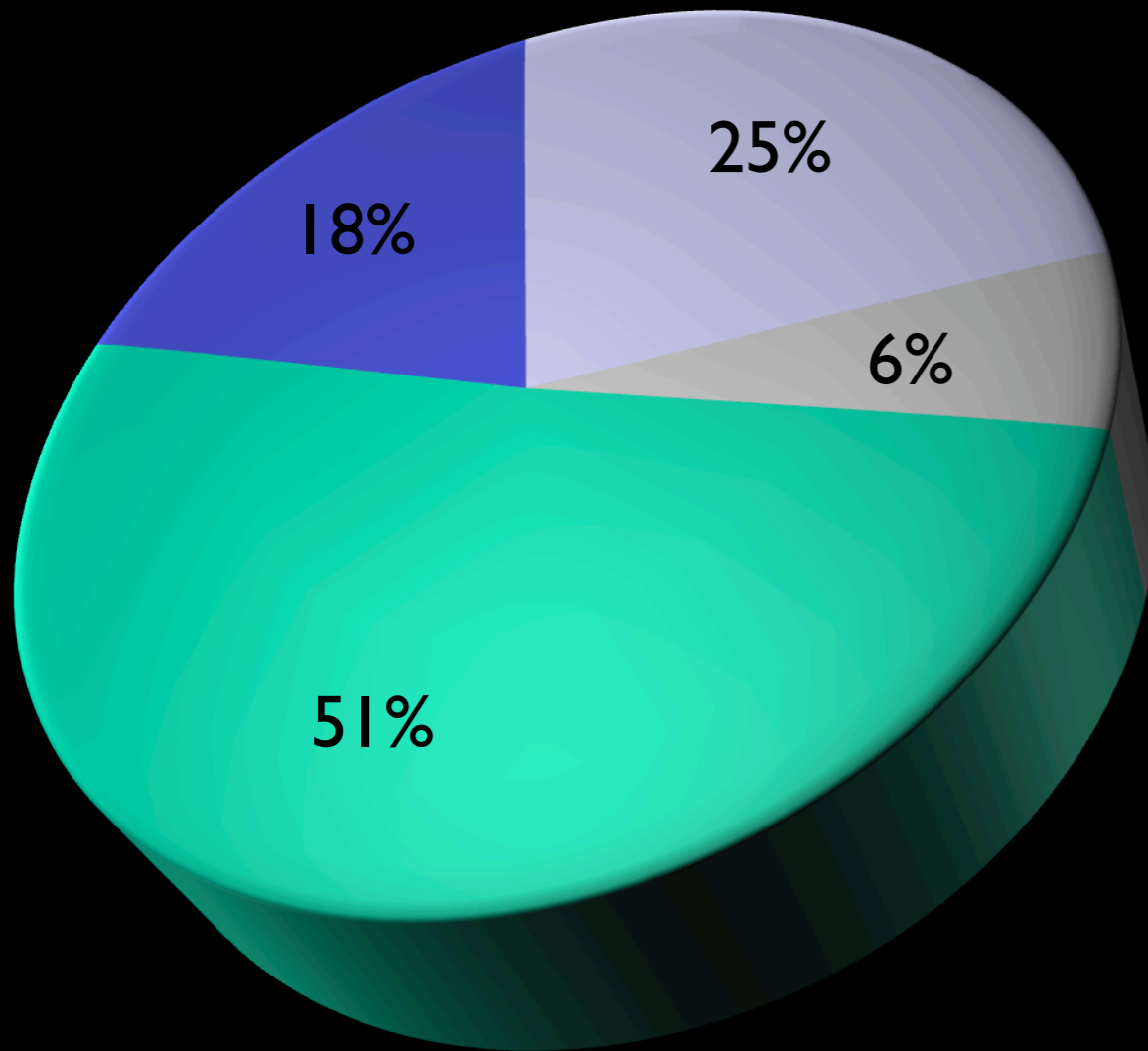
August 2007



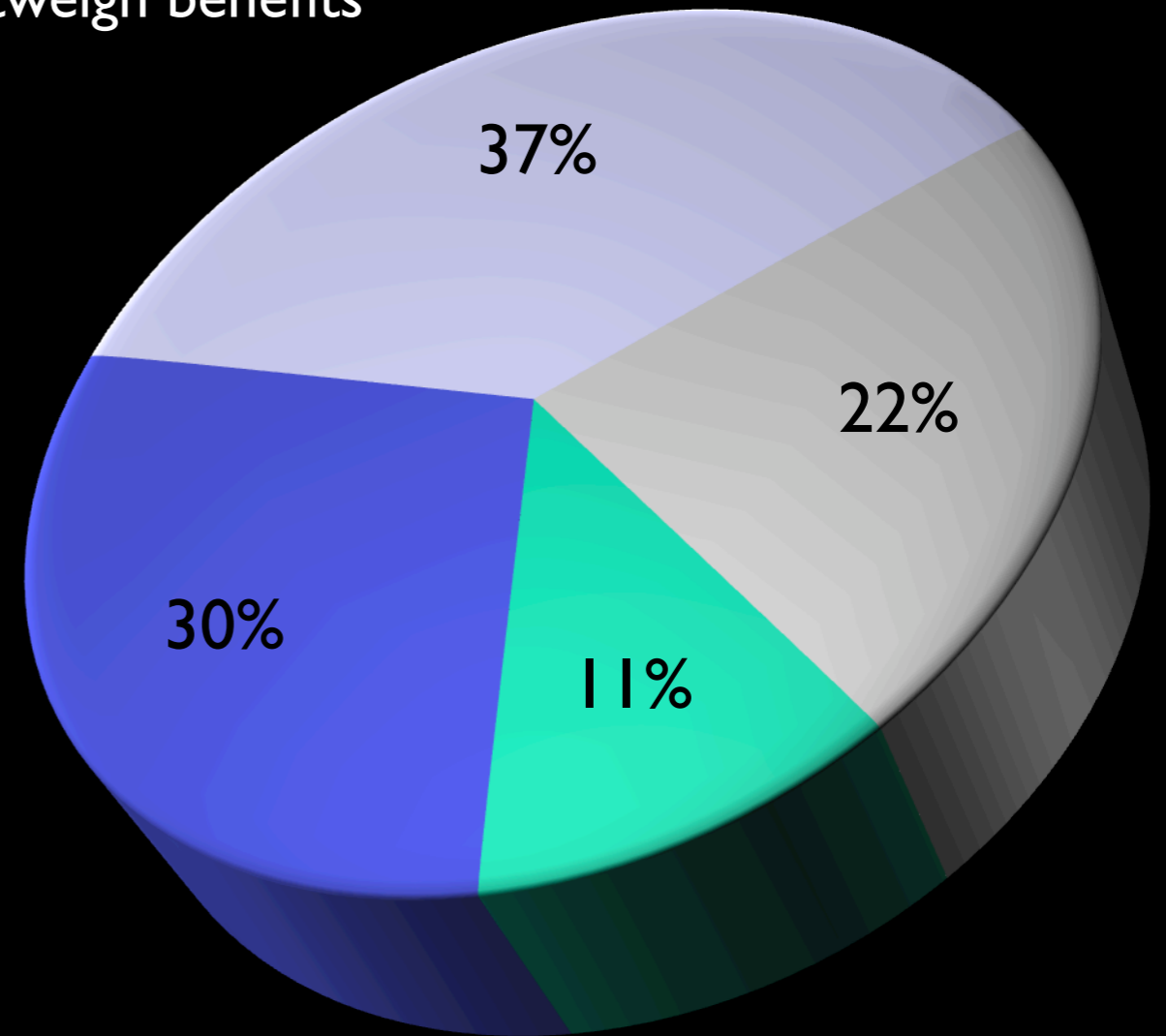
Topless Humans Organized for Natural Genetics (THONG)

Public Opinion Poll: Attitudes Towards Nanotechnology

- Not Sure
- Benefits will outweigh risks
- Benefits and risks will be about equal
- Risks will outweigh benefits



Initial impressions



Informed impressions

1014 adults polled

Hart Research Associated, published September 2007

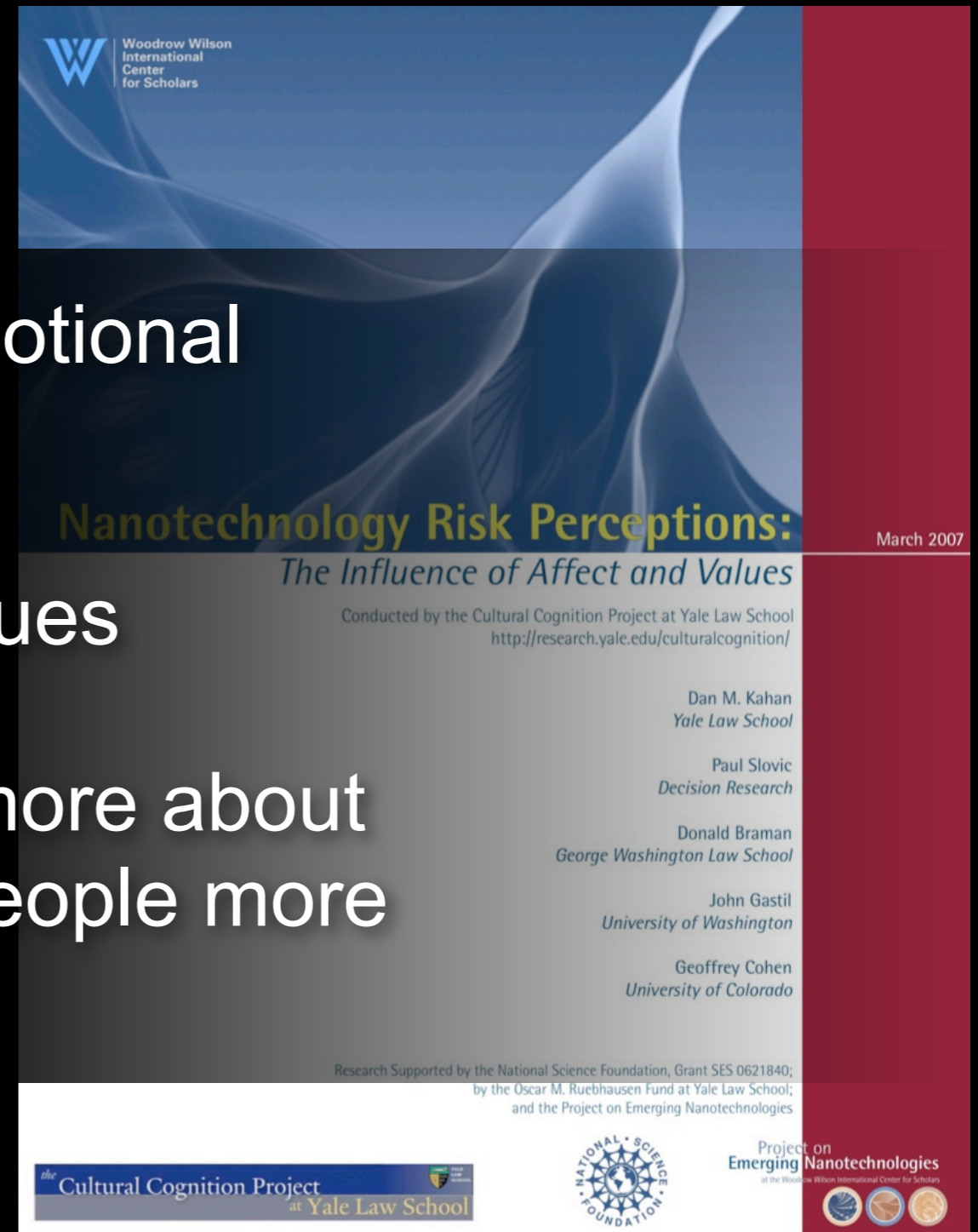
www.nanotechproject.org/138

Kahan et al. 2007

Initial attitudes derive from an emotional response

Informed attitudes depend on values

It does not appear that learning more about nanotechnology tends to make people more favorably disposed to it



Shouting
louder and longer
about research
does not lead to
effective science communication!

Public Opinion Poll: Attitudes Towards Nanotechnology



Balancing benefit and risks



Sources of Information



Have you heard of nano?



Introducing nano-products



Reactions to products



Concern over risks

Public Opinion Poll: Attitudes Towards Nanotechnology



Raising public confidence

Goals

Funding

Mechanisms

Science &
Technology

Security

Innovation

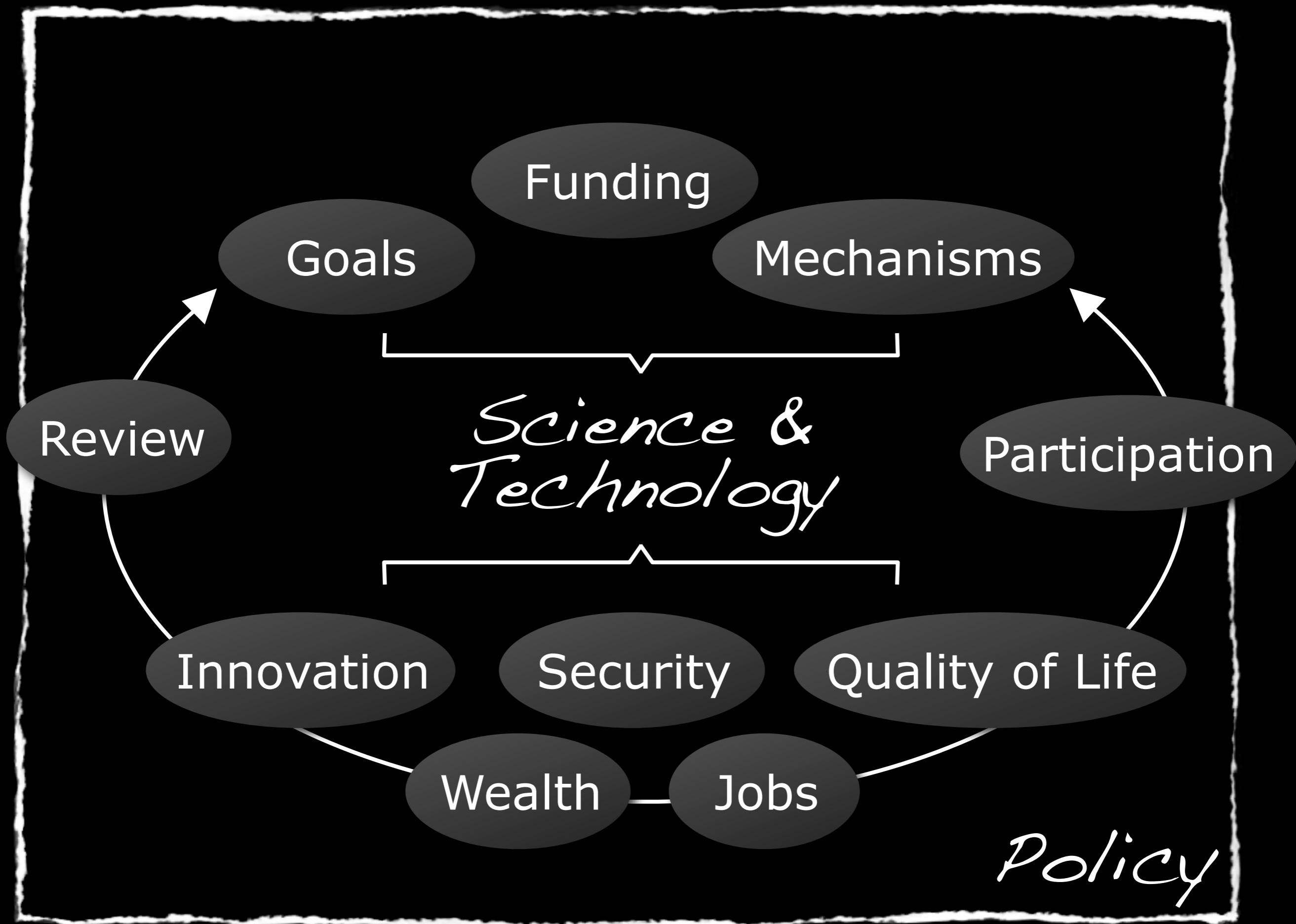
Jobs

Wealth

Quality of Life

Policy

...a simplistic perspective...



Funding

Goals

Mechanisms

Review

Science & Technology

Participation

Innovation

Security

Quality of Life

Wealth

Jobs

Policy

Empower: Stakeholders

For lay stakeholders

- Foster critical thinking
- Ensure knowledge is accessible
- Convey consequences of actions

For expert stakeholders

- Learn to communicate
- Learn to listen

Engage:

Stakeholders

For lay and expert stakeholders

Public discourse

Participation in decision-making

Integrate science into society

Build constituencies

Re-Evaluate:

Drivers, Mechanisms, Policies

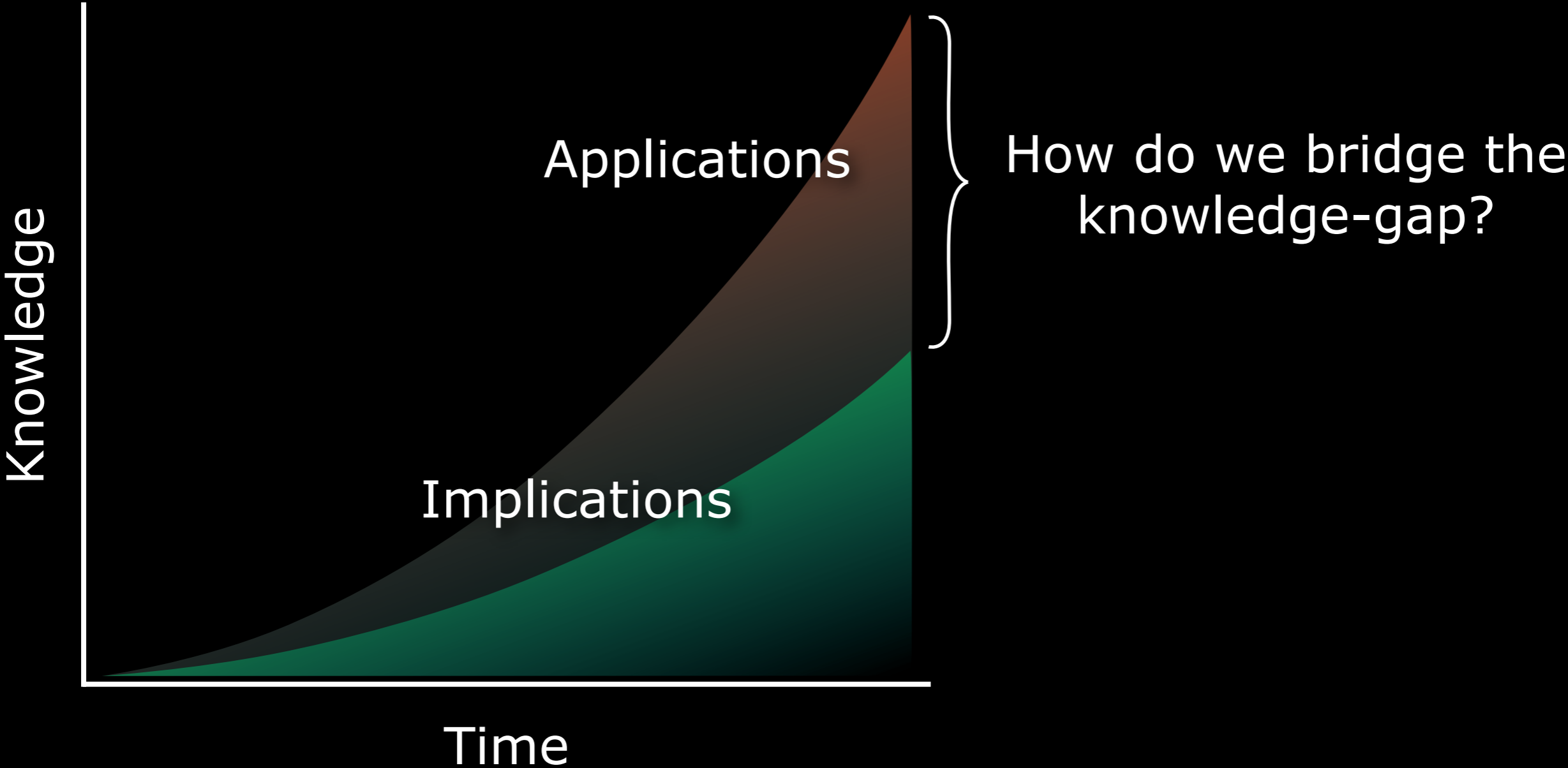
For policy makers and funders

[Challenge-informed science
New knowledge stimulation
Knowledge coupling

REGULATION **Challenge**

Developing effective oversight which protects people and the environment and supports business, as nanotechnology becomes increasingly sophisticated

REGULATION Challenge
KNOWLEDGE

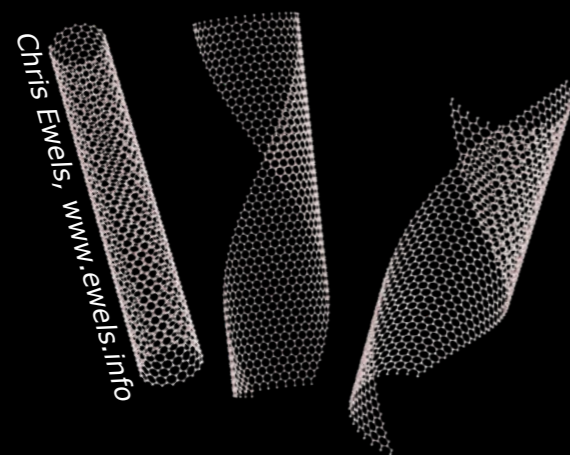


REGULATION Challenge

DIVERSITY

Nanomaterials

Nanoscale structures in unprocessed form



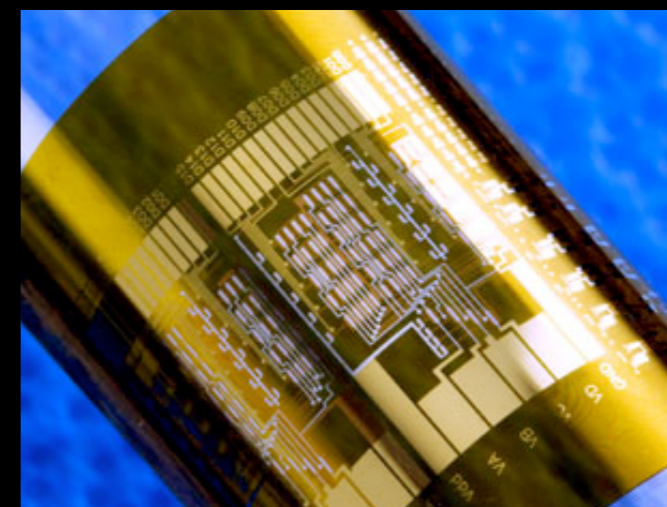
Nanointermediates

Intermediate products with nanoscale features



Nano-enabled products

Finished goods incorporating nanotechnology

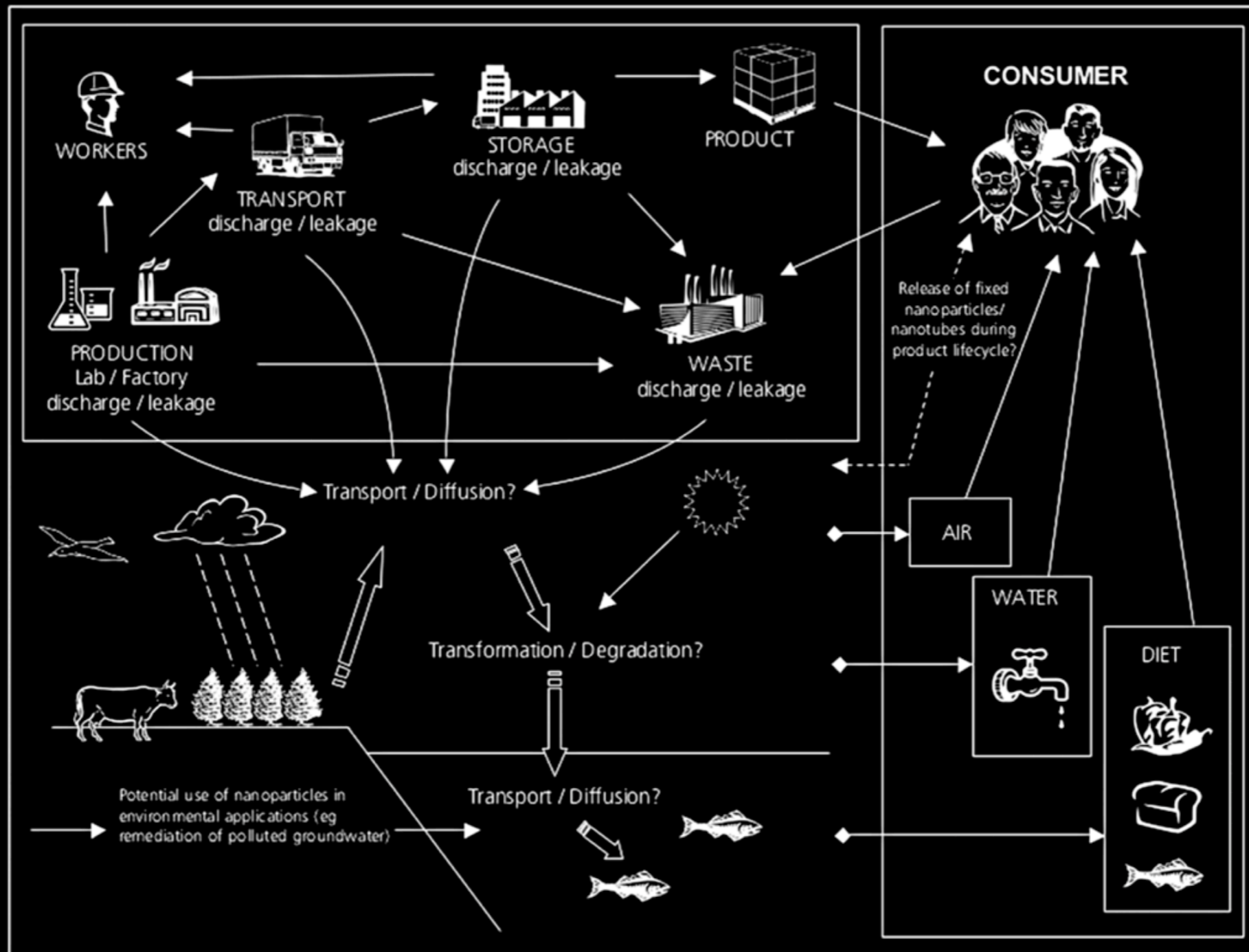


Nanotools

Capital equipment and software used to visualize, manipulate and model matter at the nanoscale



REGULATION Challenge LIFE CYCLE



REGULATION Challenge
NOVELTY

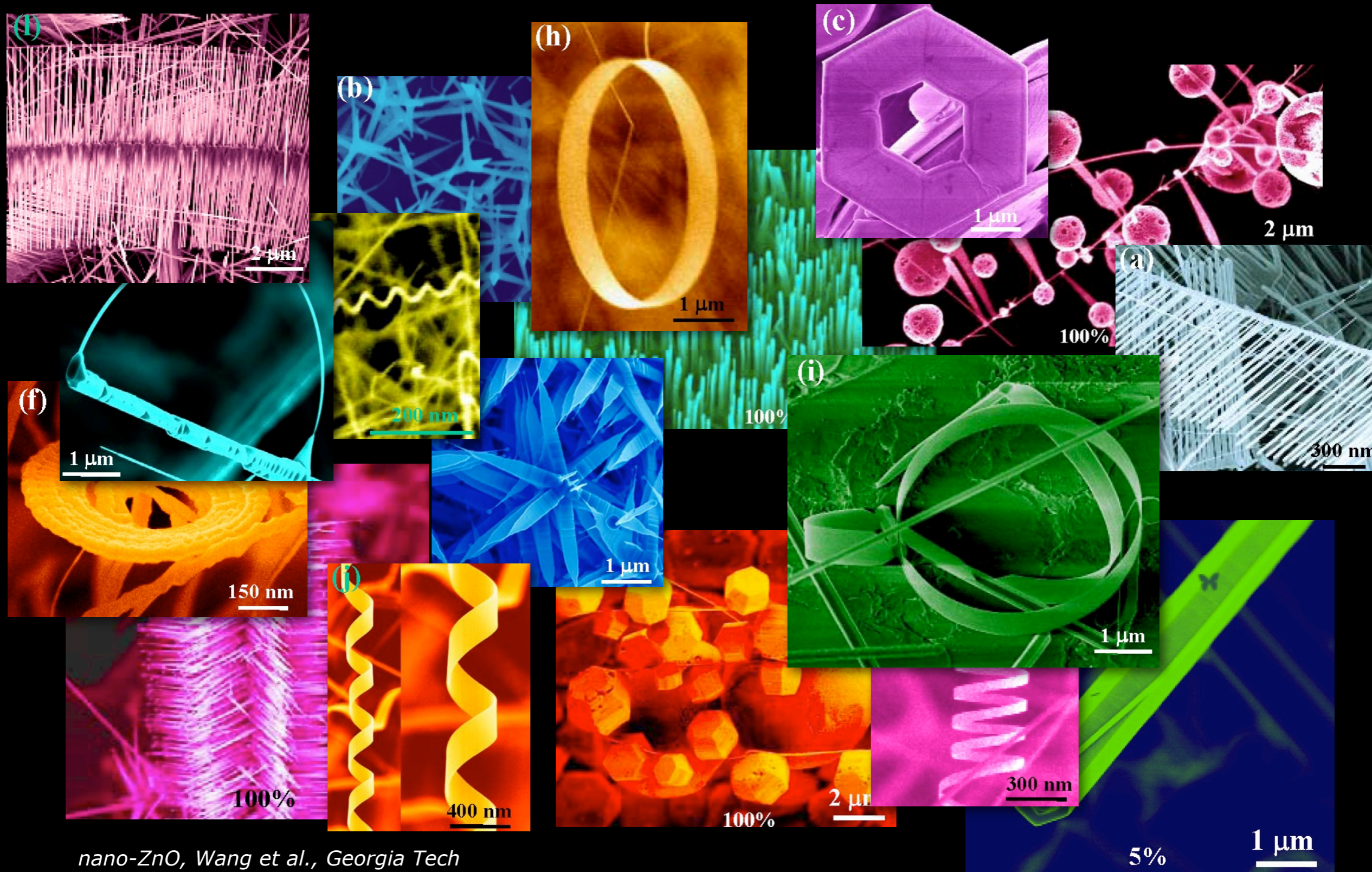
Similar Chemistry



Different Risks

REGULATION Challenge
NOVELTY

Similar Chemistry



Potentially Different Risks

Nanotech Risks: An Industry Perspective

Corporation:

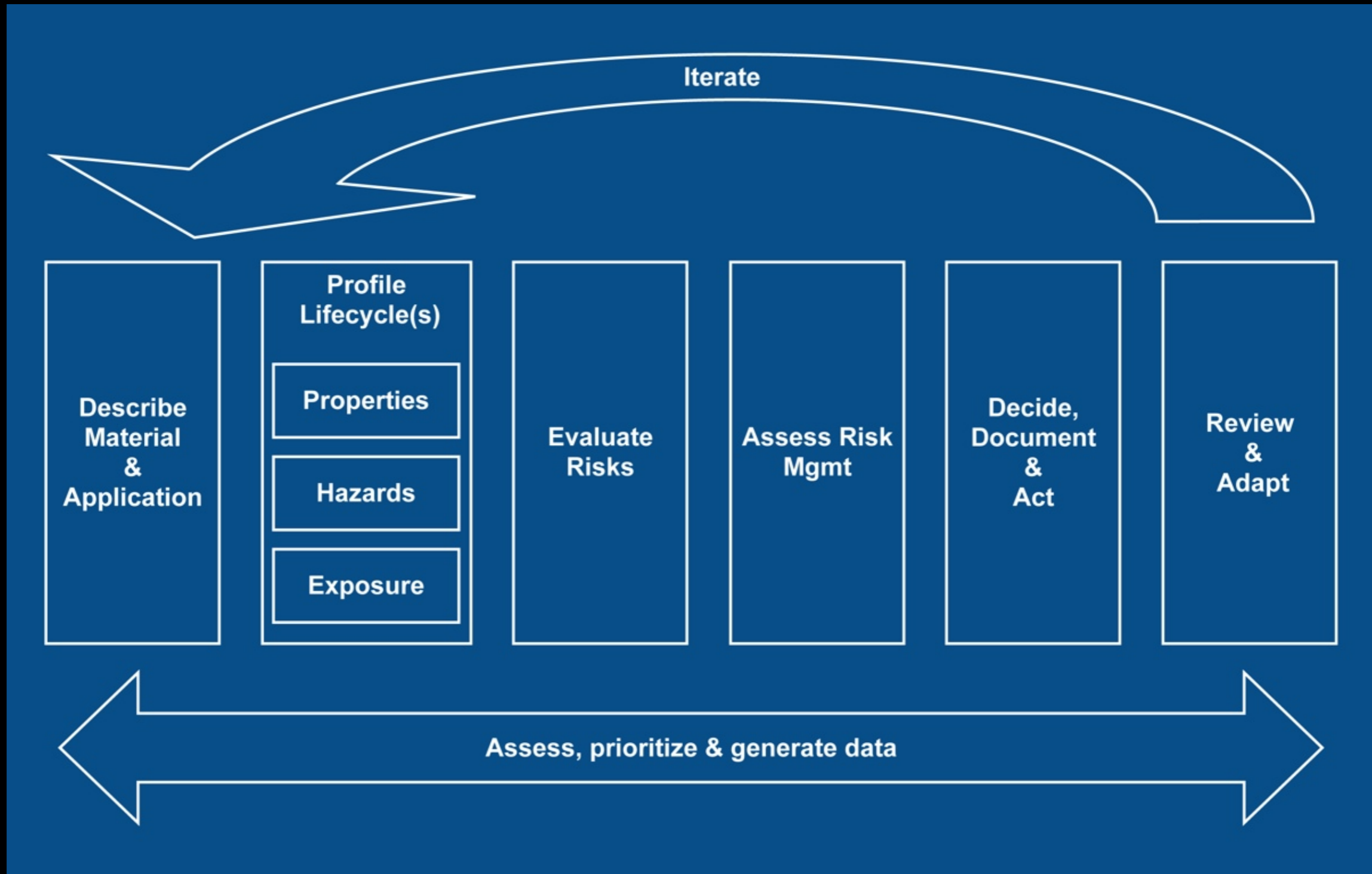
“We’ve cancelled several projects because of a lack of EHS information from the supplier”

Corporation

“We’ve stopped development where costs were too high to ensure no exposure or risk... It’s quite complicated; we can’t set decision points today”

Startup:

“Almost every time we talk with a company that will incorporate our material into products, EHS is one of the most important topics... Compared to companies that don’t have this data, it puts us ahead of the curve ...”



REGULATION Challenge PRODUCTS

I wish my sunscreen
wasn't so unsightly



I wish my socks didn't
smell so much!



I wish my tennis
racquet was lighter and
stronger



I wish I could keep
leftovers for longer,
before they go off



I wish spilt red wine
would run off my pants
without staining



I wish I could get more
songs on my iPod



Over 800 listed manufacturer-identified nanotech consumer products:
www.nanotechproject.org/consumerproducts

Food and Drug Agency

Capacity for nano-product oversight

	Cosmetic Ingredient	Whole Food	Dietary Supplement	GRAS Food Ingredient	Food Additive	Food Packaging	Medical Device	OTC Drug	New Drug
Pre-Market									
Obtain Early Information on Pipeline	None	None	None	Weak	Weak	Weak	Moderate	Weak	Moderate
Enforce Safety and Testing Requirements	Weak	None	Weak	Moderate	Strong	Strong	Strong	Strong	Strong
Place Burden To Prove Safety on Sponsor	Weak	None	Weak	Moderate	Strong	Strong	Strong	Strong	Strong
Review Safety Prior to Marketing	None	None	Weak	Weak	Strong	Strong	Strong	Moderate	Strong
Post-Market									
Require Needed Monitoring and Testing	Weak	None	None	None	Weak	None	Strong	Weak	Moderate
Require Timely Adverse Event Reporting	None	None	None	None	Weak	None	Strong	None	Strong
Inspect Facilities and Safety Records	Weak	Moderate	Moderate	Moderate	Moderate	Moderate	Strong	Strong	Strong
Remove Unsafe Products from Market	Moderate	Moderate	Moderate	Strong	Moderate	Strong	Strong	Strong	Strong



House Science Subcommittee on Research & Science Education
October 31 2007

REGULATION Challenge IN PERSPECTIVE:

Myths and realities

“**Nanotech risk**” is an illusion...

..but the **potential dangers** of some nanotech products are very real

it's not so much how **small** something is that is important...

...as how **unusual** its behavior is.

New technologies **can** be shoehorned into old regulations...

...but at some point, they will inevitably **give way** at the seams

REGULATION Challenge IN PERSPECTIVE:

What's Important?

Smallness



Strangeness

Noof!



Sophistication





Andrew D. Maynard PhD

Chief Science Advisor

Project on Emerging Nanotechnologies

Woodrow Wilson International Center for Scholars

Tel: +1 202 691 4311

Email: andrew.maynard@wilsoncenter.org

Web: www.nanotechproject.org

Writing on emerging technologies at:

<http://2020science.org>