PUBLIC ENGAGEMENT IN SCIENCE (POLICY): OPPORTUNITIES AND DEAD ENDS

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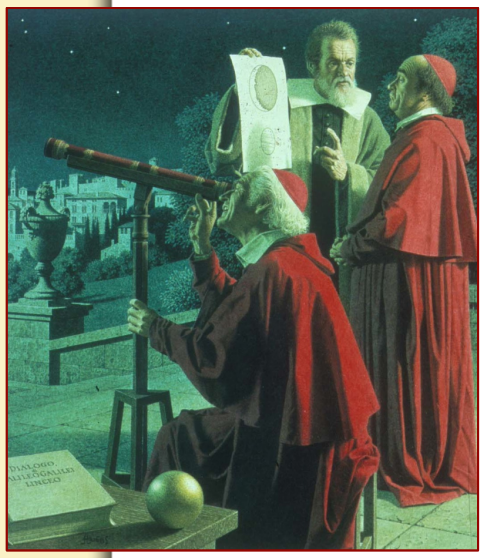
First Annual Conference on *Governance of Emerging Technologies: Law, Policy, and Ethics*

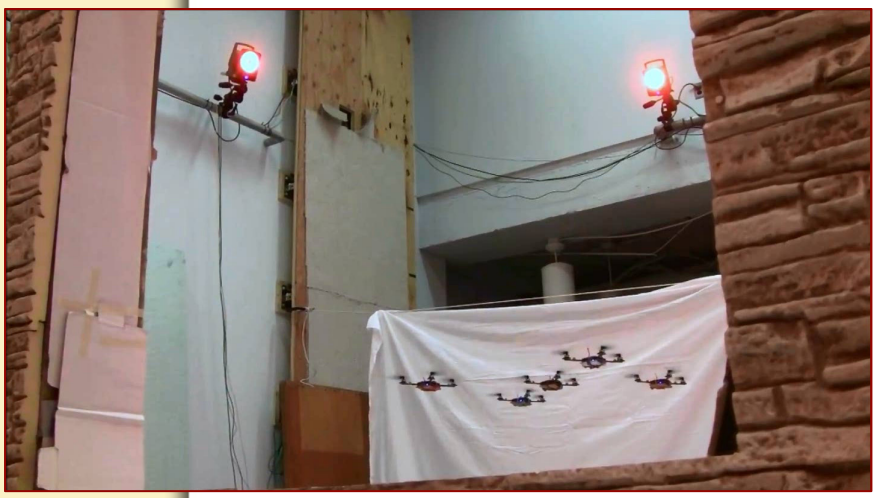
May 20-21, Phoenix, AZ

TODAY



- The NBIC revolution: Science meets policy
- Understanding policy arenas
  - What do NBIC public opinion landscapes look like? Synthetic biology as an example …
  - The complexities of building better science-policy interfaces
- Next steps?

POLICY MAKING IN AN AGE OF NBIC TECHNOLOGIES



Experiments performed with a team of nano quadrotors at the GRASP Lab, University of Pennsylvania. Vehicles developed by KMel Robotics.

- Policy stakes exponentially higher for NBIC technologies
  - Highly complex science
  - Speed of development
  - ELSI concerns emerging at a rate that often outstrips our capacity to think through policy options
- One example …

NEWS

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'Frankenstein' doc creates life

By EMMA MORTON, Health and Science Editor

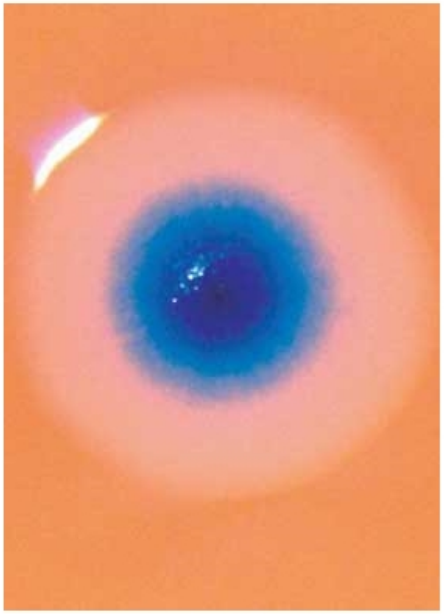
Published: Today

Add a comment (40)

A SCIENTIST has created life in a pioneering laboratory experiment in which a bug was "brought back from the dead".

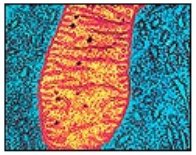
It was last night hailed as a breakthrough that opens the door to exciting new technological advances.

But opponents of genetic engineering condemned the experiment as dangerous Frankenstein-style tampering with nature.



Alive ... synthetic cell

RELATED STORIES



Doc 'creates 1st man-made cell'
A US biologist has created a bacterium using genes made in the lab – a world first

- Designer baby debate rages on
- 1997 — send in the clones
- IVF monkeys could hold cure

TOP STORIES

CONTROVERSY
RAND PAUL'S LIBERTARIAN CHALLENGE
p.4

THE LAST WORD
Maybe life *isn't* a bowl of cherries
p.44

INTERNATIONAL
The world's most pathetic former royal
p.13

THE WEEK

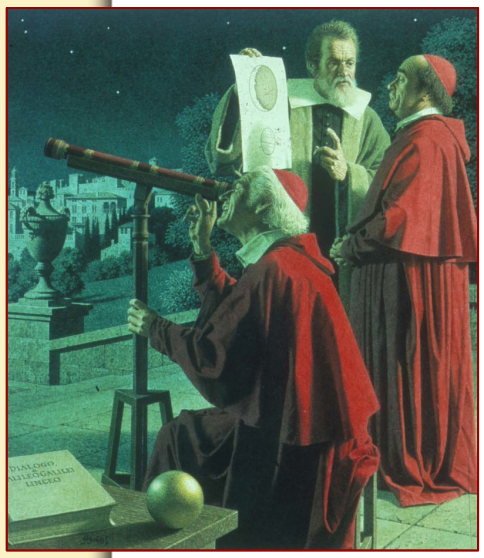
THE BEST OF THE U.S. AND INTERNATIONAL MEDIA

It's alive!

Now that science has gained the power to create life, what lies ahead?
p.18

JUNE 4, 2010 VOLUME 10 ISSUE 466

TODAY



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LEVELS OF PUBLIC AWARENESS
SYNTHETIC BIOLOGY IS THE NEW NANO

We would like to know how much you have heard or seen about synthetic biology, nuclear power, and nanotechnology (1 = "not at all," 10 = "very much")

	Mean	SD
Nuclear Power	5.23	2.80
Nanotechnology	3.13	2.40
Synthetic Biology	2.85	2.17

BUT THAT DOESN'T STOP PEOPLE FROM MAKING POLICY JUDGMENTS

Do you think it is true or false that …

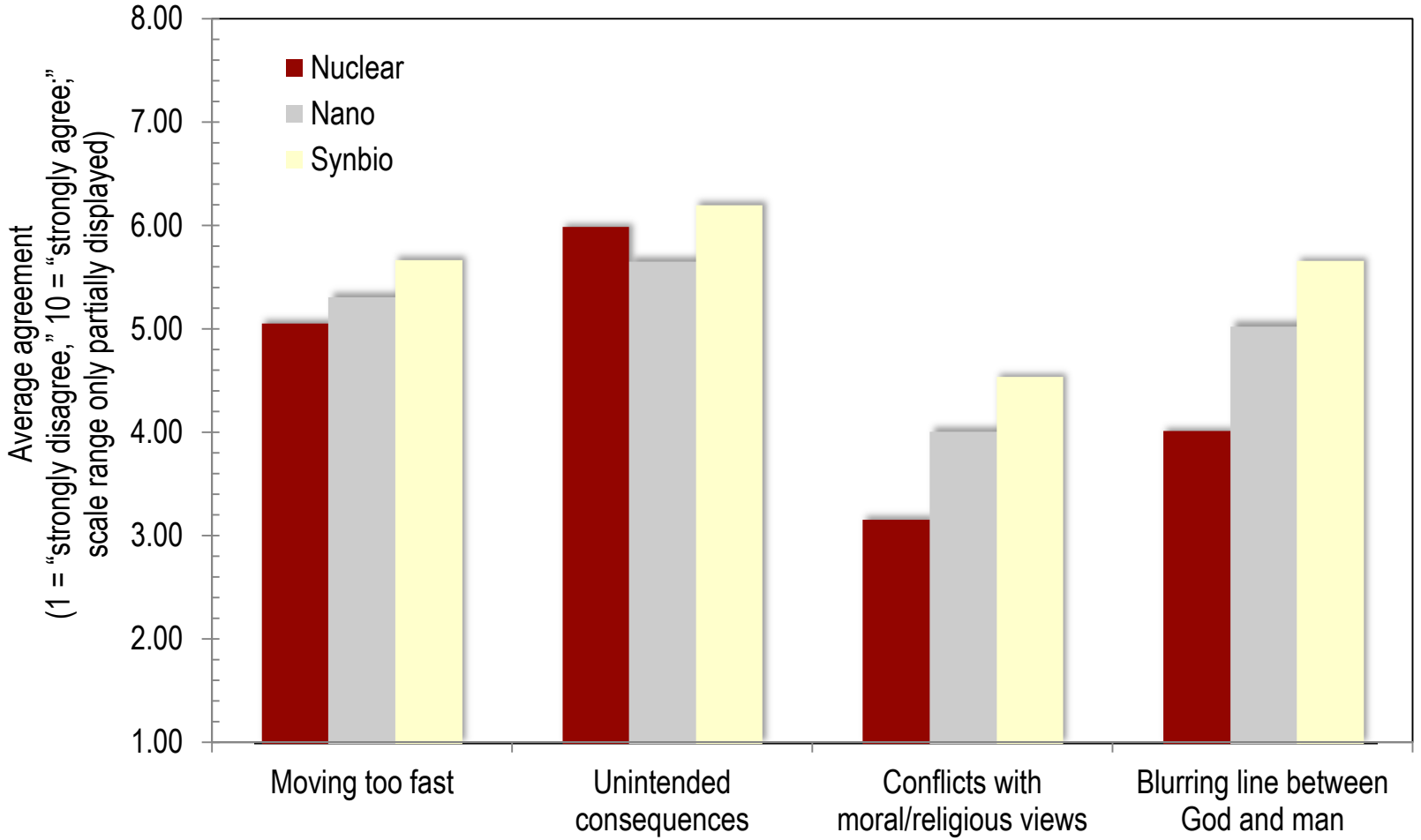
	False (%)	True (%)
… recently, the Obama Administration banned all synthetic biology research	33.8%	66.2%

OVERALL POSITIVE ATTITUDES, BUT FOR SYN BIO OUTWEIGHED BY RISKS

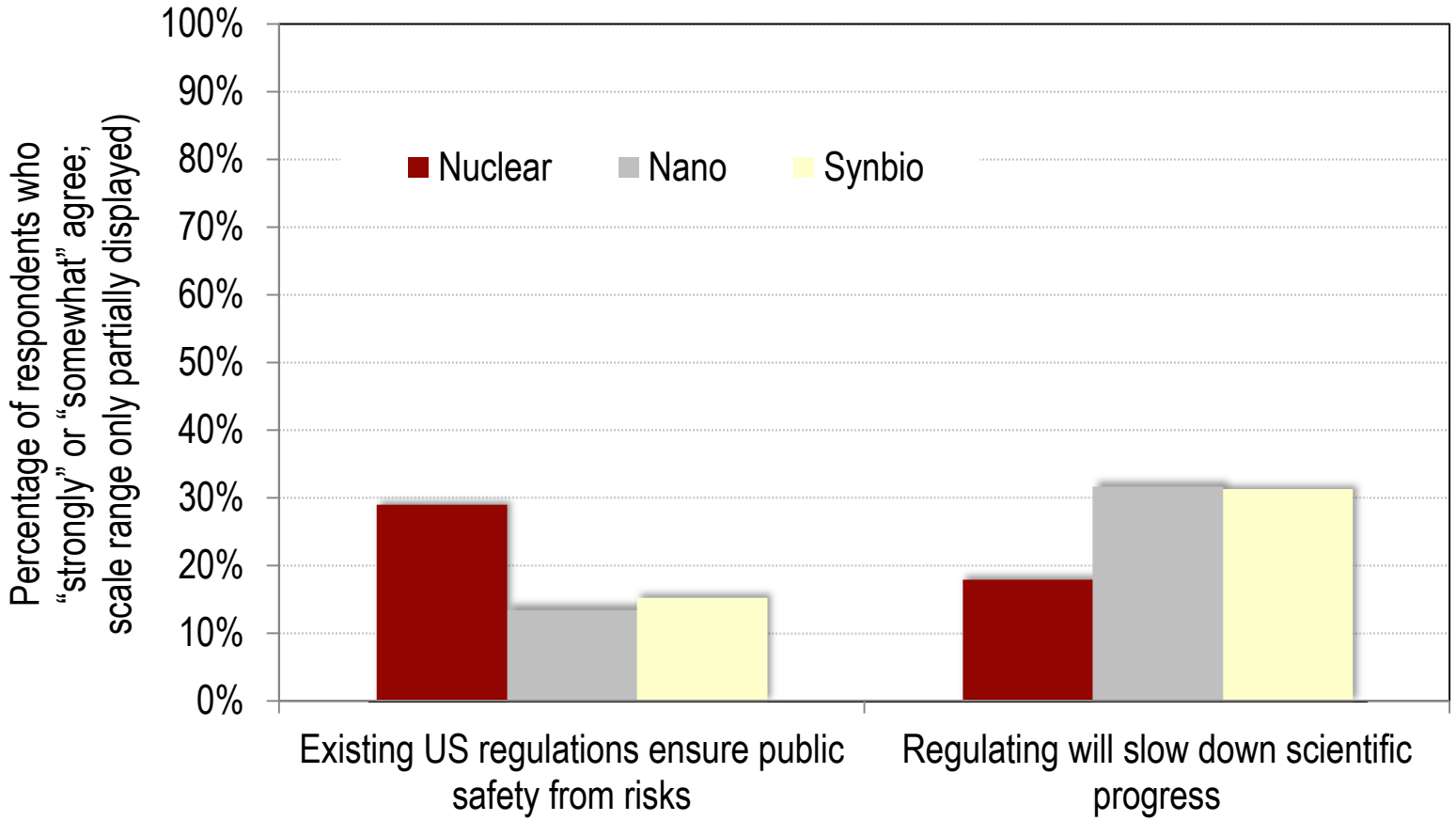
How beneficial/risky do you think each of the following is for society as a whole? (1 = "not at all beneficial/risky," 7 = "very beneficial/risky")

	Benefits *Mean (SD)*	**Risks** *Mean (SD)*
Nuclear Power	4.51 (1.71)	4.67 (1.63)
Nanotechnology	4.20 (1.61)	4.08 (1.54)
Synthetic Biology	3.93 (1.57)	4.40 (1.52)

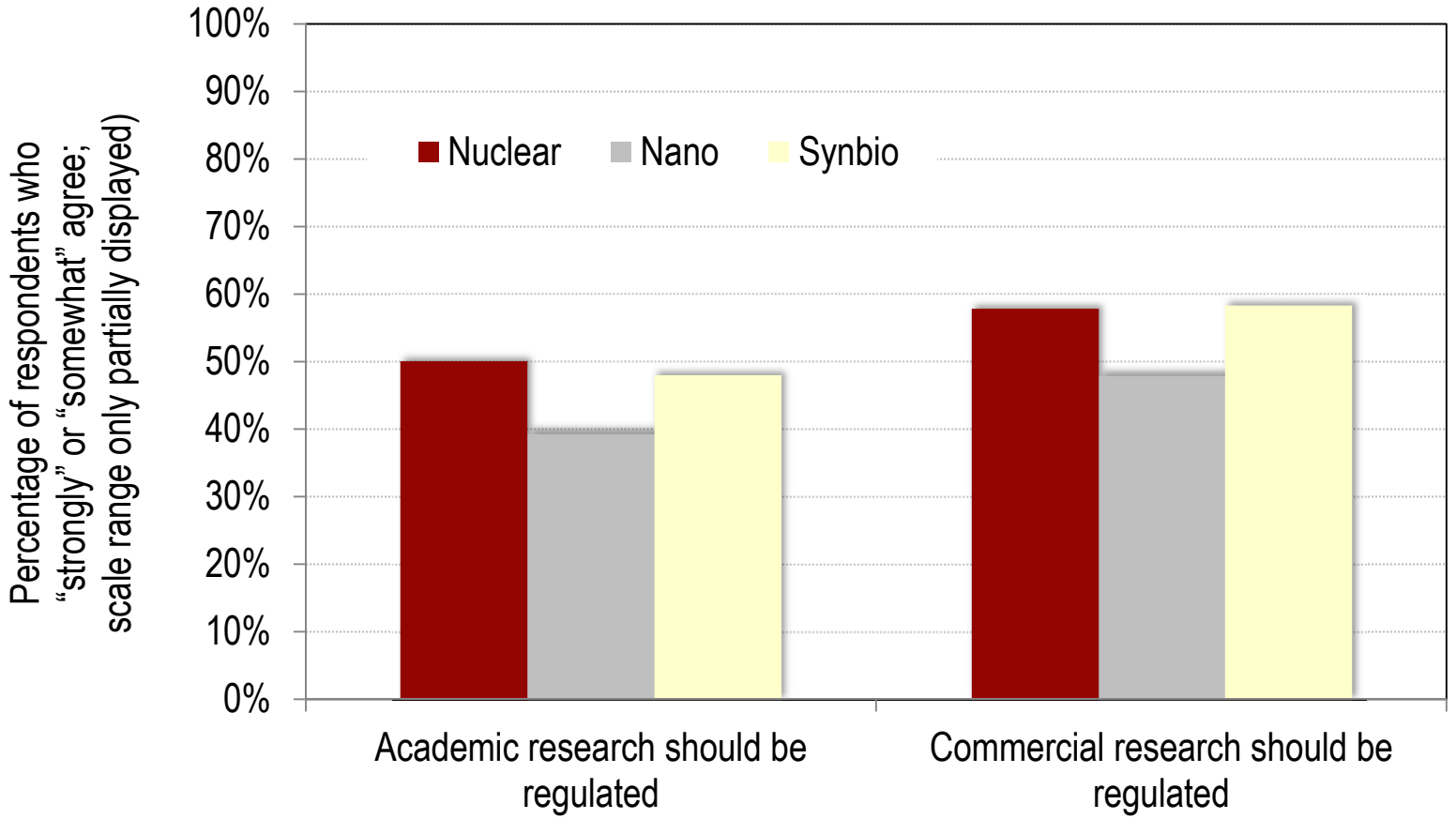
PANDORA'S BOX TRUMPS RELIGIOUS VIEWS



VIEWS ON REGULATION: SUPPORT FOR MORE CONSUMER PROTECTION …



… BUT NO OVERWHELMING APPETITE FOR REGULATING RESEARCH



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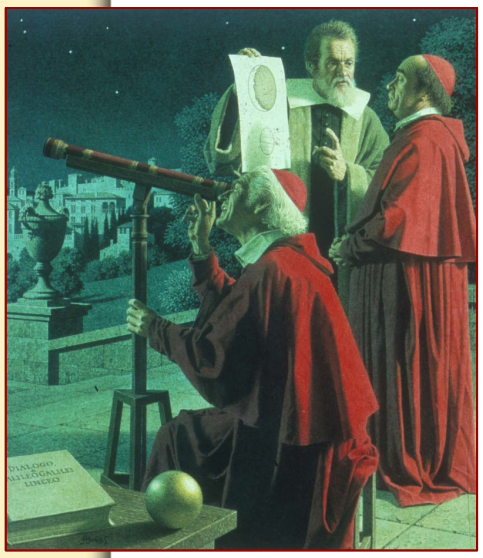

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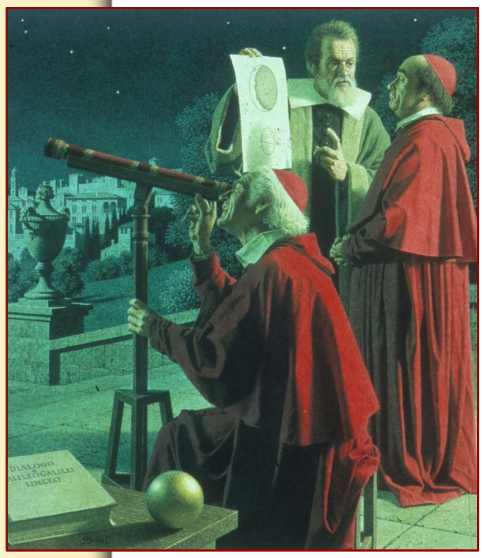
  - The complexities of building better science-policy interfaces
    - Miserly audiences
- Next steps?

FOR LAY AUDIENCES, NBIC SCIENCE AS JUST ANOTHER POLITICAL ISSUE

Scheufele, D. A. (2006). Messages and heuristics: How audiences form attitudes about emerging technologies. In J. Turney (Ed.), *Engaging science: Thoughts, deeds, analysis and action* (pp. 20-25). London: The Wellcome Trust.

- "Low information rationality"
  - It does not make sense for most of us to develop an in-depth understanding of complex issues
  - As a result, we form attitudes on issues, including S&T, even in the absence of sufficient information
  - Heuristics, become powerful shortcuts for making ELSI judments

TODAY



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    - "Politicized" science
- Next steps?

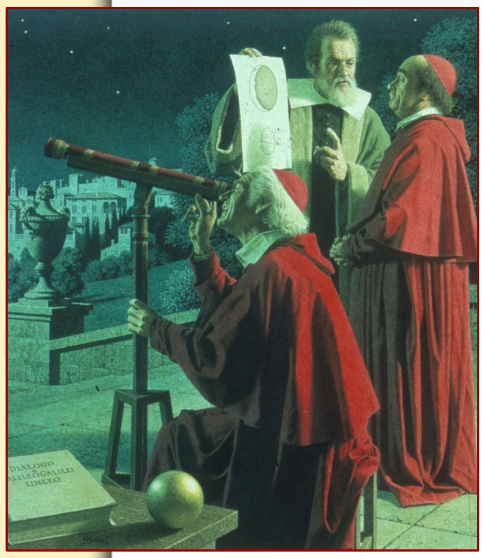
IRONICALLY, SCIENTISTS THEMSELVES END UP MIXING SCIENCE AND POLITICS

Corley, E. A., Scheufele, D. A., & Hu, Q. (2009). Of risks and regulations: How leading US nanoscientists form policy stances about nanotechnology. *Journal of Nanoparticle Research, 11*(7), 1573-1585. doi: 10.1007/s11051-009-9671-5

Predicting views that nano research should be regulated …

Other disciplines	−0.05
Political/social ideology	
Economic conservatism[b]	−0.19**
Social conservatism[c]	0.07
Societal allocation of risk[d]	−0.23**
Incremental R^2 (in %)	15.7**
Overall perceived risks and benefits	
Overall risk perception[e]	0.26**
Overall benefit perception[f]	0.04
Incremental R^2 (in %)	6.8**
Risks and Benefits in Application Areas	

TODAY



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    - The failed experiment of consensus conferences
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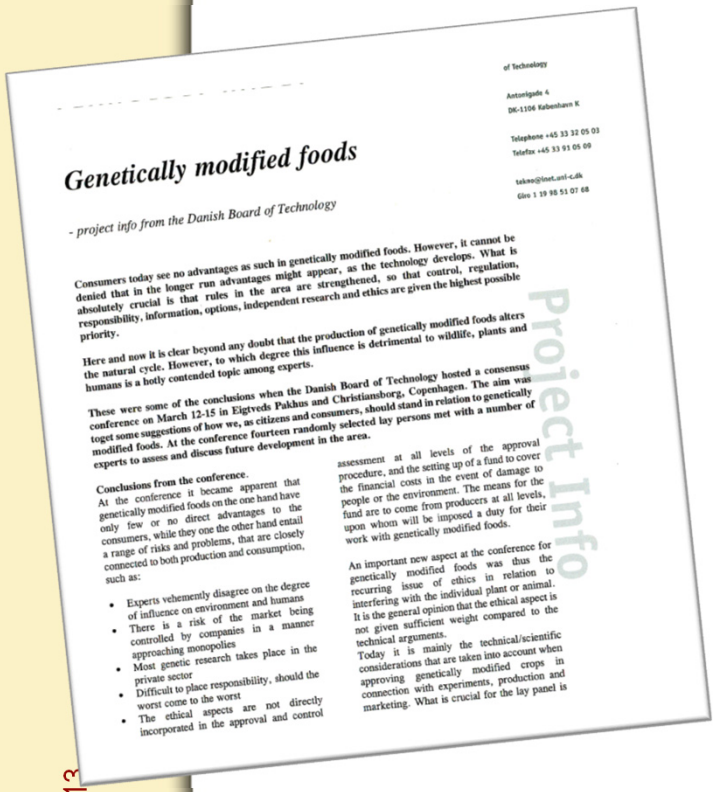
ONE SOLUTION: DANISH CONSENSUS CONFERENCES

- First introduced in the 1980s
- Designed “to enrich and expand the scope of traditional debate between experts, politicians and interested parties … on potentially controversial technologies”
- Consensus reports as deliverable

- Similar deliberative efforts all around the globe (deliberative polls, technology forums, science cafes, etc.)

FROM A NORMATIVE PERSPECTIVE, AT LEAST THREE IDEAL OUTCOMES



Genetically modified foods

- project info from the Danish Board of Technology

of Technology

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Consumers today see no advantages as such in genetically modified foods. However, it cannot be denied that in the longer run advantages might appear, as the technology develops. What is absolutely crucial is that rules in the area are strengthened, so that control, regulation, responsibility, information, options, independent research and ethics are given the highest possible priority.

Here and now it is clear beyond any doubt that the production of genetically modified foods alters the natural cycle. However, to which degree this influence is detrimental to wildlife, plants and humans is a hotly contended topic among experts.

These were some of the conclusions when the Danish Board of Technology hosted a consensus conference on March 12-15 in Eigtveds Pakhus and Christiansborg, Copenhagen. The aim was toget some suggestions of how we, as citizens and consumers, should stand in relation to genetically modified foods. At the conference fourteen randomly selected lay persons met with a number of experts to assess and discuss future development in the area.

Conclusions from the conference.

At the conference it became apparent that genetically modified foods on the one hand have only few or no direct advantages to the consumers, while they one the other hand entail a range of risks and problems, that are closely connected to both production and consumption, such as:

- Experts vehemently disagree on the degree of influence on environment and humans
- There is a risk of the market being controlled by companies in a manner approaching monopolies
- Most genetic research takes place in the private sector
- Difficult to place responsibility, should the worst come to the worst
- The ethical aspects are not directly incorporated in the approval and control assessment at all levels of the approval procedure, and the setting up of a fund to cover the financial costs in the event of damage to people or the environment. The means for the fund are to come from producers at all levels, upon whom will be imposed a duty for their work with genetically modified foods.

An important new aspect at the conference for genetically modified foods was thus the recurring issue of ethics in relation to interfering with the individual plant or animal. It is the general opinion that the ethical aspect is not given sufficient weight compared to the technical arguments.

Today it is mainly the technical/scientific considerations that are taken into account when approving genetically modified crops in connection with experiments, production and marketing. What is crucial for the lay panel is

Project Info

- Upstream citizen **involvement** in the policy making process
- Help participants (and the broader community) reach **consensus** about technologies and their ELSI components
- Increase **trust**, efficacy, and learning among all stakeholders

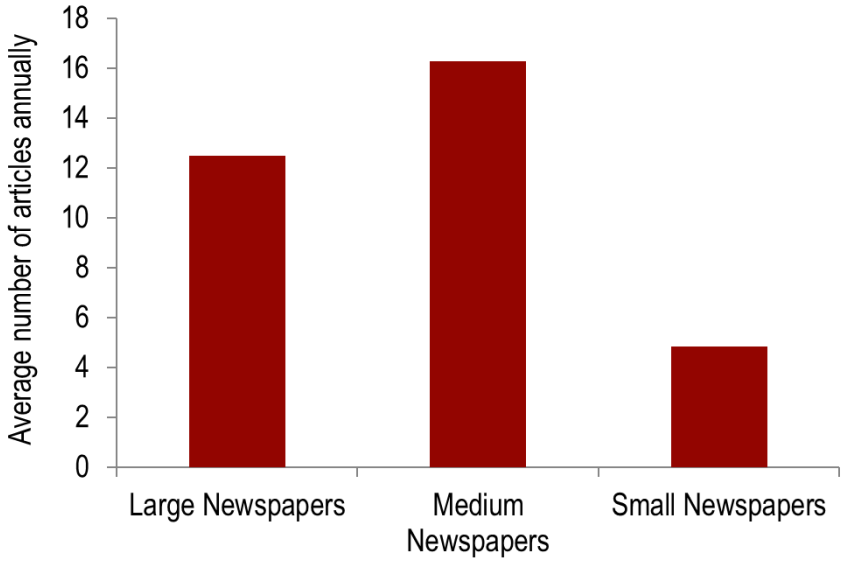
EMPIRICAL REALITIES VS. NORMATIVE CLAIMS

Scheufele, D. A. (2011). Modern citizenship or policy dead end? Evaluating the need for public participation in science policy making, and why public meetings may not be the answer. Paper #R-34, Joan Shorenstein Center on the Press, Politics and Public Policy Research Paper Series. Harvard University. Cambridge, MA. Retrieved from http://www.hks.harvard.edu/presspol/publications/papers/research_papers/r34_scheufele.pdf

- Intrinsic problems
  - Self-selection biases (demographic, ideological, etc.)
  - Violation of key deliberative principles during meetings
- Extrinsic problems
  - Artificial settings and opinion formation dynamics with little external validity
  - Limited measurable policy impact …

FOR EXAMPLE, NO SPILLOVER EFFECTS INTO REAL-WORLD POLICY DEBATES

Coverage of science and technology-related public meetings in U.S. Newspapers 1992-2009



Search string: BODY(("town hall meeting" or "public meeting" or "consensus conference" or "deliberative poll") and (science or technology)) OR HLEAD(("town hall meeting" or "public meeting" or "consensus conference" or "deliberative poll") and (science or technology))

IF THERE ARE POLICY IMPACTS, THEY OFTEN BACKFIRE

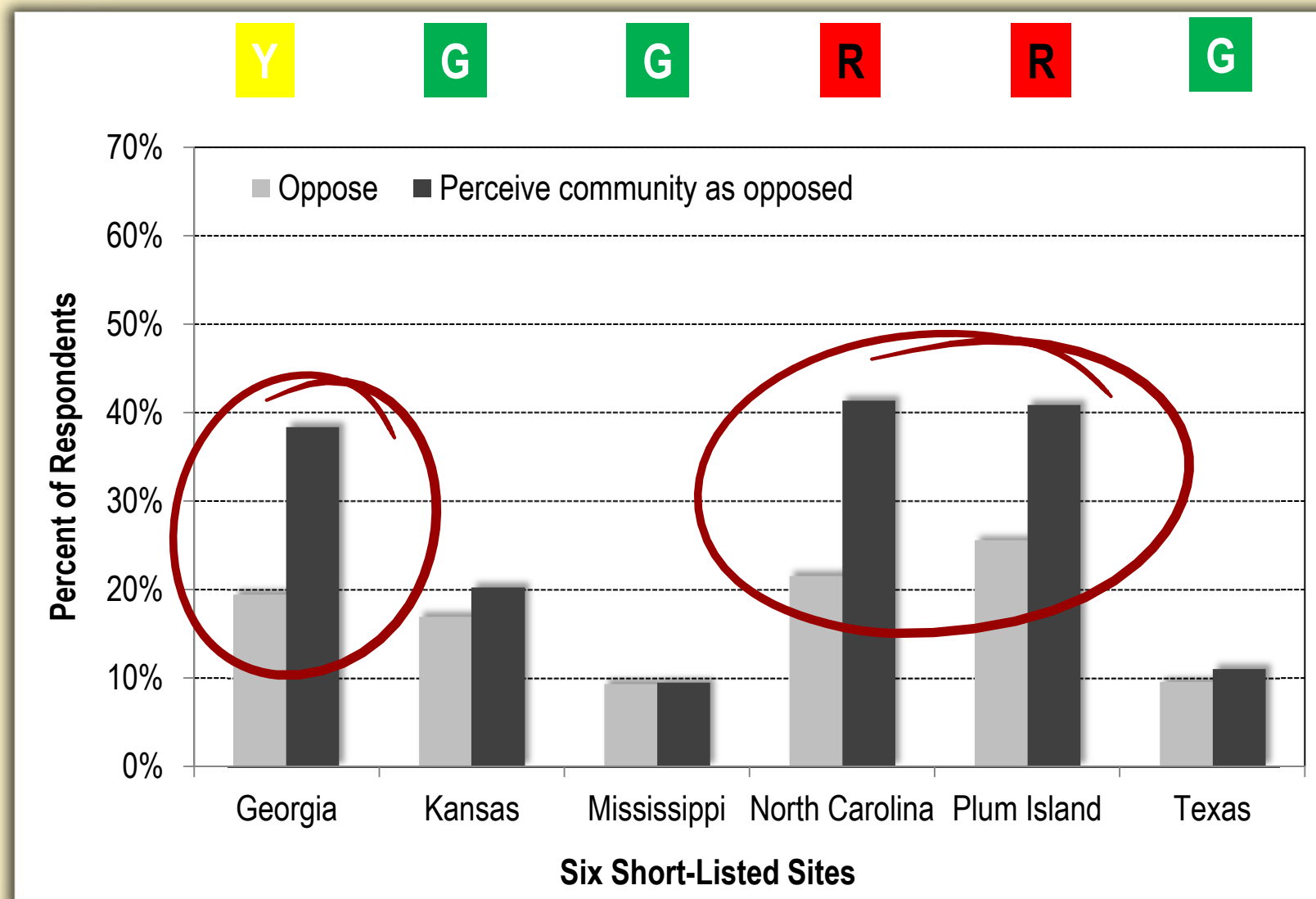
(National Science Foundation: "Media, talk, and trust: The social amplification of risk during site selection for a bio-research facility," Principal Investigator: D. A. Scheufele, award # SES-0820474)

- Site selection for National Bio- and Agro-Defense Facility (NBAF) by Department of Homeland Security
- DHS assessments of "community acceptance" for six finalist communities:

Site	Rating	Description
Georgia	Y	Partial fulfillment of overall criteria
Kansas	G	Clearly meets overall criteria
Mississippi	G	Clearly meets overall criteria
North Carolina	R	Does not meet overall criteria
Plum Island	R	Does not meet overall criteria
Texas	G	Clearly meets overall criteria

Source: DHS Final Environmental Impact Statement, 2008

POLICY MAKING BASED ON VOCAL MINORITIES?

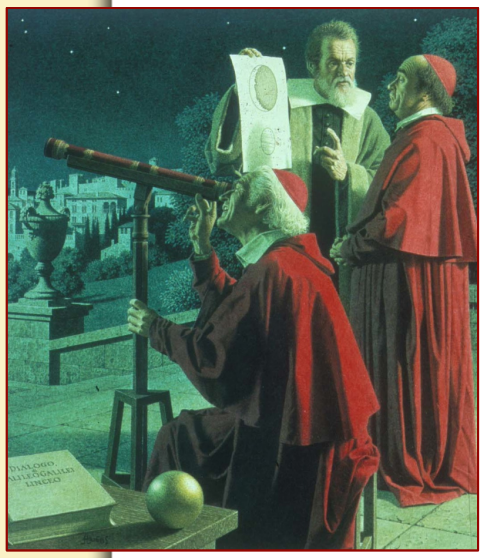


THE DANGERS OF ENGINEERED PUBLICITY

Granville county official on the hijacking of public meetings by NBAF opponents in Butner, NC:

"From my point of view, it was very unprofessional to come to a public school where we were having a meeting and have a 1962 ambulance sitting in front of the doorway with red paint running down the side. That was the pits."

TODAY



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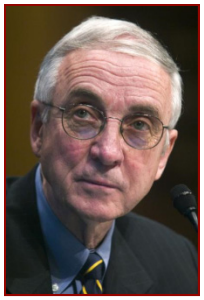
BUILDING BETTER PUBLIC-SCIENCE-POLICY INTERFACES IS NOT OPTIONAL

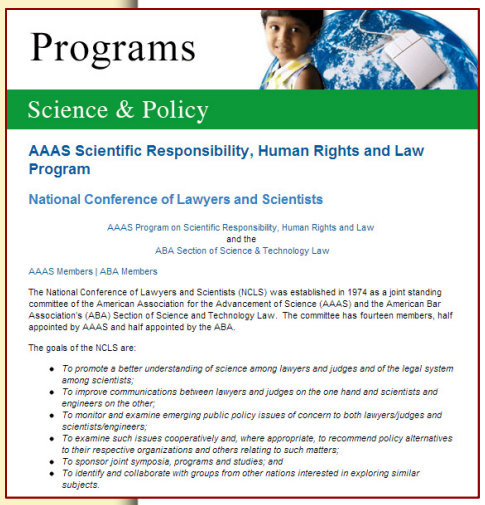


The greatest long-term threat to U.S. national security is not terrorists wielding a nuclear or biological weapon, but the erosion of America's place as a world leader in science and technology."
– *Gordon England, Former Deputy Secretary of Defense*

"If the United States doesn't get its act together, DuPont is going to go to the countries that do." – *Chad Holliday, Retired Chairman and CEO, DuPont Corporation*

"Nanotechnology is an activity for which this government will not spare money." – *Vladimir Putin, Prime Minister of Russia*

THE NEED FOR INFRASTRUCTURES AT THE SCIENCE-PUBLIC INTERFACE



Programs

Science & Policy

AAAS Scientific Responsibility, Human Rights and Law Program

National Conference of Lawyers and Scientists

AAAS Program on Scientific Responsibility, Human Rights and Law
and the
ABA Section of Science & Technology Law

AAAS Members | ABA Members

The National Conference of Lawyers and Scientists (NCLS) was established in 1974 as a joint standing committee of the American Association for the Advancement of Science (AAAS) and the American Bar Association's (ABA) Section of Science and Technology Law. The committee has fourteen members, half appointed by AAAS and half appointed by the ABA.

The goals of the NCLS are:

- *To promote a better understanding of science among lawyers and judges and of the legal system among scientists;*
- *To improve communications between lawyers and judges on the one hand and scientists and engineers on the other;*
- *To monitor and examine emerging public policy issues of concern to both lawyers/judges and scientists/engineers;*
- *To examine such issues cooperatively and, where appropriate, to recommend policy alternatives to their respective organizations and others relating to such matters;*
- *To sponsor joint symposia, programs and studies; and*
- *To identify and collaborate with groups from other nations interested in exploring similar subjects.*

- NBIC technologies create urgent need for
  - sustained social science efforts surrounding emerging technologies
  - formalized interfaces between social and natural sciences
- Ideal outcomes
  - better tools for real-time regulatory assessment that integrate input from science, policy, and public opinion
  - institutional infrastructure and capacity building

THANK YOU

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UW Nanoscale Science and Engineering Center on Templated Synthesis and Assembly

National Science Foundation

U.S. Department of Agriculture

U.S. Department of Energy

University of Wisconsin—Madison Graduate School

Worldwide Universities Network

etc.