Uncertainty is Political!
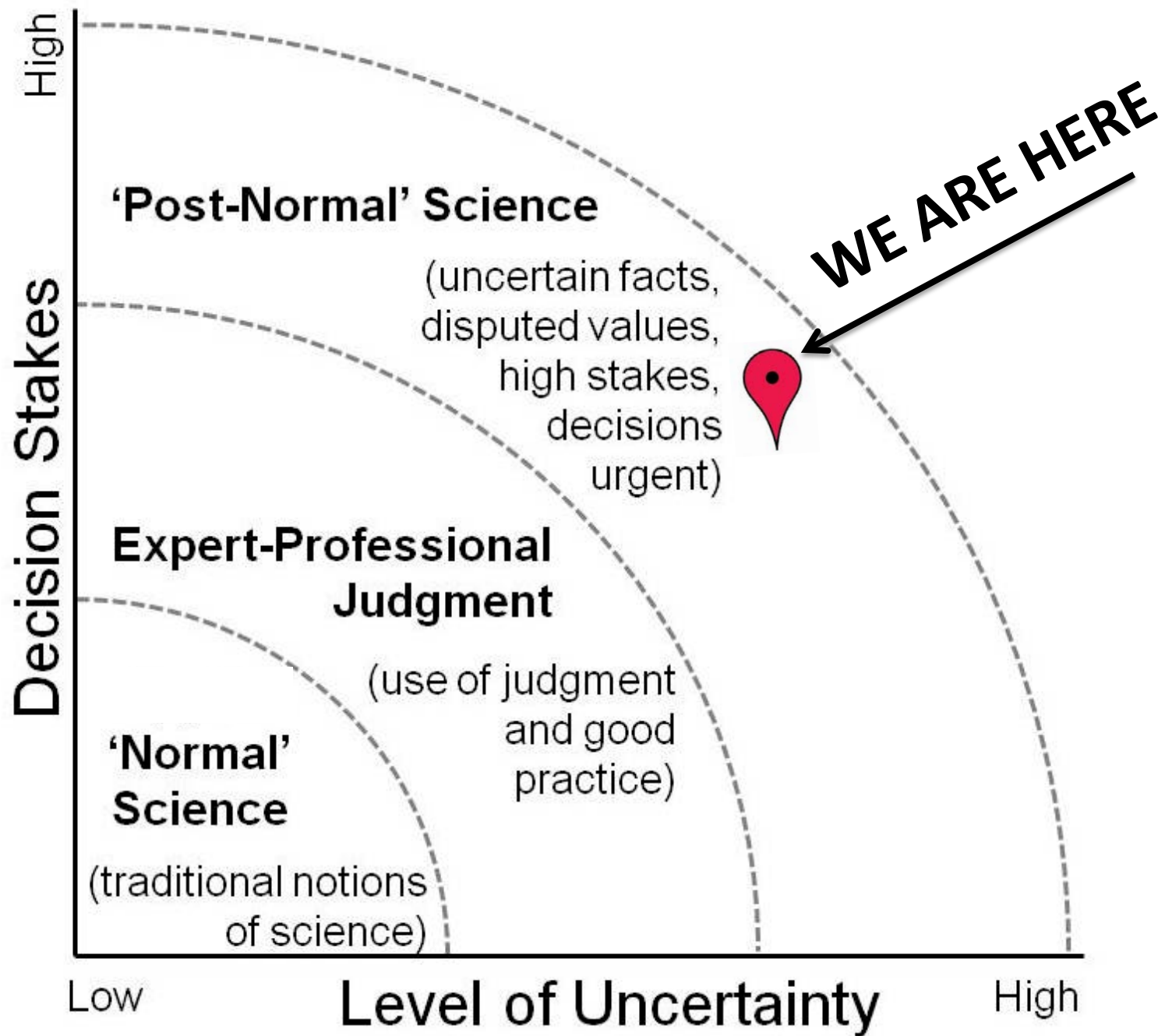
Dan Sarewitz & Mahmud Farooque

Consortium for Science, Policy and Outcomes at Arizona State University
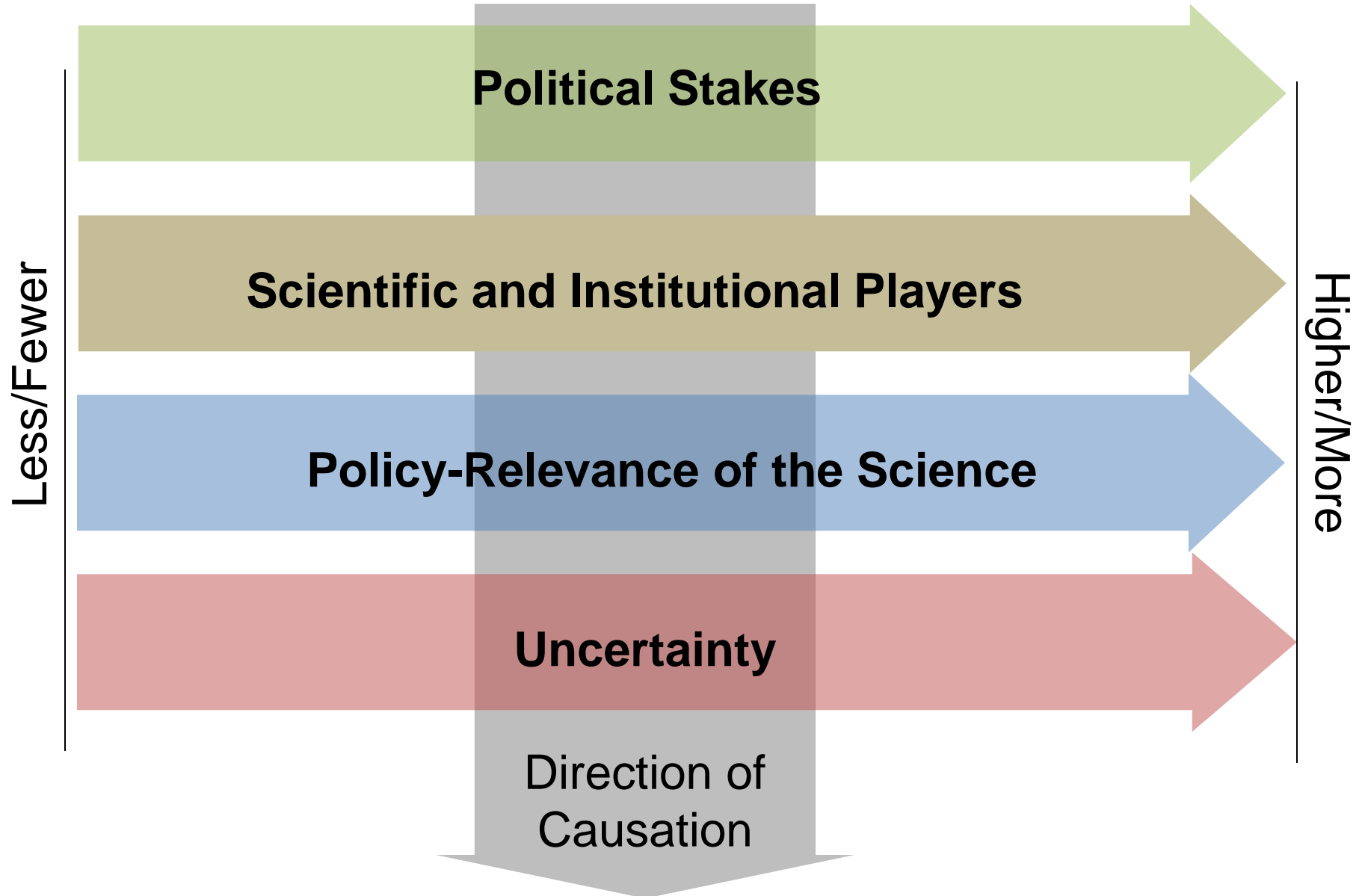
Adapted from: Funtowicz and Ravetz, 1993

95% certain

II. Where does uncertainty come from (part 1)?

Uncertainty is a Political Phenomenon

Where does uncertainty come from?

uncertainty

Cl 36

certainty

H. Reid

A permanent repository for uncertainty

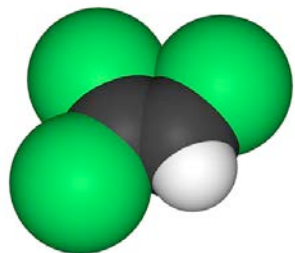**Beatty, Nevada, USA**
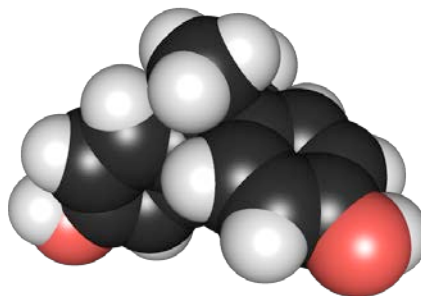
From "never enough" to "good enough"
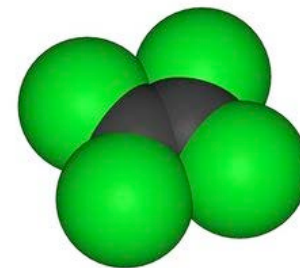
Home of "good enough"

Östhammar, Sweden

Toxic Substances Control Act

5/80,000

TCE

BPA

PERC

3/3

The 'No More Tears' Shampoo, Now With No Formaldehyde

By **KATIE THOMAS**   JAN. 17, 2014

THE
GRAND
BUDAPEST
HOTEL

SKILLMAN, N.J. — The only hint that something is different inside millions of bottles of Johnson's Baby Shampoo arriving on store shelves are two words: "Improved Formula."

The shampoo has the same amber hue, the same sudsy lather and — perhaps most important — the same familiar smell that, for generations of Americans, still conjures memories of childhood bath time.

What's different about the shampoo, and 100 other baby products sold by Johnson & Johnson, isn't so much about what's been added; it's what's missing. The products no longer contain two potentially harmful chemicals, formaldehyde and 1,4-dioxane, that have come under increasing scrutiny by consumers and environmental groups.

Johnson & Johnson's decision to reformulate its baby products is the first step in an effort to remove an array of increasingly unpopular chemicals from its personal care products.

"Good Enough" is a Political Phenomenon
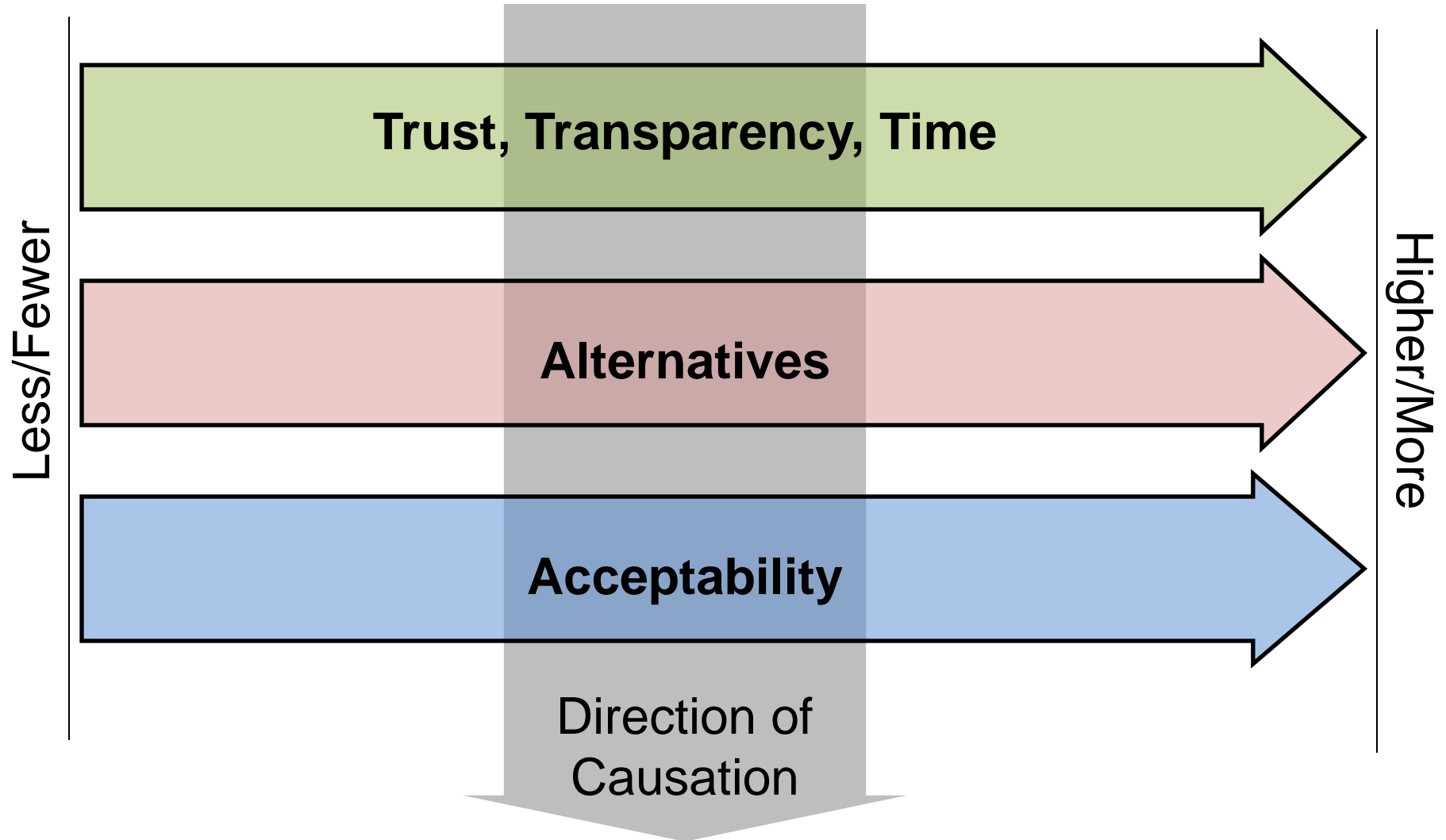
Uncertainty, Public Opinion, Public Policy
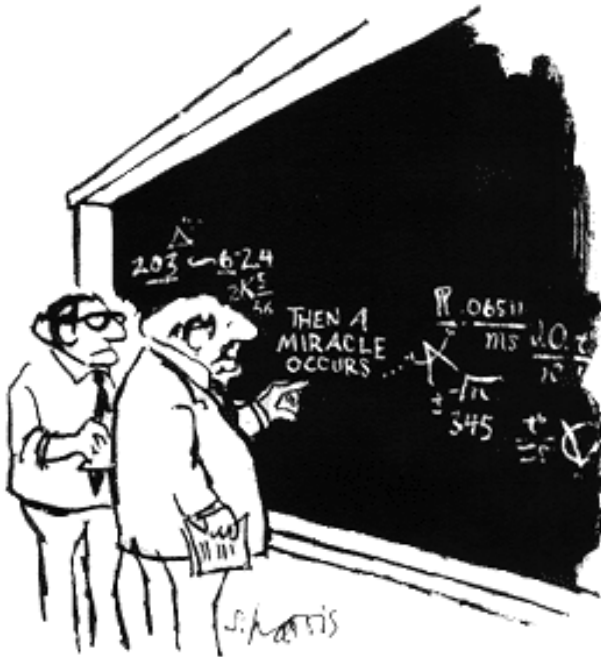
"I think you should be more explicit here in step two."

ASSESSING THE IMPACT OF CLIMATE CHANGE...

GRAPH

CLIMATE DATA

THE SCIENTISTS

VOTING INTENTIONS SURVEY

OPINION POLL

THE POLITICIANS

19/02 2007-098 © John Ditchburn

Public Opinion: NASA's Value

Public Understanding of NASA's Benefits – ViaNovo Study (2009)

Research provides further insight into limited public understanding of NASA's value.

Few Can Correctly Name Specific Contributions from NASA-Related Work
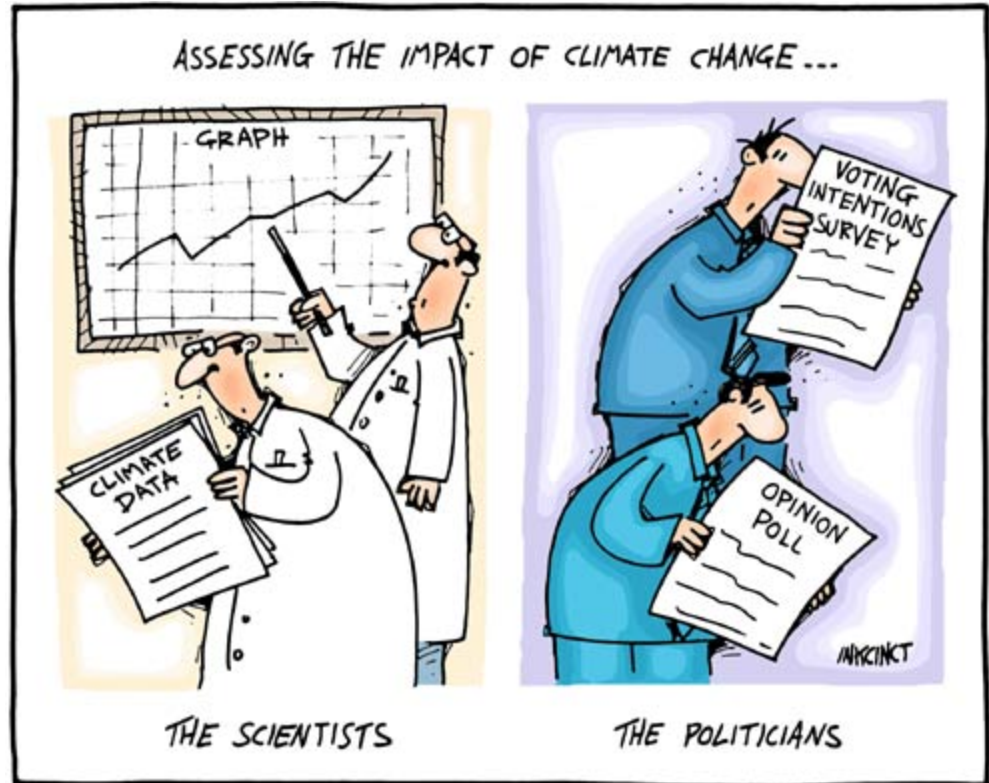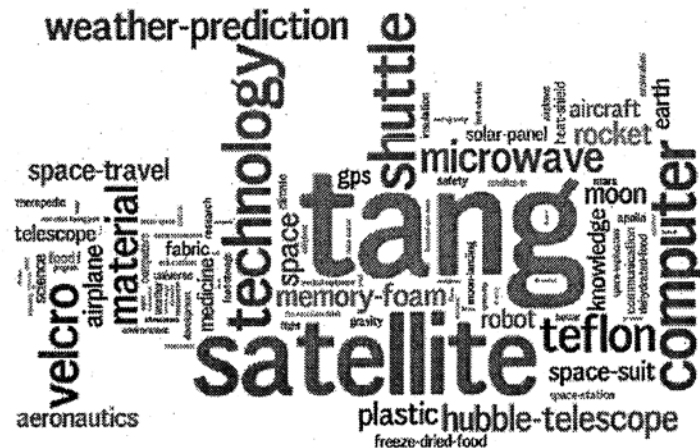
Off the top of your head, what's the first product, device or contribution to society that comes to mind that NASA has helped to develop through its research programs?

weather-prediction · shuttle · technology · space-travel · telescope · microwave · aircraft · rocket · earth · solar-panel · heat-shield · airframe · gps · safety · tang · moon · space-climate · knowledge · apollo · computer · material · velcro · airplane · fabric · medicine · memory-foam · gravity · robot · teflon · space-suit · satellite · aeronautics · plastic · hubble-telescope · freeze-dried-food · science

Note: The size of the word or phrase reflects the relative frequency of mentions; image was created using wordle.net

26

Is Scientific Illiteracy THE Problem?
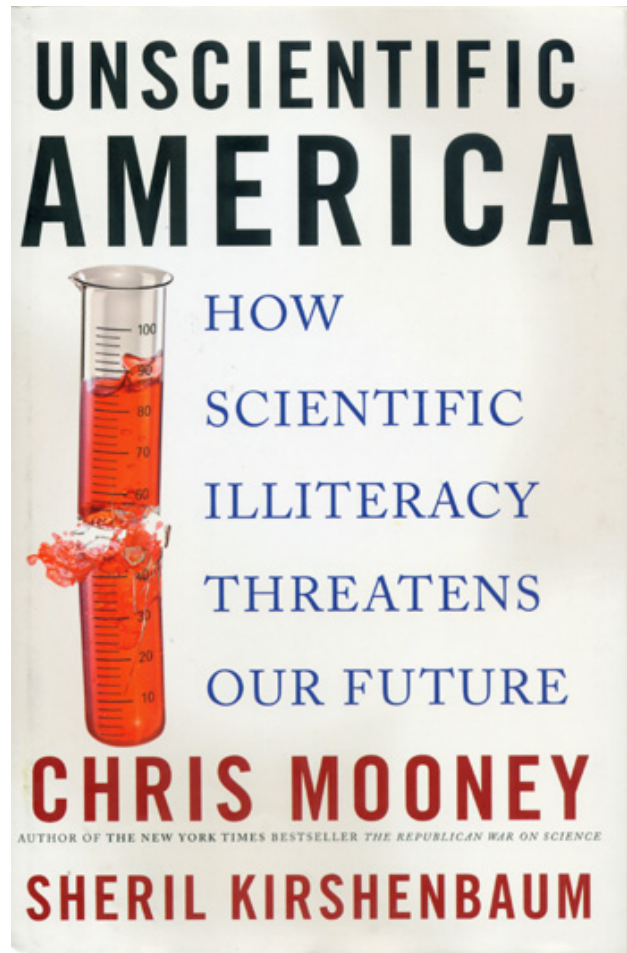
- Science literacy only accounts for a small fraction of variance in how lay public form opinion about controversial issues of science.
- Ideology, partisanship, and religious identity have stronger influence on public opinion.
- Accurate communication and understanding of science cannot separate policy decisions from values, political contexts and necessary trade-offs between costs, benefits and risks.
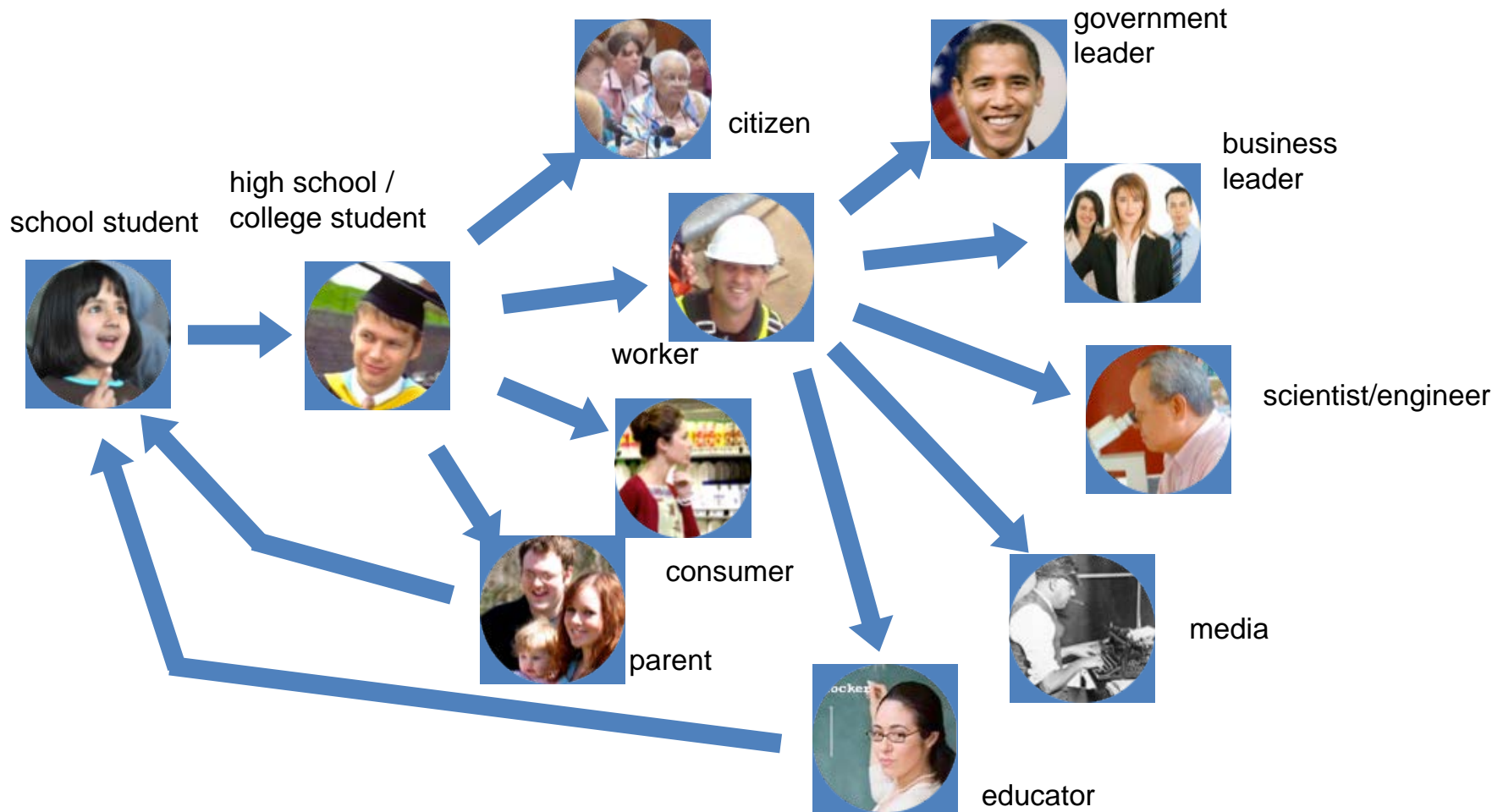
[Nisbet and Scheufele, 2009]

Deficit vs. Public Engagement Models

[Gorffman et al., 2010]

Aspect	Deficit Model	Public Engagement Model
Major influence(s) on public beliefs and decisions	Science literacy or the lack thereof	Values, trust, identity, and social networks
Proposed solution to societal inaction	To improve science literacy (to fill in the "deficit" in the public's technical understanding of a problem)	To connect a problem to public values while building trust and empowering public participation
Communication is a process of…	…transmission, which means "popularizing" and "simplifying" technical information that flows from experts to the public	…dialogue and the two-way exchange of perspectives; both the public and experts learn from this process
The definition of "reaching the public"	Increasing the amount and technical accuracy of science news coverage	Reframing a complex issue around relevant and familiar dimensions; engaging in local community forums and dialogue; partnering with opinion leaders and other societal groups
The ultimate goal	To improve science literacy – once the public is brought up to speed on the science, they will view issues and decisions as scientists do, controversies will go away, and progress will occur in dealing with the problems	To motivate, enable, and empower the public to make decisions about complex problems – yet, no matter how accurately communicated and understood the science, public decisions cannot be separated from values, political context, and necessary tradeoffs between costs, benefits, and risks

Sustained Co-production of Plausible Futures

school student

high school / college student

citizen

government leader

worker

business leader

scientist/engineer

consumer

parent

educator

media

Situating the science within the Lifecycle of a Decision-maker

Participatory Engagements: A Mission Agency Approach

- The Grander Challenge: Sustained Co-production of Plausible Futures
- Partnership and Participation could be placed in an Anticipatory Governance inspired Capability Driven Framework combining natural and physical sciences with the state of the art in social sciences.
- Leveraging opportunities are provided by distributed institutional network of Universities, Non-profits, Citizen Science Projects and Informal Science Education Centers

1. **Increase public understanding of and engagement in science policy and decision-making**
   - Transition to a public engagement models
   - Scientists, Program Personnel, Public
2. **Solicit informed, structured feedback from citizens in specific program areas and regions**
   - Multi-site structured deliberations
   - Based on agency expert generated contents
3. **Have continued feedback for future outreach approaches**
   - Outcomes research on public participation methods
   - Dissemination of best practices
4. **Provide onramp for public to engage in related, ongoing activities**
   - Engagement modules for science centers
   - Connect citizen science efforts with decision making

The Supportive Developments

Public Understanding to Engagement

- Center for the Advancement of Informal Science Education (CAISE)
- Nanoscale Informal Science Education Network (NISENet)
- Association of Science-Technology Centers (ASTC) PES Community of Practice

Research on Deliberative Methods

Citizen Participation in Global Environmental Governance

Edited by Mikko Rask, Richard Worthington, Minna Lammi

Citizen Science to Citizen Policy

- Using crowdsourcing to collect, classify and share data and content and facilitate information retrieval for all users of public information.
- Using smart devices to report potholes, faulty traffic lights and other inconveniences to make local government more responsive
- Using participatory methods to discuss complex issues on global warming and produce an outcome usable to policymakers.

"**Competent social scientists should work hand-in-hand with natural scientists, so that problems may be solved as they arise, and so that many of them may not arise in the first instance.**" - *Detlev Bronk*

Why Engagement Matters

we are building ongoing relationships between publics, educators, students, experts, and policymakers to explore how the values in science and decision making can combine to achieve desirable societal outcomes.

- **Values help shape science and technology development. Recognizing how and where values play a role we can envision our pathways for getting to a desirable future.**
- **Decisions about what cell phone to buy or which research program to fund shape technological developments. These decisions are made better when there are a variety of ways for looking into the problem and a diversity of voices around the table.**
- **Technologies develop as a product of complex relationships between publics, scientists, engineers, entrepreneurs and policymakers. Understanding these relationships is key to making better relationships and better choices.**

Many Possible Platforms

to think, to write, to publish

This NSF funded project and associated workshop uses creative non-fiction/narrative techniques to train and build intellectual and innovative collaborations between science policy scholars and science writers to make science policy communications accessible, compelling and engaging.

science outside the lab

Since 2002 we have engaged more than 150 science and engineering graduate students from more than a dozen universities in a participatory learning environment that helps them recognize and understand the confluence of factors governing science policy decision making.

expert and citizen assessment of science and technology

ECAST is a distributed network of nonpartisan policy research institutions, universities, and science centers working together to build a participatory technology assessment (pTA) capacity in the U.S. by involving experts, stakeholders and the lay public.

science, policy, and citizenship

Balanced background information, peer discussions, interaction with real world experts and presentation to decision-makers help students explore plausible options arising from emerging and current issues in science such as geoengineering, synthetic biology, biological diversity.

new tools for science policy

This seminar series hosted in Washington addresses a fundamental challenge: How can scholars and practitioners work together to continually improve the alignment of our scientific enterprise with desired societal outcomes?

museum collaborations

These collaborations challenge scientists and social scientist to make their research socially accessible while increasing the capacity of the public to engage in debates about the role of science in our lives.

futurescape city tours

Using photography and neighborhood tours as a tool for deliberation, the Futurescape City Tours brought citizens together to consider the many ways that place and new technology can combine into multiple plausible "timescapes" for their own cities.

"The nascent field of the social science of science policy needs to grow up, and quickly." – John Marburger III, former Science Adviser to the U.S. President