

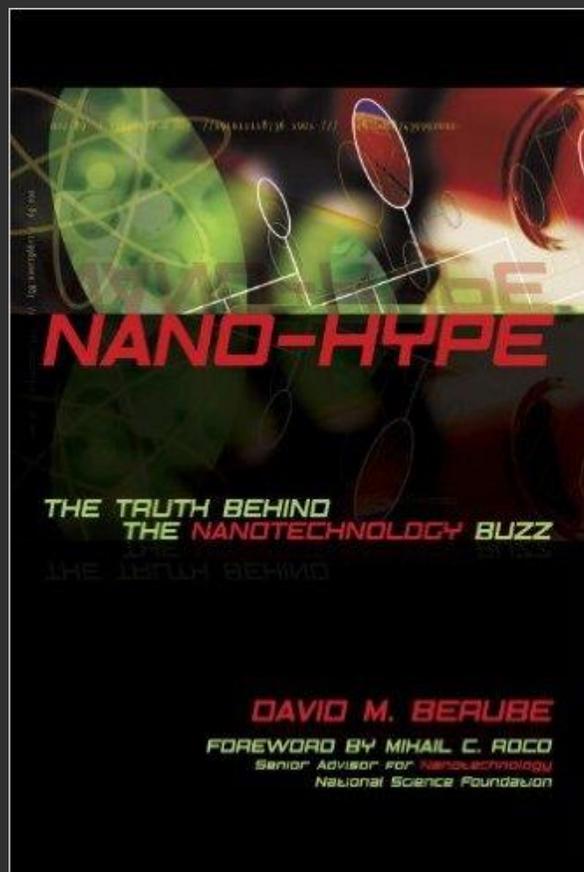
# Strategic Re-Framing - Nanotechnology as Green: Patterns and Prospects



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**SCHOLARSHIP**  
20+ articles and chapters



# NanoHype: Nanotechnology Implications and Interactions

<http://nanohype.blogspot.com/>

## Nano Hype Blog

Here is a collection of the posts from our blog, **Nano Hype**. The following is a series of posts regarding the contemporary topics in Nanotechnology.

**The State of the Social Science of Nanoscience** (25 Oct. 2016)



**Research Triangle Nanotechnology Network**

A Partnership Between NC State University, Duke University, and UNC Chapel Hill

Propaedeutics & Design protocols for business  
and industry.

# Overview: Re-Framing Nano as Green

- **First**, “Frames,” “Framing,” “Greening” and “Greenwashing”
- **Second**, Existing Frames across Nanotechnology Literature
- **Finally**, The Peril and Potential of Green Nanotechnology Frames

## On Framing as a Theory of Psychological Effects

### Scheufele and Tewksbury (2007)

- **Agenda Setting** refers to the idea that there is a strong correlation between the emphasis that mass media place on certain issues and the importance attributed to these issues by mass audiences (McCombs & Shaw, 1972).
- **Priming** refers to “changes in the standards that people use to make political evaluations” (Iyengar & Kinder, 1987, p. 63)
- **Framing (macro)** refers to modes of presentation that journalists and other communicators use to present information in a way that resonates with existing underlying schemas among their audience (Shoemaker & Reese, 1996).
- **Framing (micro)** describes how people use information and presentation features regarding issues as they form impressions.



# 1.0 “Framing” as Communication Theory

Media Effects (Media, esp. digital media).  
Interpersonal Theory (THE ELECTION).  
Rhetorical Theory.

# On Framing as Communication Theory: Framing as Meaning Construction:

Beyond examining how frame characteristics will be appealing to potential participants, little is known about how "frames are made."

- The literature now appears to offer extensive insights a number of the processes associated with frame development and innovation.
- What literature suggests is that frames are developed, generated, and elaborated only via attending to the core framing tasks but also a set of overlapping processes.

# The Public Framings of Nanotechnology

Clinton and onward.

**PRIMARY FRAME –  
THE NEXT INDUSTRIAL  
REVOLUTION**

The ability to systematically control matter at the nanoscale will lead to a technological and industrial revolution.

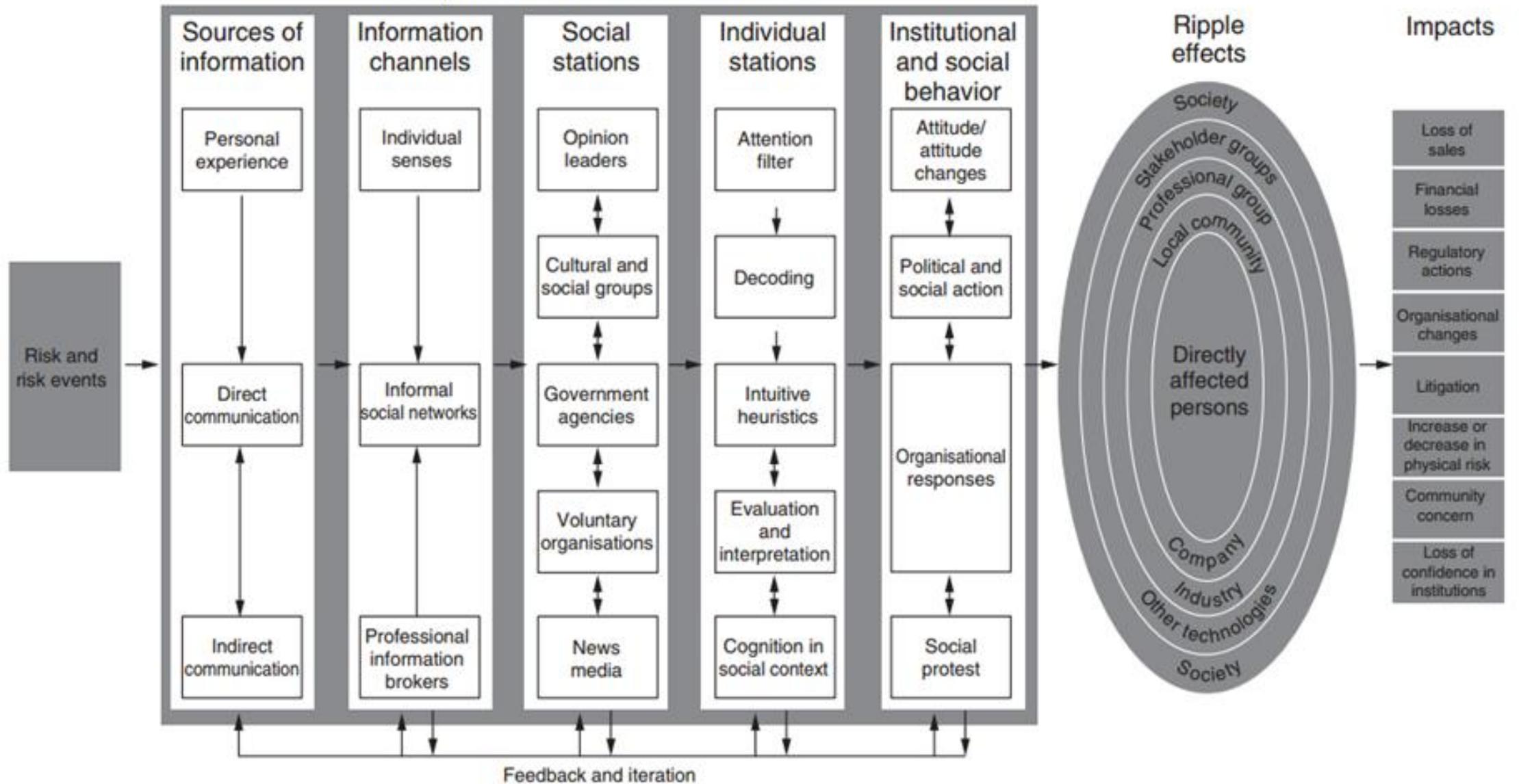
Rick Weiss, "For science, nanotech poses big unknowns," Washington Post, February 1, 2004, p. A01, <http://www.washingtonpost.com/ac2/wp-dyn/A1487-2004Jan31> (accessed February 4, 2004).

# **SOCIAL AMPLIFICATION OF RISK – via frames**

SARF: Originally developed via 5 publications --

- ▣ Kasperson, Renn, Slovic et al., 1998
- ▣ Renn 1991
- ▣ Kasperson 1992
- ▣ Burns et al., 1993
- ▣ Kasperson and Kasperson 1996

## Amplification and attenuation



**FIGURE 1** | Amplification and attenuation. (Reprinted with permission from Ref 50. Copyright 2003 Cambridge University Press)

# INFORMATION CHANNELS

Individual senses



Informal social networks



Professional information brokers

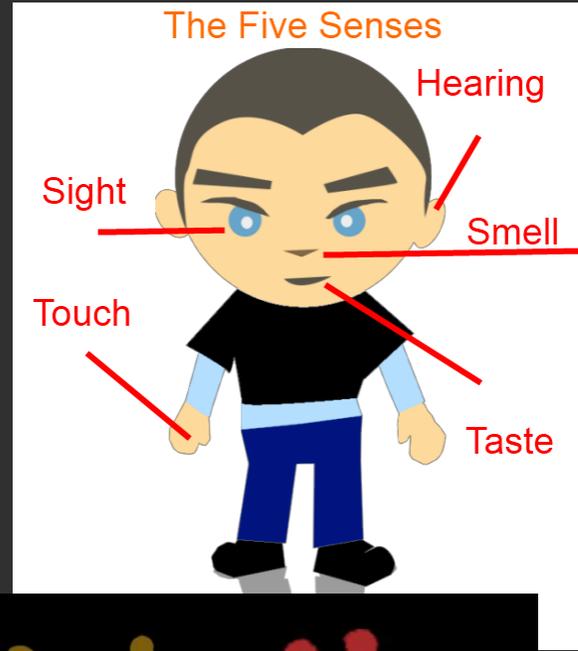
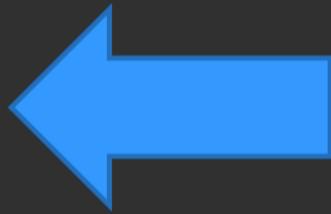
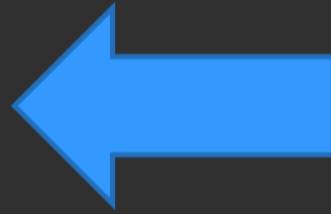
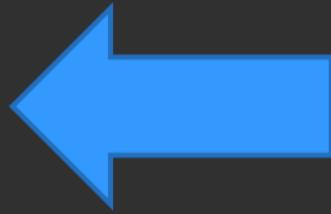


Figure 8 - SARI - Information Channels

# SOCIAL STATIONS.

Opinion leaders



Cultural and social groups



Government agencies



Voluntary organizations



News media



Figure 4 - SARF - Social Stations

# GOVERNMENT Marketing of nano as “next industrial revolution”

- There seems to be an arms race going on among nanotechnology investment and consulting firms as to who can come up with the highest figure for the size of the "nanotechnology market". The current record stands at \$2.95 trillion by 2015.
- The granddaddy of the trillion-dollar forecasts of course is the National Science Foundation's (NSF) "\$1 trillion by 2015", which inevitably gets quoted in many articles, business plans and funding applications.
- The problem with these forecasts is that they are based on a highly inflationary data collection and compilation methodology. The result is that the headline figures - \$1 trillion!, \$2 trillion!, \$3 trillion! - are more reminiscent of supermarket tabloids than serious market research. Some would call it pure hype. This type of market size forecast leads to misguided expectations because few people read the entire report and in the end only the misleading trillion-dollar headline figure gets quoted out of context, even by people who should now better, and finally achieves a life by itself.



2.0

# Existing Frames for Nanotechnology

Abridged Review of the Literature

# Knowledge about Nanotechnology

“The Evolution of Informing Publics about Risk Perceptions of Nanotechnology” Cacciatore et al. (2011)

## What difference does knowledge make?

1. INFO/UNDERSTANDING -- “Levels of knowledge have remained absolutely static over the last few years.”  
(Scheufele et al. 2009).
2. US PUBLIC OPTIMISM -- “Four in ten Americans ... believed that the benefits of nanotechnology would outweigh the negatives [while] just over 22% felt the opposite.” (Cobb and Macoubrie, 2004).
3. AWARENESS PRECONDITION -- “55% of all respondents who indicated they were aware of the issue of nanotechnology expressed overall support for the technology, compared to only 28% of the unaware.” (Scheufele and Lewenstein, 2005).

# The Public Framings of Nanotechnology

## “The Evolution of Risk Perceptions about Nanotechnology”

### Problems with Positive Affective Framing of Nanotechnology

1. SUSPICIOUS DATA -- Survey methodology suggests that the order of questions (i.e. *do nano-risks outweigh benefits? / do nano-benefits outweigh risks?*) exercises a significant influence over the responses given. “The earlier in the list an acceptable answer appears, the more popular it is.” (Tourangeau et al., 2000) (386).
2. IMPORTANCE OF FRAMING -- “Studies have shown that framing of nanotech has an effect on how audiences perceived risks and benefits of the technology.” (e.g., Cacciatore et al. forthcoming; Cobb 2005, Schutz and Wiedemann 2008).
3. DISSONANCE -- Nanotechnology has the potential to lead to environmental or new human health problems. For instance, fullerenes, composed of spherically arranged carbon atoms, are being examined for potentially damaging effects on fish, aquatic microorganisms, and human liver cells and DNA (Consumer Reports, 2007). More recently, carbon nanotubes have been linked to inflammation of human lungs and have been referred to as the new asbestos (e.g., Consumer Reports, 2007; Poland et al., 2008). (387)

# The Public Framings of Nanotechnology

Sarewicz and Nelson's (2008)

## Three Rules on Technological Fixes (one feature of greenness)

"Claims of nanobiotechnology are premised on technology as a fix, a solution at the impact level ... . Some [conservation ethicists] argue the resulting ethic continues environmental exploitation with the implicit assumption problems of all sorts are remediable."

(Berube, 2011)

Rule 1: The Technology Must Largely Embody the Cause-Effect Relationship Connecting Problem to Solution.

Rule 2: The Effects of the Technological Fix Must be Assessable Using Relatively Unambiguous or Uncontroversial Criteria.

Rule 3: Research and Development is Most Likely to Contribute Decisively to Solving a Social Problem When it Focuses on Improving a Standardized Technical Core *that already exists*.

# Overview: Nanotechnology's Frame Themes

1. **MEDIA** Print/Digital Media Frames
2. **MEDIA** Visual/Sub-visual Frames from Seen to Unseen.
3. **INTERPERSONAL** Scientist/User Frames
4. **INTERPERSONAL** Trust/Betrayal Frames
5. **FUTURIST** Apocalyptic/Utopic Frames
6. **SPATIAL** Regional/International Frames
7. **RISK** Economic/Social Risks Frames
8. **ANTHROPOCENTRIC** Food/Refuse Frames
9. **PUBLIC** Research/Public Engagement Frames

branding

# HOW ARE FRAMES USED? 1/2

On the one hand, the public framing of nanotechnology might promote exemplars of 'green' nanotechnology to establish a more widely-accepted 'green' frame for the technology as a whole.

- Priming
  - Nisbett and Ross, 1980; Iyengar and Kinder, 1987; Iyengar 1990; Brosius and Bathelt, 1994; Scheufele, 2000; Zillman, 2006; Scheufele and Tewskbury, 2007.
- Heuristic Cues
  - Burri, 2009; Felt et al. 2008; Slovic et al. 2004; Kahan 2008; Cacciatore, 2011.
- Value Predispositions
  - Brossard, 2009; Ho et al. 2008; Nisbet 2005

# HOW ARE FRAMES USED? 2/2

- RISK MANAGEMENT ... a willingness to rely on the endorsements of others, such as scientists and regulators, as well as institutions ... to manage risk associated with emerging technologies. (Earle and Cvetkovich 1995; Giddens 1991; Luhmann 1979; Sztopka 1999).
- IMAGE MANAGEMENT... a state-like disposition which acts as an uncertainty reduction mechanism, driving down citizens' concerns over the unforeseen risks and costs of emerging science. (Freudenburg 1992, 1993; Slovic 1999).
- DECISION MANAGEMENT...a tool in decision making ... when individuals have limited knowledge and personal experience and have little chance to anticipate the future consequences of a particular technology. (Olofsson et al. 2006).

# “Green” and “Greenwashing” as Frames

## Green

- Huge markets: For example, the global market for sustainable packaging is forecasted to reach \$142.42 billion by the year 2015. This growth is fueled by two key trends: manufacturers realizing that executing sustainable strategies can reduce total costs and consumers jumping on the “green” bandwagon. (Global Industry Analysts, 2010).

## Greenwashing

- Eco-labeling: Despite increasing alignment around basic sustainability concepts, there are more than 25 different eco-label programs in place worldwide that companies can use in order to make green claims, all with little or no consistency (Sabre, 2010).

3.0

# Prospects and Perils of the “Green” Re-Frame for Nanotechnology

Campaigns

# “Green” and “Greenwashing” as Frames

## Green

- Green marketing/public relations consists of marketing products and services based on environmental factors or awareness. Companies involved in green marketing make decisions relating to the entire process of the company's products, such as methods of processing, packaging and distribution.

## Greenwashing

“...refers not only to “greening” the appearances of products and commodity consumption, but also **to the deliberate disavowal of environmental effects.** In relation to environmental causes of cancer, thus, greenwashing has become a critical term used to identify when a person, group, or institution purports to care about environmental health (both human and nonhuman) yet does something that perpetuates the production and distribution of environmental carcinogens.”

(Pezzullo 346)

# FRAME SLIPPAGE

- There is the ever-present possibility of slipping from a comic, utopic, or affect-positive “green” frame to a tragic, apocalyptic, or affect-negative “green-washing” frame.
  - A comic-utopic “green” frame is opposed to a tragic-apocalyptic “green-washing” frame because ... .
  - An affect-positive “green” frame is opposed to an affect-negative “green-washing” frame because ... .
- Affect-positive frames are less effective at grasping the public’s attention than affect-negative frames. This means that it is already an uphill battle to re-brand a technology that already carries **negative affective weight**.

# ANTI-GREENWASHING VIGILANCE

## TerraChoice

- Increase labeling: According to a recent survey, **eco-labeling is nearly twice as common as it was in its 2007 survey**, increased from 13.7% to 23.4% on all "green" products. This trend is a function of collaboration of environmentally responsible companies and organizations and the growing demand from consumers wanting all things green.
- Without guidelines to adhere to, it is easy for companies to make false green claims about products and packaging. TerraChoice's recent survey of 2,219 consumer products in the US and Canada shows that **98% of these goods committed at least one Sin of Greenwashing**.

# 7 SINS OF GREENWASHING

1. SIN OF THE HIDDEN TRADE-OFF.
2. SIN OF NO PROOF.
3. SIN OF VAGUENESS.
4. SIN OF WORSHIPPING FALSE LABELS.
5. SIN OF IRRELEVANCE.
6. SIN OF LESSER OF TWO EVILS.
7. SIN OF FIBBING.



# PUBLIC UNDERSTANDING OF GREENWASHING

- Greenwashing is “the act of *misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service*” (Greenpeace, n.d.)
- A rising number of U.S. residents think corporate environmental campaigns are more hype than reality, according the Adecco USA Workplace Insight survey released April 17. Of 2,281 adults responding, *68% think most companies overstate, or "greenwash," their environmental actions.*
- Perhaps due to heightened attention to the issue in the past few years, the number of products that avoid greenwashing according to TerraChoice’s (2010) standards appears to have *increased by about 3.5% between 2007 and 2010.*

# FRAME INTEGRITY

CAMPAIGN: 2. SET SPECIFIC  
COMMONALITIES

- The diversity of nanotechnological applications is a constraint because it increases the inherent *riskiness* of sliding from more affiliative frames into more negative public affiliations.
- Nanotechnology's "green" applications extend across disciplinary domains that include water, food, and energy.
- Beyond its "green" applications, nanotechnology also has mention-worthy applications in the areas of material science and medicine.

# FRAME DISSOLUTION: POLICING OR BADGING

CAMPAIGN:  
3. POSITIVE  
REINFORCEMENT

- It is always possible for a failure of one 'green' nanotechnology to become an anecdotal failure for all others. Strategic framing is ongoing.
- As Berube (2008) has argued, nanotechnology belongs to an un-self-critical rhetorical field characterized by hyperbole and metaphors that equate its research and development with scientific progress writ large.
- This is evidenced by the public analogies that attack "green" nanobioscience by equating it with the genetically-modified food controversies, even when the logical links between different technological innovations are tenuous, their negative attributes are easily (if not also counter-factually) transferred from one to the other.

# FRAME DIRECTION: ANTECEDENTS AND IMPACTS

CAMPAIGN 4:  
DETERMINE  
CRITERIA

- It's clear that the “green” frame of *any* nanotechnology must negotiate the existing landscape of nanotechnology's frames. **As Berube (2011) has argued**, arguments over nanotechnology's “green” applications hinge on the imbalance between the antecedents and the impacts of nanotechnology:
- “Claims of nanobiotechnology are premised on technology as a fix, a solution at the impact level ... . Some [conservation ethicists] argue the resulting ethic continues environmental exploitation with the implicit assumption problems of all sorts are remediable.”

# FRAME HOLISM:

CAMPAIGN 5: PLAN  
TACTICALLY

- The public framing of nanotechnology might promote exemplars of ‘green’ nanotechnology to establish a more widely-accepted ‘green’ frame for the technology as a whole. We might say, for instance, “such-and-such “green” nanotechnology has successfully broken new ground.”



# DANGER OF EXEMPLARS

Risk of  
marginalizing  
the concept.

- A likely consequence of promoting exemplars of 'green' nanotechnology is that this nanotechnology will adopt a (i.e. nanobiotechnology) as its predominantly 'green' wing without producing a suitable support structure for other 'green' applications that might arise alongside or after it.

# FRAME LONGEVITY

CAMPAIGN 6: LONGITUDINAL  
PLANNING (PRE-MORTEM)

- **Finally**, it is necessary for any effort to intervene into nanotechnology's green frame to beforehand answer the question of whether the fix *outweighs* the possible and lasting consequences of its development. The developers of nanotechnology must address the possible antecedents of environmental crisis if, for no other reason, to act as a hedge against the potential and actual impacts of unleashing this technological 'fix' onto the world.

# STRATEGIES FOR REFRAMING NANO

Snow & Benford  
2000, 2009

1. New marketing – take the lead.
2. Marketing science in a world of weakening advocacy.
  1. Waiting for the products.
  2. Waiting for the ROI.
  3. Waiting for new admin.
3. New media and editorializing frames.

4.0

# Re-Framing

The Approach

## FRAME BRIDGING

Linking one  
frame to  
another as  
issues surface.

- Frame bridging refers to the linking of two or more ideologically congruent but structurally unconnected frames regarding a particular issue or problem.
  - sentiment pool or
  - public opinion cluster,
  - or across social movements

## FRAME AMPLIFICATION\*

Taking one feature of a phenomenon and developing it into a competing frame and over time crowding out other frames.

- Frame amplification involves the idealization, embellishment, clarification, or invigoration of existing values or beliefs.  $N=G$
- Given that one of the key factors affecting whether or not a proffered frame resonates with potential constituents has to do with the extent to which the frame taps into existing cultural values, beliefs, narratives, folk wisdom, and the like, it is not surprising to find that most movements seek to amplify extant beliefs and values.

# FRAME EXTENSION

The political manifestation of competing frames for a particular purpose or goal.

- Frame extension entails depicting a frame (such as greenness) as extending beyond its primary interests to include issues and concerns that are presumed of importance to potential adherents.
- Empirical examinations of frame extension indicate that although often employed, this alignment strategy is subject to various hazards and constraints. (GREEN POLICE)
- Frame extension activities spawns increases in intramural conflicts and disputes within movements regarding issues of ideological "purity," efficiency, and turf.

## **FRAME TRANSFORMATION\***

**Frame diffusion –  
understanding  
how frames  
multiply.**

- Frame transformation, the final strategic alignment process, refers to changing old understandings and meanings and/or generating new ones.
- Few studies deal explicitly with this form of frame alignment.



**COM, CRDM GES, RTNN, and others.**

**Hunt Library, Centennial Campus, NCSU**

# THANKS



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happy  
Thanks  
Giving