Presenter and Panel Member Abstracts

TUESDAY, MAY 30, 2006

8:30 – 9:10 AM Nanotechnology Primer

Carl Batt, Cornell University

Nanotechnology offers outstanding promise to revolutionize a vast array of materials, components and devices; it will simply impact the way we do many things. As defined, nanotechnology involves the deliberate manipulation of matter at size scales of less than 100 nanometers with the anticipated benefit of realizing the unique physical properties at these dimensions. The challenge is not only the significant technical hurdles to implementing the technology in a manner that is practical but also articulating the impact of the field on the lives of everyday people. Nanotechnology will impact biomedical research, analytical chemistry and the manufacturing of everything from clothing to the most sophisticated computers. It will help to build the interface between a number of fields including engineering, chemistry, physics and the life sciences. The world that is too small to see can be fascinating but it can also instill fear. For example, many people have relatively unfounded fears of germs and these when extended to include things that are man-made and too small to see enhances the challenge. The balance between promoting the promise of nanoscale science and engineering and keeping it within the realm of reality is important. It will demand new and more dedicated approaches to informing the general population and finding novel ways to increase science literacy in the area.

9:30 – 10:45 AM Panel 1. Why Participation?

Carolyn Lukensmeyer, AmericaSpeaks

Why Do Public Participation?
Why engage the public in policy-related decisions? What are the elements of good public engagement?

David Guston, Arizona State University

What Do We Want to Learn from Public Participation in Nanotechnology?
This presentation will discuss public participation and engagement in nanotechnology from two directions: First, it will discuss what our reasons are for focusing on public participation and engagement, the need for which is often formulated as either: 1) a normative claim by the public on science that the latter requires participatory input as other political phenomena do (e.g., Langdon Winner); or 2) a pragmatic claim that local knowledge is critical for the (co-) production of the best available information for decision-making (e.g., Brian Wynne). In nanotechnology, participation is increasingly rationalized as a way to soothe the slumbering beast of the public, lest it be roused and derail new or potential industrial technologies, as some interpret the GM food experience. Less often has public participation been conceived of as a scientific responsibility and, when it has, that conception has tended to err significantly on the side of the deficit model of public understanding of science – which holds knowledge the prerequisite for participation – rather than on the priority of engagement for developing the participants' stake in the topic and, consequently, their understanding. Second, the presentation will discuss how we should go about evaluating public participation and engagement activities in nanotechnology. Such activities can have four broad categories of impact: 1) an actual, substantive impact on policy, e.g., a new regulation; 2) substantive or procedural impacts on the general thinking on the topic, e.g., a new way of framing an issue; 3) substantive, procedural, and/or reflexive

David Guston (continued)

impact on the training of knowledgeable personnel, e.g., better understanding among NNI administrators about how the public feels about nanotechnology; and 4) substantive, procedural, and/or reflexive impact on the lay participants, e.g., what they know and how they feel about nanotechnology and how public and private institutions are managing it. The design of public participation and engagement activities, as well as the design of their evaluations, should keep both the first set of purposes and the second set of impacts, in mind.

Rosalyn Berne, University of Virginia

The Ethical Dimensions of Public Dialogue in Nanotechnology

Whenever a new technology, such as nanotechnology, emerges with the potential to reshape and impact society, public narratives emerge right along with it to establish the meaning, significance and even the moral boundaries of that technology. Narrative, the use of language based stories, is one of the most basic tools that human beings have for making sense of what we perceive and experience, and to invest those with meaning. It provides access to otherwise unarticulated hopes, fears, expectations, and assumptions regarding our relationships to our bodies, to one another and to the physical world we inhabit. There are myriad forces at work inside the development of nanotechnology. One of those forces is the competition to shape the course of human events. Public narratives have an important role in both defining and exploring the meaning and significance of nanotechnology, and in constructing an ethics for nanotechnology's evolution and development. But the narratives of individual research scientists and engineers need to be included in that public discourse, not simply as the voices of professional experts, but as interested citizens with their own stories to tell. The successful building of public trust and understanding requires the inclusion of individual laboratory researchers as persons, contributing their own understandings, ideas, beliefs and perspectives about the nanotechnology initiative to the wider, public discourse.

While individual nano researchers can be quite introspective and thoughtful about their own research, their participation in the public discourse is rare. Very few scientists are speaking and writing to non-expert audiences about nanotechnology; particularly about its societal dimensions and ethical implications. As a group, research scientists and engineers have a long history as agents of social awareness. They have spoken out into the public and against technology policies and government practices when reasonable moral limits are crossed. But so far, they have generally been publicly uninvolved in the ethical guidance of nanotechnology development. They seem to prefer to abstain from expressing their own voices, relinquishing that role to the designated public spokespersons of the science community. Yet it is these very voices of the lesser known, behind the scenes, individual researchers; speaking not for or from 'the community of science' or on behalf of their sponsors, but for themselves, which are especially needed in the narrative processes of public engagement for understanding.

12:15 – 1:30 PM Luncheon Speaker

David Ropeik, Harvard School of Public Health

Nanotechnology and Risk Perception

The industrial/technological/information age has, by many of the most basic metrics - increased lifespan, reduced infant mortality, all-but-complete eradication of many major diseases - made this a much safer and healthier world for billions of people. But many of the goods and services of our modern age, and indeed the very pace of progress, also bring new hazards, forcing societies to choose between risks and benefits. Often we face such tradeoffs before our knowledge about new products and processes is complete. In the absence of complete information, humans use affective and intuitive risk perception heuristics - mental shortcuts - to guide their choices. Simply put, we use both our facts, and our fears, to decide. Risk perception will play a fundamental role as nanotechnology moves, or attempts to move, from the research lab into the market place.

David Ropeik (continued)

So even as the natural sciences are beginning to investigate the physical risks of nanotechnologies, we must understand the psychological risk perception characteristics of this powerful new way of controlling matter, if we are to make thoughtful and wise tradeoff choices that maximize nanotechnology' s potential in ways that minimize risk to human and environmental health.

2:00 – 3:15 PM Panel 2. Planning for Public Participation

Douglas Sarno, The Perspectives Group

Best Practices in Public Participation

Public participation can be defined as any process that seeks to understand public values and use input from diverse publics in a planned effort to improve decision-making. Current practice too often engages the public in an attempt to get buy-in to an existing decision or conducts public meetings simply because they are required. In both cases, the results are not only negative for that project but perpetuate the false perceptions that public participation does not work and that the public cannot engage constructively on controversial or difficult issues. When the public and government leave public meetings more angry, more confused, and further apart than when they arrived, we can think of this as anti-participation.

What Goes Wrong?

Anti-Participation occurs for many reasons, but much this futility can be assigned to one or more of the following "sins":

1. Lack of Commitment/Negative Attitude
2. Checklist Approach
3. Late Start
4. Lack of Integration with Decision-Making
5. Limited Perspectives Engaged
6. One-Sided Information
7. Inadequate Feedback

How Do We Improve?

To implement more meaningful and successful public participation, planners need to think about these Seven Best Practices:

1. Clarify the intent of participation
2. Fully commit
3. Focus the participation
4 Plan and integrate
5. Be inclusive
6. Communicate on a human scale
7. Evaluate

Barbara Herr Harthorn, University of California, Santa Barbara

How Do We Identify the Publics To Be Engaged in Nanotechnology?

Current low awareness of nanotechnology's meanings among the US publics poses both a set of rather challenging problems for the design and implementation of public participation programs and an incredible opportunity for them. Because awareness is low, we can't simply ask people what they think about nanotechnologies— a new approach is needed. Similarly, identifying who will be most interested and most concerned about emerging nanotechnologies is more a matter of prediction than knowledge—we simply do not yet know who will come forward, through what social or political processes, and with what aims and intentions, particularly from what we might call the 'general public.' Longitudinal research that will follow the course of the publics' developing understandings and participation is thus essential for understanding nanotechnologies' reception. We also draw heavily on analogies from other technologies and their publics.

The low level of public awareness raises questions about why we should try to engage at this time. Current and past social science research with these and other technologies informs our approach to public participation. There is widespread recognition and acceptance of the idea that we need to do public participation differently with these new technologies, in particular with an aim of facilitating two-way communication between science and society. Past efforts have failed primarily because of the lack of sufficient engagement or the initiation of engagement at a point too far down the developmental path, when the publics' priorities and/or concerns cannot alter the course of technology development or promulgation in society.

There will almost certainly be diverse communities of stakeholders, with distinct issues, concerns, practices, and acceptability judgments. The publics for nanotechnology are emerging in different ways and being tracked through different research methods. Our research on internet networks indicates that among nonprofit NGOs, environmental groups are leading the global uptake of nano-related issues. The different perceptions or beliefs people have about risks are important predictors of behavior, which is why we will focus our attention on them, and spatial analytic tools will provide important insight into their demographic divides. Factors that we know produce such divisions include past histories of exposures and ill health, race, class, gender, and education, among others. Understanding such differences is critical to successful democratic engagement. And one of the paradoxical challenges to enhanced public participation in nanotechnologies' debates is that those with low (attenuated) perception of risk are particularly unlikely to pursue additional knowledge or self protection, in the case of risks, just as those with elevated sense of risk and vulnerability may demand a very high level of resources. To further complicate the picture, nanotechnologies themselves are multiple in form and application, and, in the absence of a large-scale risk event that generalizes to 'nanotechnology' writ large, there are likely to be different publics for the very different technologies. Just as the publics are multiple, so are the 'experts,' and we expect significant differences among experts by discipline, the focus of their research, the context in which they work, and other factors. Understanding these distinctions is important for public participation because we need to know how expert involvement will shape particular kinds of experiences and outcomes of interaction with them. Furthermore, scientists' judgments about the publics are likely to facilitate or impede engagement on their side.

Dietram Scheufele, University of Wisconsin-Madison

What Do We Know About Public Opinion?
Public engagement in science and scientific decision making takes different forms, which do not work equally well in all settings and for all sub-publics. In my talk, I distinguish between public engagement with specific groups in citizen forums and town-hall meetings, and public outreach toward large cross-sections of the populations through informational campaigns and mass media.

Based on previous research, I will outline strategies that work and do not work for public engagement and public outreach. What is the role that media coverage plays in shaping public perceptions? What can scientists and governmental agencies do to inform and engage the public and have their voice heard in public discourse? And how do audiences make sense of the messages they receive in mass media, from interest groups, and from governmental agencies? My talk outlines how the answers to these questions can help us engage publics whose views on issues, such as stem cell research or nanotechnology, are often shaped by religious beliefs, trust in regulatory bodies, and other factors that have little to do with information about the specific technology that is being discussed.

8:30 – 9:30 AM Panel 3. Engaging the Public in Science and Technology

Rob Semper, The Exploratorium

Engaging the Public in Science and Technology
Engaging the public in science and technology can mean many different things to many different people. Different stakeholders are interested in different parts of this issue ranging from general cultural development to workforce development to a desire of public financial and policy support. Internationally this is demonstrated by the current different emphases in different regions based on cultural and historic factors with public awareness being the dominant concern in Japan, public understanding being the focus in the US and public engagement dominating the European discussions. Historically the Informal Science Education (ISE) community made up of public audience institutions (science and natural history museums, science centers, zoos, planetaria and aquaria), media presentation channels (broadcast, cinematic and interactive media such as television, radio, large screen films (IMAX), on-line media and publishing), and organized out of school activities have presented significant opportunities to reach a wide audience with current research activities as well as basic science and technology education.

Unlike formal education where the parental, structured, legal and credentialing process provides the primary impetus for engagement, the ISE field operates in a world where the audience makes a deliberate decision to participate. This has lead to a focus on the human side of the endeavor, whether it is a presentation that engages the senses like a good exhibit or IMAX film, or tells the story of real people doing real science with a documentary or a museum public program, or creates an opportunity for direct engagement through an after-school club or a discussion forum on science and society issues. Using exhibits, forums and media, the institutions of ISE can play an unique role in Public Participation in Nanotechology as an intermediary between the world of science and the world of the public because of their existing audiences and facilities, their diverse design capacities and their ability to move fluidly between these two worlds.

Larry Bell, Museum of Science, Boston

Public Engagement at Science Museums and through the NISE Net
The Museum of Science serves as a public engagement partner for two Nanoscale Science and Engineering Centers in the Boston area -- one headquartered at Harvard University and one at Northeaster n University. Activities have included live presentations by Museum staff and guest researchers in the Museum's Current Science and Technology Center, exhibits and touch screen media in the Museum, online resources, an educator symposium, and regular broadcasts on New England Cable News. Now the Museum, with the Exploratorium and the Science Museum of Minnesota, is leading the Nanoscale Informal Science Education Network with 14 initial partners. This is an NSF-funded initiative to increase public interest, understanding, and engagement with nanoscale science, engineering, and technology by creating a national network of informal science educators and nanoscale researchers. Just eight months old, the NISE Net is developing exhibits, programs, a media network, citizen forums, a visualization lab, grad student professional development opportunities, a public website, and an online resource center for nanoscale informal educators.

Cynthia Needham, ICAN Productions

Nanotechnology: The Convergence of Science and Society
Most authorities agree that nanotechnology will play a major role in defining our future. At the same time, recent surveys reveal that members of the general public have little knowledge about it and little interest in it. Acceptance of new technologies is often influenced by polarized views, sensationalism and misinformation. We hope to foster better mechanisms for respectful dialog and decision making around some of the very complex issues raised by this rapidly evolving field by seeking creative ways to engage the public early. This NSF-funded project offers an innovative approach to attracting public interest in nanotechnology by examining the social, ethical, legal, environmental, and policy issues surrounding its potential applications. The project will engage citizens in a thoughtful consideration of the potentials of nanotechnology through: (1) Three one-hour nationally broadcast television programs produced by Fred Friendly Seminars, (2) A Seminar discussion guide emphasizing the interaction of science and society as well as presenting basic constructs for "nano literacy,"(3) A series of 90-second programs broadcast as part of "Earth & Sky" radio series, and (4) A project website that will host moderated forums to engage members of the public, scientists, policy experts, and others in an ongoing dialogue about the status of nanotechnology research and its potential impacts. Community-centered public forums coordinated by the Office of Public Understanding of Science of the AAAS will further engage stakeholders in 15 U.S. cities in dialogue regarding applications that may have an impact on their particular community.

11:45 – 1:15 PM Luncheon Speaker

Phil Macnaghten, Lancaster University

Empirical research aimed at helping clarify the likely social and ethical dimensions of emerging nanotechnologies was conducted in the UK between 2004 and 2006. The purpose of the research was to develop a deeper insight into the sorts of issues likely to shape public attitudes and concerns. This was not an easy task. How do you research a topic about which most people have little or no opinion? How do you anticipate future public opinion?

The results, based on 10 in-depth focus group discussions with assorted publics, present a picture of emergent public opinion in tension with existing literature on public attitudes towards nanotechnology. It highlights a latent ambivalence towards nanotechnologies, and suggests that there may be public unease about its potential implications. What is perhaps most interesting is that this ambivalence did not diminish through greater knowledge and awareness. Instead, through exposure to the multiple ways in which the debate was being characterised, and through debate and deliberation, our participants moved towards a more sceptical view as to the ability of government and industry to represent the public interest.

9:30 – 10:45 AM Panel 4. Participation in Action Presentations

Kathy Hudson, Johns Hopkins University Berman Bioethics Institute

Genetic Town Halls

Active public engagement is essential to develop policies that reflect the wide range of perspectives that exist in America today. Yet few models exist to demonstrate how to include an informed public in the genetic policy debate. As part of an ongoing project to understand the publics' attitudes about reproductive genetic technologies (RGT), the Genetics and Public Policy Center used a "deliberative democracy" approach to a public consultation process to bring citizens, experts, and policymakers together in 2004 to learn from each other and deliberate about issues related to the use of RGTs. We evaluated two approaches to providing a deliberative democracy event. *The Genetic Town Hall: Making Every Voice Count* was held in six cities using a modified town hall format and with 15 online discussion groups. Town hall participants were recruited using community outreach. The 3-hour, scripted sessions provided a balance of education and facilitated discussions. Online participants were recruited from a representative web-enabled panel and met online for one hour moderated discussions for three weeks. Videos were developed to ensured uniform content in each setting; participants were queried before and after to document shifts in opinions. A randomly selected control group completed identical pre- and post-surveys. 536 participated in the town halls; 133 online. Shifts in attitudes occurred in both groups, most notably about appropriate uses of reproductive genetic testing and the need for oversight. The town halls attracted more knowledgeable stakeholders; online participants were more representative of the general public. Town halls generated media coverage and the involvement of community leaders; online groups had more detailed discussion but had limited wider impact. We conclude that both approaches allow for education and nuanced discussions. Depending on the goals of the public consultation, each has benefits and drawbacks.

Tom Beierle, Ross & Associates

Online Democracy

The National Dialogue on Public Involvement in EPA Decisions was an online public dialogue sponsored by the Environmental Protection Agency (EPA), which took place for two weeks in the summer of 2001. EPA convened the Dialogue to obtain input on its draft Public Involvement Policy (PIP) and gather ideas on how best to implement the PIP. The model focused on encouraging considered deliberation among a large group of participants across the country

Tom Beierle (continued)

The primary objective of the process was to provide EPA with information from a variety of viewpoints that would help the agency develop its public participation policy and ideas for how best to implement the policy. The objectively was explicitly not to build consensus. Secondary objectives were to open up new lines of communication between the public and agency staff, to educate and inform those involved, to test a new approach to public participation, and to encourage formal comments on the policy.

Vence Bonham, Education and Community Involvement Branch, National Human Genome Research Institute, NIH

Community-Based Forums

The National Human Genome Research Institute (NHGRI) is one of 27 Institutes and Centers of the National Institutes of Health. NHGRI established in 2004 a Branch to lead its community engagement and public education programs the Education and Community Involvement Branch (ECIB). The Branch is responsible for the development of the Institute's education and community involvement programs to engage a broad range of the public in understanding genomics and accompanying ethical, legal, and social issues.

Public Participation
in Nanotechology Workshop

To further the public engagement mission of NHGRI, the Institute established a public participation program described as the "Community Genetics Forum". To carry out this annual program, NHGRI awards contracts to academic institutions or community based organizations to host, plan, implement, and evaluate a public forum on genetics. The partner institution works in a collaborative manner with NHGRI to identify the target audiences and to develop strategies to engage the communities. Each organization that hosts the Forum is a part of the community that is being engaged and provides NHGRI the community expertise and perspective in engaging the community. Each Forum is evaluated to determine whether expectations were met, whether information was clear, and whether participants learned new information, their concerns were heard and questions were adequately addressed.

Carolyn Lukensmeyer, America Speaks

21st Century Town Meetings

Chris Toumey, University of South Carolina

Citizens Schools

The South Carolina Citizens' School of Nanotechnology (SCCSN) is an innovative approach which serves as a platform for experimenting with different forms of dialogue between experts and nonexperts. Its ethos and organization draw upon recent developments in the area of nonexperts' involvement in science policy, including participatory democracy and informal science education.

The SCCSN model has five elements:
1. Expert presenters who are adept at speaking with nonexperts;
2. A package of readable articles to give the participants background and confidence;
3. Numerous opportunities for participants to question the experts and express their concerns;
4. Size limited to fifty or less to ensure a friendly atmosphere;
5. Revisions from round to round in response to participants' suggestions.

The SCCSN model complements the science café and mini medical school models. It is more intimate than a mini medical school, more formal than a science café and, with its package of readings, provides more depth than either a mini medical school or a science café. This model need not be limited to nanotech; hypothetically it could serve numerous topics in science and technology. Instead, it is an historic coincidence that discourses on participatory democracy and experiments in informal science education have matured just when nanotechnology began to come to the attention of nonexperts.

Leslie Bourquin, Michigan State University

Extension Service Outreach

USDA Cooperative Extension Service: Facilitating Engagement and Public Participation
Established by the Smith-Lever Act in 1914, Cooperative Extension was designed as a partnership of the United States Department of Agriculture and the land-grant universities that originated with the Morrill Act in 1862. As stated in Section 1 of the Smith-Lever Act, the original mission of the Cooperative Extension Service was "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture, home economics, and rural energy, and to encourage the application same." Although many persons may be unaware of Extension, most are familiar with some of the more visible Extension programs, such as 4-H.

During recent decades, Extension has evolved from an organization focused primarily on dissemination of knowledge in agriculture and home economics (primarily utilizing a top-down teacher:student approach) to a more interactive approach to public engagement. No longer primarily focused on educating farmers, Extension now has major programming in urban as well as rural areas. In addition to its traditional programs

Leslie Bourquin, Michigan State University (continued)

in agriculture and natural resources, Extension now includes core programs on family and consumer sciences as well as community and economic development.

As a model or vehicle for engaging public participation, Extension has many strengths. The organization has a long history of being embedded in urban and rural communities – there are Extension offices and staff in most counties of the U.S. These Extension educators are networked to faculty and Extension personnel in the land-grant universities as well as to USDA-CSREES in Washington. Because the majority of funding for Cooperative Extension offices and personnel is derived from state and county budgets, rather than the federal government, community-based Extension staff are highly cognizant of the need to engage with their local clientele to determine programmatic needs. Thus, Extension has through its very evolution become an excellent example of an "engaged" institution that is well-positioned to participate in and facilitate public discourse on issues and policies affecting persons from all walks of life.