

SDN Annual Meeting Report 2004

Panel 1: Representation (Rapporteur: Frank Laird)

Mark Brown (California State University-Sacramento): “Citizen Panels and the Concept of Representation.”

This paper examines the potential of experimental institutions such as citizen panels, consensus conferences, and deliberative polls to improve democracy by involving lay citizens in deliberation on complex political issues. I first briefly present a normative theory of representative democracy built on a combination of elite responsiveness and popular participation. From this perspective, representative democracy is not a pragmatic second-best alternative to so-called direct democracy, as is often assumed, but normatively superior to it. The next part of the paper draws on classical and contemporary theories of representation to evaluate four ways that commentators have conceptualized the representative status of citizen panels. The first two -- citizen panels as representing individual interests or group interests -- each mistakenly treats citizen panels on the model of stakeholder workshops or negotiated rulemaking procedures. In these latter instances, however, interest group representatives are usually authorized to act on other people’s behalf and are potentially held accountable to them. This is not the case with citizen panels. The third prevalent view portrays citizen panels as representative of abstract human interests or the public interest, not tied to particular individuals or groups. I compare this view to the eighteenth-century doctrine of virtual representation and argue that if it is taken to mean that decision makers should automatically adopt citizen panel recommendations, it cannot be sustained, as it would leave non-participants with no way to shape what is done on their behalf. The fourth prevalent view sees citizen panels as representing -- or rather, making representations of -- a diversity of social, political, and scientific perspectives. I argue that only this view accords with the institutional design of most citizen panels. I also draw on recent work on “descriptive representation” to argue that diversity on citizen panels is best conceived not on the model of a representative sample (as in deliberative polls), but that of a demographic cross-section (citizen juries and consensus conferences). The final part of the paper draws on this assessment of their representative status to examine how citizen panels can best contribute to representative democracy. I argue against the common overemphasis of their capacity to facilitate either political participation or representation, and suggest instead that citizen panels have a genuine but limited potential to promote informed deliberation among experts and lay citizens. In this respect, the value of citizen panels lies primarily in their contribution to the substantive justification rather than procedural legitimation of political decisions.

R. Alta Charo, “Passing on the Right: Conservative Bioethics is Closer than it Appears.”

This paper is a critique of the Presidential Commission on Bioethics (PCB), a panel that President Bush established in 2001 after his decision on stem cell research. The PCB’s leadership, particularly through the statements and actions of its chair, Leon Kass, has pushed a conservative agenda on the PCB, one linked to numerous neoconservative

organizations and intellectually inspired by conservative intellectuals like Leo Strauss and Hans Jonas. This ideology calls for reining in scientific research, in part because such research may pose challenges to existing social norms. In contrast to similar past commissions, the PCB has made its membership and its staff ideologically homogeneous and ignored contrary views in the field. The result is a Presidential commission that neglects many of the interests in society and pushes a rigid ideological agenda in a forum that should be the space for vigorous debate.

Harald Heinrichs & Hans Peter Peters (Research Center Juelich, "Media communication on climate change and coastal protection: Transformation and culturalization of expert knowledge in public communication processes."

Global climate change has been one of the most prominent transnational risks for the last 15 years. Since climate change and its potential consequences is (at first) only accessible by scientific methods and interpretations the development of representations about this risk does not take place via direct perception of citizens. For most citizens the media-based public communication is the most important social context to get into contact with this risk issue.

In order to gain better understanding of the "public risk construct" climate change and coastal protection we analyzed the communicative processes between experts, journalists and media recipients during the last three years. The project focused on the media coverage and on two interfaces: journalist / expert (production of media content) and media-content / audience (reception of media content). With a content analysis we explored over 1.200 media products (TV, Radio and Print), in a mail survey we interviewed 169 experts and 85 journalists regarding their interactions, and with a quasi-experimental study we explored the reception processes of 183 test readers.

The results show, how expert knowledge is contextualized in public communication. Between experts and journalists there has been emerged a "symbiosis": the science-journalism interface is well developed and we observe a co-orientation which supports the anthropogenic climate change hypotheses. The reception of media content by the test-readers is highly interpretative and influenced by (local) experiences, pre-values, pre-attitudes and personal characteristics. The test-persons in our sample - similar to respondents to a national survey - have a high and differentiated risk awareness. Therefore there is a critical attitude to media coverage which communicates skeptical views on the expected climate change. The study indicates, that expert knowledge on anthropogenic climate change - despite ongoing cognitive uncertainty and normative ambivalence - has been 'successfully' culturalized: there is a high awareness in the German public sphere regarding the public risk construct climate change and coastal protection.

James Wilsdon (Demos, UK), "The Politics of Small Things: Nanotechnology, Risk, and Uncertainty."

For its proponents, nanotechnology offers so much - unlimited energy, targeted pharmaceuticals, intelligent materials and self-organizing molecular machines. Bottom-up or top-down, the promises of nanotech are revolutionary. Yet in both the US and Europe, a debate about the risks of nanotech, with its origins in dystopian fears over 'grey goo', is rapidly taking on a sharper focus around issues of nanoparticle toxicity and the need for tighter regulation. Allied to this are concerns about the vested interests that lie behind the technology, and the lack of public scrutiny of nanoscience. Nanotech may be a new field, but already it is bristling with tensions and uncertainties. Will it inevitably become 'the next GM'? What is the right balance to strike between innovation and precaution? How can its development be made more responsive to social concerns? This paper explores three dimensions of uncertainty in debates over nanotech:

1) Imagination - Perceptions of nanotech are being shaped by radically differing visions of its transformative potential and practical application. The paper identified three distinct groupings - nano-radicals, nano-realists and nano-sceptics - and explore the relationship between them.

2) Participation - For most people, nanotech is still an unknown quantity, and it is not clear how or when wider processes of public engagement and deliberation should get underway. Can these processes be moved 'upstream' within nanotech R&D?

3) Regulation - From a regulatory perspective, uncertainties surround the degree of novelty and continuity represented by nanotech. Are new regulations required? If so, what form should they take?

Rapporteur's Comments

This is quite a diverse set of papers. Nonetheless, they address several common themes that are central to the work of the SDN.

1. Who participates or is represented?

Central to almost any conception of democracy is the notion that individuals and groups have some claim to participate in decisions that affect them and the polity as a whole. However, this simple statement opens up a host of complex questions. Since not all people can participate in all political decisions, a set of difficult theoretical and empirical questions arise about the nature of participation and representation. Each of the papers sheds some light on these questions.

Mark Brown's paper on citizen panels, focuses on the representation involved even in direct forms of democracy. For whom do the participants speak, other than for

themselves? Based on various theories of representation, he makes the case for the normative superiority of the position that participants should speak for diverse social perspectives rather than stand for statistical samples of the population.

R. Alta Charo's paper depicts a different problem. She points out that three different ideas or groups can be represented on bioethics advisory committees: ideological agendas versus scientific autonomy versus marginalized voices. Her critique of the current President's Commission on Bioethics is that it now represents only the ideological agenda of its chair.

Harald Heinrichs's and Hans Peter Peters's paper raises several questions about representation. For example, which scientists do the media present to the public, and how are scientific controversies over climate change presented in the media?

Finally, John Wilsdon's paper raises the issue of which version of nanotechnology is represented in policy making. Wilsdon depicts those visions as nano-radicals versus nano-realists versus nano-skeptics. Both the radicals and the realists express considerable enthusiasm for nanotechnology, as opposed to the skeptics.

In discussion, Brian Wynne pointed out that representation itself is a convoluted and constructive process. For example, an NGO may construct a public attitude via its actions.

2. Communicative competence

In one sense, all of these papers address the efforts that various groups make to fill a communicative gap. Each author could consider in future work questions such as what gaps get filled, by whom, and with what content.

3. Public Interest

During the discussion of the panel, Sheila Jasanoff asked the paper presenters how their cases of representation fulfilled the public interest. All the presenters pointed out that the public interest is hard to determine in a pluralistic society, which is a reasonable assessment, as far as it goes. However, saying that a concept is contested is different from saying that it does not exist. Even essentially contested concepts, to use the classic term, may exist.

One could say that the paper presenters need the courage of their convictions. Everyone in the public arena claims to fight for the public interest. As scholars we should be able to refract those claims through a critical lens that provides us with a defensible normative position. Most of the papers expressed an implicit notion of the public interest, and so contained the beginnings of such a stance. It would be worth developing that stance more explicitly.

4. Uncertainty

The papers revealed a very wide range of uncertainty in these cases. In addition to the well-known technical uncertainties, the papers highlighted problems such as epistemic and political uncertainty. These multiple types of uncertainties were present for each of the cases depicted in the papers. We possess limited understanding of the implications of each type of uncertainty for the democratic governance of science, a topic worth much more investigation.

Panel 2: Institutions (Rapporteur: Daniel Barben)

The theme of institutions was present in all sessions. Each paper contained notions of “institution” by referring to different kinds of institutionalization, institutional frameworks, or institutionalized practices and beliefs. In addition, the themes of representation and citizenship were also articulated in the session on institutions. This is no surprise, given that science itself is an institution and is practiced in and shaped by institutions, and citizenship is a fundamental form of subjectivity and community in democratic societies.

The four papers presented in the session on institutions can be roughly characterized by two basically different perspectives. While Bruce Goldstein’s and Roopali Phadke’s papers provided bottom-up analyses of particular processes in or attempts at institutionalization, Hideyuki Hirakawa’s and Willem Halffman’s papers analyzed, in a top-down kind of approach, the institutional configuration of risk management and expertise in Japan and the Netherlands respectively.

In his paper “Scientific Certainty and the Co-Destruction of Science and Social Order” *Bruce Goldstein* (Virginia Tech) examined a clash between two perspectives on scientific certainty during the design process of an endangered species habitat preserve for the Coachella Valley of southern California. He traced how scientists competed to consolidate their influence over preserve design by assembling and disassembling the scaffolding of the natural and the social order, engaging in both scientific “co-production” and “co-destruction”. The scientists were first recruited to serve on a scientific advisory committee (SAC) in 1993. They were tasked with designing an affordable and scientifically defensible habitat preserve system that would allow landholders in the Coachella Valley to mitigate their impacts on endangered species. By 2000, the SAC had deadlocked into two antagonistic factions, one consisting of regulatory biologists from state and federal wildlife agencies, and the other consisting of three local biologists who worked in the Valley. The regulatory biologists attempted to break their deadlock by soliciting the opinions of plan stakeholders as well as external scientific peer reviewers, assembling a heterogeneous collection of opinions that reinforced their understanding of the unpredictability and uncertainty of nature and society in the Valley. The local biologists saw this effort as a challenge to their own certainty about local ecological and social dynamics, which had become indispensable to the Valley’s political ecology over the past twenty years. Accordingly, the local biologists bitterly resisted making even the slightest accommodation, since this would only bring on the twin disasters of species extinction and their own professional marginalization. The deadlock continued until the SAC disbanded. What was more important to both scientific factions than remaining on the SAC or even establishing a

habitat preserve was catalyzing institutional relationships that were compatible with their distinct forms of scientific practice. The case illustrated both “constitutive” and “interactional” themes within the literature on co-production, while providing an example of scientific “co-destruction,” in which co-production had a corrosive effect on alternative forms of scientific credibility and social order.

The main point of criticism in the discussion concerned Bruce’s understanding of “co-production” and “co-destruction.” Instead of adding another concept to the notion of co-production (i.e., co-destruction), it was proposed to extend the understanding of co-production to the domains of both consent and dissent. Another principal objection claimed that processes of co-production were not based on conscious strategies. As to this specific argument it was suggested that it may be best to empirically enquire about the extent to which co-production entails conscious or unconscious strategies. In addition, reservations were voiced that the impossibility claim in Bruce’s story was too strong, and that “destruction” was not the end of the story. Finally, a significant difference between the written paper and its presentation was observed concerning the institutional dimension of the processes analyzed: What was missing in the presentation, but was demonstrated in the paper was that federal politics played an important role by virtue of the Endangered Species Act and its Amendment because they structured the spaces available for negotiating between conservation and development.

Roopali Phadke’s (Harvard) paper analyzed conflicts in the case of a modernization project: “Building the Uchangi Dam: Counter-mapping Knowledge and Power.” In 1985, the Indian government began construction of the Uchangi dam in Maharashtra. This project, which threatened to submerge two entire villages, elicited intense political protest for almost fifteen years. In 1999, this political stalemate was resolved after an alternative technical design for the dam was designed by NGO engineers working closely with affected villagers. While state engineers had based their original dam design on abstracted topographical information, the alternative plan resulted from data gathered through a community mapping effort. Through detailed ethnographic analysis, this paper described the community mapping exercise and the ways in which NGO engineers were able to translate and hybridize lay knowledge and engineering expertise. In contrast to the irrigation agency’s assessment of water resources, the community mapping exercise made visible local experience and knowledge of the land. Employing this data, the NGO engineers designed a project that was sensitive to agroecological conditions and reflected local development priorities. More than being a conventional story about a controversial dam, it raises fundamental questions about the democratic design of technology and the ways in which land and water resources are rendered mappable. In this case, uncertainty can be understood in two interrelated ways. First, as a systematic blindness on the part of state officials to the importance of local histories and knowledge. Second, as a total lack of trust in state experts to safeguard livelihoods. In this vacuum, NGO engineers emerged as important knowledge brokers who provided certain links between nature, culture and artifact. As a boundary organization, the NGO engineers in this case helped create a countermap that reflected local realities. Using this map, it became possible to extract different sets of data to inform technical options. While continuing to embody universal principles of hydrological engineering, the technology in question became firmly rooted to people and place.

While this paper is focused on a regional example, it relates most closely with other papers that discuss social movement activism and the role of scientific expertise. The paper contributes to the study of institutions by examining how NGOs serve as boundary organizations, negotiating between the interests of the state and village communities. The discussion made clear that an important condition of success in this story was due to the fact that the main NGO engineers were retired government engineers, thus building a knowledge community with government engineers. A more general claim brought up in discussion was the observation that, unlike the co-production of knowledge, the co-production of social order was not equally analyzed in the paper. In order to evaluate Roopali's case-study within a broader context, it was suggested that other dam projects in India or developing countries such as China should be taken into account. On this basis, various forms of technocratic or participatory, violent or liberating processes would provide a basis for fruitful comparisons.

Hideyuki Hirakawa's paper, "Reinvention of Food Safety Policy in Japan: Scientific and Political Tasks Ahead," addressed institutional adjustment to new food safety issues. As a direct response to the outbreak of BSE and other food scandals in Japan, which caused an acute decline of public trust in government and revealed scientific and political incapability of regulatory authorities, the Food Safety Commission (FSC) was established in July 2003. Its principal mission is to undertake risk assessment along with risk communication and emergency response. Risk management, on the other hand, lies under the authority of the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Health, Labour and Welfare (MHLW). Scientific risk analysis and public involvement are thought to be key to overcome institutional and procedural deficiencies. The paper aimed at examining, first, to what extent scientific and political capacities of food safety policy have been improved through the operation of the FSC, and second, at identifying other problems to be addressed in the future. Thus it focused on a variety of aspects concerning the scientific and political capacities of the FSC. For example, as for the scientific capacity, the separation between risk assessment and risk management, which is supposed to secure the independence of decision making from particular sociopolitical interests, was said to be crucial. One problem is that only very few independent scientific resources are available to the FSC. Most data it uses are provided either by MAFF and MHLW, or by risk management organizations and their in-house laboratories. In addition, many members of FSC expert committees are also members of relevant MAFF or MHLW committees. It is unclear whether this overlap would jeopardize independence, or promote appropriate communication between risk assessors and managers. As for the political capacity, problems exist such as the lacking inclusion of stakeholder representatives in the supervising committee of FSC. Despite the will to maintain independence, problematic social framing assumptions are likely to be left unchallenged. Finally, the ability of Japanese NGOs to critically watch the FSC's activities are said to be still limited.

The discussion focused on the processes that led to the creation of the FSC, and on the position the FSC took within transnational disputes on how to regulate food safety issues. Was the FSC the result of bottom-up pressure by public interest groups, or of concerns within the Japanese government, or of advice given by international organizations such as the Codex Alimentarius? How did Japan position itself against the trade-related disputes between Europe and the US? Several issues touched upon in the paper were highlighted

as worthy of further investigation: What did the policy shift “from the farm to the table” mean in Japan, for example compared to the same policy shift in Germany? What are the principles characteristic for the Japanese approach to risk assessment and risk management? How did the traditional corporatist arrangement of Japanese policy-making, although itself under challenge, affect food safety policy?

Willem Halffman’s (University of Twente) paper, “Science/policy boundaries: a changing division of labour in Dutch expert policy advice” described changes in the division of labour between experts and policy makers in the Netherlands over the last decade. He claimed that both the conceptualization of national styles and of encompassing transitions (e.g. normal to post-normal science) would fail to address the heterogeneous and conflicting developments in policy expertise. Instead, he grouped a number of salient tendencies under three patterns: corporatist, neo-liberal, and deliberative patterns of organizing expertise. For example, the further expansion of the Dutch planning bureaux was seen as a clear indication that corporatist conceptions of the role of experts in policy making have not disappeared (although corporatist ways of integrating expertise into the policy process had been modified). A neo-liberal pattern was found in the elaboration of institutions that create a market for policy advice, most clearly reflected in the growing contractualization of expert advice. The deliberative pattern was identified with, for example, the experimentation with participative expertise and knowledge brokers. Rather than a transition from one pattern to another, these three patterns were presented as existing next to each other, often contradictory and often in competition. The labels intentionally refer to politically and ideologically loaded concepts, as Willem wanted to show that the organization of expertise is not only closely related to the organization of policy, but also to conceptions of how policy should be organised. Thus the organization of policy expertise touches upon charged issues such as the role and delimitation of the state, the legitimacy of non-parliamentary democracy and the grasp of societal organizations over policy sectors, the nature of the market, and the position of the citizen vis-à-vis the collective and the state. This suggests that attempts to identify optimal ways of organizing expertise for policy may run into more resistance than might be expected, as this is ultimately far more than an optimization exercise. A central issue raised in the discussion concerned aspects of the validity of the three models presented. As to this issue, the paper assumed that the models were appropriate at least for the description of institutionalized, and changing, patterns of the boundary between expertise and policy making in the Netherlands. While the author refused to speak of particular “national styles” of expert policy advice, it was proposed to refer instead to the concept of “national configurations” which, instead of supposing essential national qualities, allows us to apprehend the specific national ensemble of institutions and its transformation. Other suggestions were to relate the (political science) models to modes of knowledge production, to elaborate the conflicts and dynamics between the three patterns, or to highlight the controversies related to the institutionalized epistemology of the three models.

To sum up, the first two papers emphasized in particular the processes of knowledge production and appropriation, and of knowledge-related community building. The concept of institutions mainly applied to new institutions that are related to practices of citizenship. Accordingly, democracy was understood as the creation of legitimate concerns. On the other hand, the broader configuration of social institutions was left out

of the picture. The second set of papers focused on the institutional configuration of expertise and policy-making in a particular society. Knowledge production was taken into account as being important in and for policy-making. But, on the other hand, the relationship between the models and their dynamic remained out of the picture.

Panel 3: Citizenship (Rapporteur: Kate O'Neill)

The theme of citizenship and participation in the study of science and democracy is one that is highly current, bringing together social movement theory and STS in innovative ways. Each of the four papers presented in this panel addressed how citizens' movements are exercising agency in influencing political and regulatory decisions around chemicals, organic standards, breast cancer research and policy, and neoliberal globalization. In addition, these papers showed how citizens' movements are increasingly generating their own scientific data and analysis, and working strategically within contexts of uncertainty to influence public opinion and decision-makers' deliberations. In effect, they are engaging in active efforts to re-frame these issues, in ways that also make them more visible and accessible to the broader public. These sorts of movements are changing how knowledge is produced, used and shared, in turn supporting more contentious, but on the whole more inclusive, notions of democracy and participation.

Alastair Iles, in "Citizens Identifying Chemical Uncertainties in Consumer Products: A Changing Civic Epistemology of Regulatory Science?" demonstrates how activist organizations have shaped the politics of chemical risks, focusing on a commonly used set of chemicals, phthalates, which are found in many toys and cosmetics. These groups used innovative methodologies to highlight uncertainties in existing regulatory science methods, calling for measures that examine the everyday use of these chemicals over time or that utilize the "body burden" concept – which measures chemicals inside human bodies, rather than those in the environment. But in addition to speaking to chemical companies and government agencies, these groups encourage consumers to educate themselves about possible (and heretofore invisible) risks from chemicals, and take action to challenge existing regulatory conclusions.

Mrill Ingram's paper, "Regulating the Alternative: The Organic Agriculture Movement and the Emergence of US Federal Organic Standards", focuses on the interaction between the organic agriculture movement and federal organics standards in the USA. In this debate, organics supports confronted powerful industry actors in fighting for particular, and real, national organics standards. She charts how the organics movement has moved from being viewed as a marginal bunch of "back-to-the-land cranks" to becoming a powerful and inclusive movement, with widespread public support. The "mainstreaming" of organics is demonstrated nicely through content analysis of newspaper articles, 1990-2002. The movement obtained political influence through the National Organics Standards Board (set up to represent the stakeholder community), and, by mobilizing public support, was able to effect important changes in federal organics legislation. It used this support and its own analysis to counter charges of "scientific unsoundness" from the agriculture industry arguing in favor of consumers' right to choose their own food. Finally, though, she argues that public and political success carried a cost for the

original activists, as the movement shifted away from the more radical agenda of transforming industrialized agriculture.

Barbara Ley, in “Strategic Uncertainties: The Construction of Science and Politics in US Environmental Breast Cancer Activism”, unpacks exactly how breast cancer activists have been able to use uncertainty in their campaigns. She identifies three types of “uncertainty work” carried out by activists engaging in the debate over environmental causes of breast cancer: “uncertainty as a symptom of corporate malfeasance, a result of faulty scientific assumptions and inadequate testing methods, and a rationale for embracing precautionary policy action.” These uncertainty constructs have enabled activists to mobilize support, and to undertake their own studies (and counter-studies), constructing a strong (and popular) rationale for precautionary policy decisions. Importantly, many activists have used their own life experiences to bolster their claims, and have been able to insert themselves in the hitherto insular discourse between government regulators and the “cancer industry”.

Finally, Malte Schophaus’s paper, “Global Social Movements, Expertise and the Uncertainty-Paradox: The Scientific Advisory Board of ATTAC-Germany” deals with the role of experts in the global justice movement. ATTAC supports the introduction of the “Tobin Tax” on global financial transactions, but has broadened its agenda to critiquing all dimensions of economic globalization, with the specific goal of providing information and knowledge to inform political pressure, calling itself “the adult education center of the movement”. Its heterogeneity (pluralism) and its explicit goal of reflexivity have generated the need for a wide variety of scientific expertise. Its large Scientific Advisory Board (SAB) thus consists of experts from across the disciplines, and meets twice a year, while engaging in on-going movement activities. The organization’s commitment to pluralism and reflexivity generates paradoxes in its relationship with the SAB and with the wider political world. First, this commitment likely negates the formation of a coherent and consensual “message” the group can use to push its political agenda. Second, the movement stands in some contention with the SAB: it must confront the contradiction of relying on scientific expertise but also questioning the legitimacy of “neutral” science on which policymakers rely. Schophaus argues that ATTAC is resolving these paradoxes by remaining committed to pluralistic and open *processes* of decision-making, while employing a wide enough range of experts to guarantee pluralistic input from the SAB.

The paper presentations and plenary discussions drew out some important commonalities across these four papers. Here, I pull out a few examples. First, they all demonstrate how citizen groups are increasingly building their own expert communities, which often (but not always) exist outside or on the margins of “establishment” science. These communities could be termed “citizen-scientists”. As one participant in the discussion put it, “biostatisticians are swimming downstream to ally with activists”, a process worthy of further examination. But, their role is to provide different ways of thinking about, and framing, important political issues characterized by uncertainty – or where accepted knowledge and ways of generating knowledge are increasingly questioned by activists and consumers. New epistemologies call for different measures of chemical impacts, for

example. Second, these papers all stress the role of social movements in mediating between the public and policy-makers, and the need to ground policy decisions and regulatory science in peoples' everyday lives, experiences and perceptions. At the same time, these groups all see an important role for themselves in educating, and therefore mobilizing the general public. Thus, both "top-down" and "bottom-up" notions of citizenship and participation come in across the papers.

The plenary session found Barbara Ley's concept of "uncertainty work" particularly applicable to how uncertainty is understood and used by different citizen movements. Across all the cases, the movements' emphasis is less on how to remove uncertainty, but how best to work with, and within it, and on making artifacts and interrelationships visible to the broader public (and to regulators?) which previously were not. Also, these activist groups use uncertainty as a strategy to gain legitimacy, as an alternative to relying on speaking the language of establishment science. Certain paradoxes emerged in the course of the discussion – for example, the almost "love-hate" relationship between movement activists and science and/or regulation. Also, while the authors did a good job of problematizing epistemic claims, less attention was paid to problematizing the social world – i.e. the movements themselves. Finally, we briefly discussed how the insights from these discussions might be applied to, or integrate, growing work on transnational social movements.

In conclusion, this panel (papers plus discussion) represented both significant advances in research on the role of citizen movements with respect to uncertainty, science and democracy, while pointing out important avenues of new research, and ways of tying these papers together to coherent sets of themes and concepts. The authors (and the audience) are to be commended on generating such thought-provoking commentary and analysis.