

Conference: Public Engagement with Nanotechnology

ABSTRACT BOOK

Contents

Introduction	2
The Netherlands: public engagement in nanotechnology	3
The United Kingdom: experiences in public engagement with nanotechnology	5
Program	8
Message from the Chairman, David Reinhoudt	12
Abstracts:	
“Dilemmas of public engagement with nanotechnology” By Arie Rip	13
“Smalltalk: Discussions between Scientists and the Public” By Melanie Smallman	14
“Korean Activities on Nanotechnology Communication and Public Engagement” By Jungil Lee	15
“Understanding Public Opinion and Discourse About Nanotechnology via Scientometric and Media-Mapping Methods. <i>Where do Nono-networks Connect?</i> ” By Zachary Devereaux	17
“Thinking big about thinking small: lessons learned from biotechnology public engagement in nanotechnology public engagement” By Craig Cormick	19
“Public participation in nanotechnology in France” By Brice Laurent	20
“Ten Lessons for a Nanodialogue” By Rinie van Est	21
“Risk and Reason: Risk Communication and Nanotechnology – A Train- the-Trainer Model” By Vivian Ota Wang	22
“The Irish Experience in Nanotechnology Communication, Education and Public Engagement” By Pádraig Murphy	23
“The Austrian Experience: Nano Trust” By André Gzásó	24

“Improving the dialogue with society about scientific issues” By Jean-Pierre Alix	25
“Public Engagement Processes in Sciences in General” By Angela Hullmann	26

Welcome to the conference on public engagement with nanotechnology in Delft!

At the OECD Working Party on Nanotechnology (WPN) meeting of April 21-24th 2008 in Paris the delegates of the WPN discussed and agreed to organize a workshop on public engagement with nanotechnology. The Netherlands volunteered to arrange this two-day workshop. On the first day a conference will be held for people working in and/or interested in public engagement with nanotechnology. The second day consists of a closed workshop for WPN delegates involved in the work of project D: ‘outreach and public engagement’.

The goal of the conference on October 30th is to exchange ideas and best practices in public engagement from various countries and use these on the second day to formulate some key elements of best practice in public engagement.

The main goals of the second day (October 31st) are:

- 1- to present a first synthesis and analysis of the responses to the questionnaires which the secretariat of the OECD will have received previously,
- 2- to have a policy dialogue on these results as well as on the ideas which will have been shared on the previous day,
- 3- to set up some key elements of best practice in public engagement.

We have worked hard to make this event a success and hope that you will enjoy the lectures, the discussions and the city of Delft. We would like to thank the speakers for their lecture, the Dutch Rathenau Institute for their support, NanoNed for the pens and notepads and the Leids Congres Bureau for their help with all logistics.

With best wishes,

The organizing committee,
Jacqueline Mout-Leurs, the Netherlands
Leo le Duc, the Netherlands
Stéphanie Lacour, OECD secretariat
Jacqueline Allan, OECD secretariat
Karen Folkes, United Kingdom
Steve Morgan, United Kingdom

The Netherlands: public engagement in nanotechnology

By Francien Heijs

Last summer the Dutch cabinet released its Action plan on Nanotechnology, with action lines on the research agenda, dealing with risks, social dialogue and ethical and legal implications. With this action plan the cabinet devotes itself to the great economic opportunities and social promises of nanotechnology. The Netherlands wants to be able to keep up with the global developments in nanotechnology and with other leading countries. At the same time the cabinet is very much aware of the risks, ethical and legal questions involved with nanotechnology. It also takes into concern that actions should be taken to control the risks for the sake of public health and environment. Only by carefully handling the risks the Netherlands can fully exploit its opportunities.

Since insecurities will be great in the time to come, the Dutch government has chosen to cope with possible risks prudently, carefully and with precaution, based upon the cabinet vision "Dealing sensibly with risks" which the government published earlier. This approach is characterized by transparent political decision making. It also clarifies responsibilities of different parties: government authorities, business world and social organizations. Knowledge on risks should be shared as best as possible. Therefore the cabinet will set up a "Platform on the risks of nanotechnology".

Issues in the domain of ethics, human rights and public law, related with nanotechnology could be for example: liability, privacy, the protection of human dignity and the enlargement of differences between poor and rich countries. Unexpected negative aspects of nanotechnology or insecurities can also arise, such as health problems, damage to the environment, shifts in power relations and the augmentation of social inequalities.

The government first wants to obtain more insight into these issues. Further more it wants to address these issues in a social dialogue on nanotechnology. This dialogue should deliver insight into the opinions and feelings in society on nanotechnology. The cabinet also wants to offer insight into its own policy making and wishes to involve society in this. Therefore it is important that the efforts of the Dutch government are transparent.

In order to achieve an accountable dialogue, government authorities and institutions should actively communicate their policies and efforts on nanotechnology. Seizing opportunities, with attention for risks and ethical implications should be the core of government communication. Communication further aims at informing citizens on the views and expectations, as well as the actions taken by the government.

The cabinet also expects active communication by the (knowledge)institutions. Indeed, when introducing a new technology with a broad spectrum of applications, it is of great importance that adequate information is available for both stakeholders and citizens.

In setting up the social dialogue on nanotechnology, the cabinet wants to join existing initiatives of the European Commission and the European parliament. In order to keep the dialogue pure and to clarify it's own position, the cabinet itself will not participate in shaping the dialogue. Therefore it has decided to set up a temporary "Commission for the social dialogue on nanotechnology". This commission will be broadly staffed and must have wide affinity with population groups. In order to be powerful the commission will consist of a limited number of members. The commission will first draw up a political agenda for nanotechnology in order to decide which issues should be addressed with priority. The commission can involve citizens in doing so. The agenda will connect already existing discussions, such as the discussion on privacy which will change course radically because of the introduction of nanotechnology. The commission takes into account which elements of dialogue could be better addressed by existing organizations. The commission will be installed by the end of 2008 and will publish its final report in 2011. Meanwhile it will issue a progress report.

Dr. Francien Heijs

Acting Director Department for Research and Science Policy

Dutch Ministry of Education, Culture and Science

The United Kingdom: experiences in public engagement with nanotechnology

The UK Government has identified as one of its key research priorities the need to understand the social and ethical implications of nanotechnologies, through a programme of public dialogue and social research. There is a diversity of ethical issues surrounding the development of nanotechnologies and the Government has encouraged and funded upstream engagement to identify these concerns. This has enabled prioritisation of an extensive programme of social and ethical research, which includes

- an exploration of the social impacts of the geographical clustering of the economic clustering of the UK's nanotechnologies innovation communities;
- nanotechnologies in medical research and related ethical issues;
- the life cycle effects of the products of nanotechnologies; and
- an exploration of whether lessons can be applied to nanotechnologies from the experiences of technologies and products such as genetically modified crops and asbestos.

Defra will be issuing a call for proposals shortly, to address the first part of the programme, and is working with potential funding partners to scope the remainder.

Public engagement

The Department of Innovation, Universities and Skills funded two public engagement activities, Nanodialogues and the Nanotechnology Engagement Group. Their final reports¹ were launched in June 2007. As well as helping us learn about public attitudes to nanotechnologies, they also provided much useful information about how to operate upstream public engagement and dialogue.

Nanodialogues was developed to find out what people think about this complex science and its possible applications in order to inform policy decisions. The project also aimed to explore how far “upstream” (i.e. ahead of policy decisions being made) such engagement should take place and how extensive the engagement should be. The project was run by Demos² and delivered four different experiments in public engagement around nanotechnology. Each had a different partner –

- Experiment 1: Environment Agency
- Experiment 2: Practical Action³
- Experiment 3: The Biotechnology and Biological Sciences Research Council and the Engineering and Physical Sciences Research Council; and
- Experiment 4: Unilever⁴

¹ http://www.bbsrc.ac.uk/society/dialogue/activities/nanodialogues_report.pdf

² <http://www.involve.org.uk/negreport>

³ <http://www.demos.co.uk/>

⁴ <http://www.practicalaction.org/>

⁴ <http://www.unilever.co.uk/>

All of the experiments were “deliberative” in that they involved people coming together to discuss the issues with experts, going away to reflect then coming back together to discuss further. The experiments did not look at any particular application over another but allowed free range in the discussions. Each dialogue process was tailored to the needs of the partner, who used the results to help develop their own policies on nanotechnology and consider how they would engage with the public and other stakeholders in the future.

The Nanotechnology Engagement Group was set up to capture the learning from Nanodialogues and a range of other public engagement on nanotechnologies. The aim was to find out what worked and to evaluate the use of the outcomes by policy creators.

The UK government is seeking to address issues such as the need for information on the roles and responsibilities of the organisations that fund nanotechnologies. We have also indicated in the text where public dialogue revealed particular aspirations and concerns. In addition, there was a public desire for the provision of information, forums, debates and literature. We are considering how to take this forward.

Further dialogue is being undertaken by the Research Councils but at present there are no further plans for Government-funded public dialogue on nanotechnologies although they are likely to feature in work to follow up the results from the Wider Implications of Science and Technology, described below. Nevertheless, we hope that industry will reflect on the messages that emerged about the need for them to understand that consumers are not only concerned about the safety of products. Rather they are worried that new products are of no real value to society.

The UK Technology Strategy Board has a role in contributing to building public confidence in, and understanding of, research into, and the development and exploitation of, science, technology and new ideas. The Technology Strategy Board will encourage greater public engagement in areas where it invests and will work with the Department of Innovation, Universities and Skills on the wider public engagement agenda.

Wider implications

The Horizon Scanning Centre⁵ in the Government Office for Science has been running a Wider Implications of Science and Technology⁶ (WIST) programme of stakeholder engagement to identify the safety, health, environmental, ethical, regulatory and social implications of new and emerging areas of science and technology. This has been closely integrated with a Department of Innovation, Universities and Skills funded Sciencewise⁷

⁵ http://www.foresight.gov.uk/HORIZON_SCANNING_CENTRE/index.html

⁶ http://www.foresight.gov.uk/HORIZON_SCANNING_CENTRE/WIST/Index.html

⁷ <http://www.sciencewise.org.uk/>

programme (sciencehorizons⁸) of public engagement on emerging technologies. Both the stakeholder and public engagement programmes covered all areas of emerging science and technology, with nanotechnologies emerging as a key issue.

The findings showed that there was plenty of interest, even excitement, about the potential benefits offered by nanomaterials and "nanofoods" (foods engineered at the nanoscale), but that enthusiasm should be tempered with caution about their potential health, safety and environmental consequences. Two issues stood out. First, there was concern that the science of nanometrology is undeveloped in comparison with the rate of advance of the technologies themselves. Secondly, "nanofoods", although presenting abundant opportunities for business and to improve human health, could generate a backlash from the public unless the public can see a clear benefit: public engagement might direct their response onto a more acceptable course.

"Extract from a Statement by the UK Government about Nanotechnologies, dated 28 February 2008"

⁸ http://www.sciencewise.org.uk/html/projects.php?source=projectdetail&project_ID=9

Program 30th October: Conference on public engagement with nanotechnology

Overall goal of the conference: exchange ideas and best practices on public engagement from various countries and use these on the second day (the workshop for WPN delegates taking part in project D) to formulate handles on 'how to best engage the general public'.

Timetable:

9.00-9.30: Registration and coffee/tea

9.30-9.45: Welcome by the Chairman prof. David Reinhoudt

9.45-10.30: Key Note speech by Arie Rip on "dilemma's in public engagement with nanotechnology"

10.30-11.10: 2 examples of public engagement processes:

UK: Melanie Smallman with "Smalltalk: discussions between scientists and the public"

Korea: Jungil Lee with "Korean Activities on Nanotechnology Communication and Public Engagement"

11.10-11.40: coffee break

11.40-13.00: 4 examples of public engagement processes:

Canada: Zachary Devereaux with “Understanding Public Opinion and Discourse About Nanotechnology via Scientometric and Media-Mapping Methods. *Where do Nano-networks Connect?*”

Australia: Craig Cormick with “Thinking big about thinking small: lessons learned from biotechnology public engagement in nanotechnology public engagement”

France: Brice Laurent with “Highlighting French Activities on Public Engagement with Nanotechnology”.

13.00-14.00: Lunch

14.00-14.45: Presentation by Rinie van Est of the Rathenau Institute on their report called ‘10 lessons for a nanodialogue’

14.45-15.05: example of public engagement processes:

US: Vivian Ota Wang with “Risk and Reason: Risk Communication and Nanotechnology – A Train-the-Trainer Model”

15.05-15.35: Coffee break

15.35-16.15: 2 examples of public engagement processes:

Ireland: Pádraig Murphy with “The Irish experience in nanotechnology communication, education and public engagement”

Austria: André Gzásó with “The Austrian Experience: NanoTrust”

16.15-17.00: Panel discussion with the speakers from NL, UK, Australia, Korea and Canada

Program 31th October: WPN Workshop on public engagement of nanotechnology

The mains goals of this second day are:

- 1- to present a first synthesis and analysis of the responses to the questionnaires the secretariat will have received previously
- 2- to have a policy dialogue on these results as well as on the ideas which will have been shared on the previous day
- 3- to set up some key elements of best practice in public engagement.

Timetable:

- | | |
|-------------|---|
| 9.00-9.30 | Registration and coffee |
| 9.30-9.35 | Welcome by the Chairwoman mrs. Karen Folkes |
| 9.35-10.05 | Presentation on the main points made on day 1 |
| 10.05-10.20 | Presentation by Masafumi Ata (Japan) on “Structuring Knowledge of NanoMaterials and nanorisks” |
| 10.20-10.45 | Presentation by Craig Cormick on “Lessons learned from biotechnology public engagement: the good, the bad and the ugly” |
| 10.45-11.15 | Coffee break |

- 11.15-11.45 Presentation by Jean-Pierre Alix of OECD's Global Science Forum named "Improving the Dialogue with Society on Scientific Issues"
- 11.45-12.15 Presentation by Angela Hullmann of the EC on "public engagement processes in sciences in general"
- 12.15-13.00 General discussion about the main points coming from day 1 and the broader issues coming from the morning presentations
- 13.00-14.00 Lunch
- 14.00-14.30 Presentation by Dr. Vivian Ota Wang of the first synthesis of the responses to the questionnaires and of some key elements of best practice in public engagement
- 14.30-15.30 Discussion on some of the preliminary results of the questionnaires and the key elements of best practices which we could suggest during the next WPN meeting, in December
- 15.30-16.00 Coffee break
- 16.00-17.00 Next steps and conclusions
- 17.00 End of the workshop

Message from the Chairman, David Reinhoudt

Nanotechnology will effect everybody's life more and more in the coming decades. As a matter of fact, it already effects us today. Using our mobiles, driving home by car, our state-of-the-art clothes, shopping in the supermarket, and the new material of our sun glasses, everywhere we use products or services made available using nanotechnology. And in the medical world scientists are searching for new ways of drug delivery to use the drugs more efficiently and reduce side effects dramatically by using nanotechnology.

It is expected that the numbers of products, services and production technologies using nanotechnology will increase dramatically this century. Some of these developments can be predicted and can be seen as evolutionary, other developments will be revolutionary and cannot be foreseen at all.

The public is curious what we are doing as scientists, and what we are doing as government or government related institutions, to stimulate and regulate these kind of new techniques.

Participation of the public is an important issue in this. People are interested in the new possibilities nanotechnology creates, they want to know what the impact is on their daily lives, and people do also have questions on possible risks.

All new technological developments do raise questions on ethical, legal and social aspects. Within NanoNed, the nanotechnology research program of the Netherlands, these issues are addressed in the Technology Assessment research line. The aim of this part of NanoNed is to understand and improve the interaction between science, technology and society.

The Strategic Research Agenda on Nanotechnology of the Netherlands Nano Initiative also addresses the importance to inform the public on the impact of nanotechnology on society and the need of a responsible development.

In the workshop ideas will be exchanged on best practices in public engagement from various countries. Public engagement and outreach is important for the nanotechnology development. We do have the responsibility to act timely and wisely.

David Reinhoudt

Chairman NanoNed

Dilemmas of public engagement with nanotechnology

By Arie Rip (University of Twente)

'Public engagement' is a label for a variety of interactions between publics and actors involved in new sciences and technologies. These range from interactive approaches to public understanding of science to deliberative processes and actual input in decision making. The reference to 'public engagement' has become common in policy documents, and exercises in public engagement, earlier for biotech and genetics, and now for nanotechnology, have proliferated.

The UK has taken the lead in such exercises (partly because of the need to restore public trust in science and in authorities in the aftermath of the BSE affair). So-called upstream public engagement has been emphasized, with the argument that early inputs are important to make a difference to later developments, before they become settled and almost irreversible. However, the recent evaluation of these exercises indicated an almost complete absence of links to decision making. Upstream public engagement is a symbolic exercise? It need not be. The recent UK Engineering and Physical Research Council exercise in involving publics in priority setting in nanomedicine did have effects. And there are precedents in other domains (French INRA's interactive TA exercise on field tests of genetically modified vines).

There are three main clusters of issues (dilemmas).

(1) Upstream engagement is too early (uncertain), but downstream engagement is too late. Upstream engagement assumes a linear causality: if you "do things right in the very beginning" (US NNI), everything will go well later.

Involvement of publics is to articulate values/preferences? How would that have an impact? And how can values be articulated under uncertainty? (cf. imaginaries)

(2) Who can speak for publics? NGOs and other "voices of civil society" have their own axes to grind. But direct involvement of publics (citizen juries, focus groups etc) may be meaningless. Public dialogue (as in Germany) includes stakeholders. The Dutch recently proposed orchestration of involvement.

(3) Public engagement, if effective, undermines representative (parliamentary) democracy. It may lead to (further) neo-corporatist elements in our political order. Deliberative democracy is discussed, but unclear what it might look like.

Further (key) considerations:

a) competencies, esp. for technology appraisal (knowledgeable appraisal as in literary criticism)

b) 'trust' is often referred to, but is just one part of the *problématique*. Reliability is what counts in the end.

c) recent interest in Codes of Conduct (etc) would imply that public engagement shifts to monitoring and vigilance (happens already: watchdogs of various kinds)

d) the new discourse of 'responsible innovation': would this make public engagement superfluous, or give it a new role?

Smalltalk: Discussions between Scientists and the Public

By Melanie Smallman

Recent public debates on issues such as GM have taught us that scientists and society should engage in dialogue sooner rather than later if we are to build a climate of trust and openness and develop robust policymaking.

Small Talk was a collaboration aiming to address this challenge for nanotechnologies by exploring the aspirations and concerns of scientists and the public about nanotechnologies, as well as sharing these views with policymakers. In particular, the project aimed to provide coherence to a range of activities around the UK focused on discussing nanotechnologies with the public and scientists, helping the science community, science communicators and policymakers to learn more about these views and about the process of working together to gather these views.

In this presentation, project director Melanie Smallman reviews the key findings of the project and highlights the areas for discussion and lessons that have been drawn for scientists, policymakers and the science and society community.

Korean Activities on Nanotechnology Communication and Public Engagement

By Jungil Lee

Korean Activities on Nanotechnology Communication and Public Engagement

Jungil Lee, Korea Institute of Science and technology

In this talk, I summarize Korean activities mainly by government related organizations concerning nanotechnology communication and public engagement. First I start with the background for Korea being keen to the development of nanotechnology. Then I introduce mainly the activities of two organizations; Korea Institute of Science and Technology Information (KISTI) and Korea Nanotechnology Research Society.

KISTI is a government affiliated research organization and is responsible for constructing and operating information support network. KISTI operates a specialized team for nanotechnology activity including, construction of website, publishing NanoWeekly and publishing monographs for topical nanotechnology reviews, among other activities.

KoNTRS was founded with two facets, one as a conventional academic society and the other as an advisory organization for the government for establishing master plan for nanotechnology development, promoting information exchange among researchers and also communication with general public. KoNTRS has three committees (Planning, academic, and international collaboration) and three ad hoc committees (education, standardization, societal implication). KoNTRS also organizes annual and international event, NanoKorea, which constitutes of Symposium and Exhibition, held in the last week of August supported by the ministries.

Also activities of other organizations will be briefly summarized. Nano Technology Research Association (NTRA) is a consortium of companies involved in nanotechnology supported by the Ministry of Knowledge and Economics and jointly organize NanoKorea, especially, the exhibition. Korea Foundation for Advancement of Science and Creativity (KOFAC), originally named Korea Science Foundation (KSF), promotes communication of S&T in general with the general public. KOFAC organizes 'S&T Ambassador' program where researchers visit schools of different levels, public libraries, giving a lecture on S&T topics including nanotechnology. Korea Science and Engineering Foundation (KOSEF) is a funding agency under the Ministry of Education and S&T and has a communication program called 'Sciencetouch on Friday', where Specialists give lectures to the public in several cities around the country on Friday evening. Science and Technology Policy Institute (STEPPI) publishes research reports on policy-related issues including nanotechnology. Korea Institute of S&T Planning and Evaluation also performs research projects related to technology assessment including nanotechnology.

In summary, there are diverse efforts by different organizations concerning nanotechnology communication and public engagement in Korea. However, I feel the intensity and the effectiveness of the activities could be improved by developing and introducing more innovative measures and the increase of the funding.

Jungil Lee, Ph.D.
Principal Research Scientist
Nano Device Research Center
Korean Scientific Coordinator
Center for Photonics & Nanostructures (CPN), KIST-CNRS LIA
Korea Institute of Science and Technology (KIST)
39-1 Hawolkok Seongbuk
Seoul 136-791, Korea
[Tel:+82-2-958-5786](tel:+82-2-958-5786)
Fax:+82-2-958-5709
E-mail: jil@kist.re.kr

Understanding Public Opinion and Discourse About Nanotechnology via Scientometric and Media-Mapping Methods. *Where do Nano-networks Connect?*

By Zachery Devereaux

This presentation will share the results of an intensive network analysis of Canadian Nanotechnology discourse carried out through mainly automated methodology. The research was funded by Health Canada, government of Canada Healthy Environments and Consumer Safety division and resulted in a report titled "Mapping Public Opinion and Discourse about Nanotechnology in Canada and OECD States." Authored by Zachary Devereaux (Ryerson University), Andrei Mogoutov (Aguidel), Claude G. Theoret (Exvisu) and Caroline Allard (Exvisu).

The results address Canadian-focused discourse in the context of international collaboration by mapping of three distinct fields: academic literature, the Web / blogosphere and print journalism.

The scholarly literature was analyzed from 2000 to 2008, using a nanotechnology boolean search methodology developed by Mogoutov and Kahane (2007). This search strategy resulted in a corpus of academic articles totaling 16,841. These articles were analyzed for fit to global trends, showing that Canada's production of nanotechnology related research is on pace with global production. The specific prevalence of domain subfields was identified, including Canada's impact in each, demonstrating that in Canada the number of publications in Chemistry, Physics, Materials Science and Engineering has grown over time while the number of publications in Clinical Medicine and Biology has slowed. Inter-citation networks were mapped, showing the networks of citation behavior by journal and by author in Canada, and these patterns were compared to global collaborations by country. These results indicate that Canada has its strongest scientific collaborations with the USA, France and UK, followed by Germany, Australia, the Czech Republic and Italy. The internal regional distribution of publications and authorship in Canada was also mapped by city, institution, and author.

The Web was analyzed for the year 2008, as was the blogosphere. Websites identified by Health Canada in connection with the OECD Nanotechnology Working Group Survey on Public Engagement were analyzed for hyperlinkage inter-connectivity. A second, broader set of websites was also mapped for hyperlinkage activity for the purpose of comparison. The results showed that Canada has a strongly connected policy, governmental, regulator and entrepreneurial network, but that external links to the rest of the world are limited. In the blogosphere some 1,000 blog posts were mapped for their relation to key terms and tone.

The findings show that the overall tone regarding nanotechnology in the Canadian blogosphere is very positive. The keywords discussed fall into two major groupings a "Business / Industry" grouping that included terms such as "citizen, pollution, future, private, investment, economy, business, manufacturing, innovation" and a second "Public Issues" grouping that included terms such as "debate, safety, risk, environment, regulation, health, research, medicine, public." Environment, health and futuristic hopes were the most negatively viewed amidst the overall positivity. A lexical analysis of the content of the blogs was also carried out.

In the news analysis 520 articles appearing from 2005 – 2008 in various Canadian outlets were studied. Political and general news dominated, followed by industrial, economic, research and science reporting. Space technology is important in Canadian news. Pollution and regulation were not major themes. Lexical analysis showed that some translation does occur from scientific research to media, mainly around nano-machines and medicine.

Thinking big about thinking small: what do we learn when we put all the information we have on public engagement on nanotechnology together?

By Dr. Craig Cormick

This presentation will outline public engagement activities being conducted in Australia, and the social theory behind them. Building on the findings of this work a model has been developed, incorporating international social research, towards best-practice in social engagement on nanotechnology. This model can be used as a starting point for other participants in the workshop to add their own lessons learned, successful strategies and social theories to, towards developing a more comprehensive model to underpin strategies and activities.

Lessons learned from biotechnology public engagement: the good, the bad and the ugly.

While there is considerable concerns that public acceptance of nanotechnology might go the way of genetically modified organisms (GMOs) if public engagement is not handled well, there are also indicators that it might be quite different. Looking at Australia's biotechnology public awareness program, this presentation will analyse the success factors that led to major changes in public attitudes and what lessons can be learned to apply to nanotechnology public awareness programs.

Biography

Dr Craig Cormick is the Manager of the Australian Office of Nanotechnology's Public Awareness and Engagement Program. He was formerly the Manager of Public Awareness for Biotechnology Australia and has worked as a science journalist and taught public relations and writing at university. He is widely published on drivers of public attitudes towards new technologies and is author of the reports, *What you really need to know about what the public really thinks about GM Foods* (2005) and *Cloning Goes to the Movies* (2006) – a study of how Hollywood portrayals of human reproductive cloning influence public knowledge and attitudes.

Public participation in nanotechnology in France

By Brice Laurent (CSI – Ecole des Mines de Paris)

This presentation will give an overview of some participatory experiments done in France over the past few years, and will highlight some of their outcomes. In particular, two series of public meetings were organized by a non-profit organization, and a citizen conference was commissioned by the Paris area regional council. Current experiments include the *Nanoforum*, which is organized by a Paris-based engineering school and national administrative departments, and focuses on specific nanoproducts.

After describing briefly the main features of these mechanisms, the presentation will make four points:

1. Many of the participatory mechanisms produced recommendations. Together with those of several expert committees, some of them were presented during a two day event at the *Cité des Sciences* in Paris. However, most of them have not been addressed yet.
2. Many of these experiments were controversial. Tacit disagreements were frequent between organizers, commissioners, participants and commentators. In some cases, vocal activist critiques were heard.
3. In part through the multiple participatory experiments, nanotechnology is gradually becoming a public concern. Yet the types of issues that are raised in public arenas are evolving, as there is increased focus on specific nanoproducts.
4. Understanding the outcomes of participatory experiments implies that one looks at the overall landscape of public participation in nanotechnology and not only at the details of each mechanism. One can thus see that through circulations of actors and ideas, nanotechnology governance issues are reconfigured, albeit in limited ways.

The presentation will conclude with an overview of the current discussions within the French administration on how to engage the public in nanotechnology issues at the national level.

Ten Lessons for a Nanodialogue

By Rinie van Est (Rathenau Institute)

The Dutch government wishes to involve the public in discussing and directing the many changes that nanotechnology may bring about. This is not a straightforward task. Which nano-topics should the discussion address? And, what means should be best used to stimulate the debate? Based on the (inter)national debate on nanotechnology thus far, the Rathenau Institute has drawn lessons about the most appropriate role for the government to play in the discussion. I will present these 'ten lessons for a nanodialogue'. To raise just a corner of the vaile, here the first lesson: make a distinction between a broad public dialogue about the social impact of nanotechnology and the more urgent discussion of its potential risks. Any lack of firm direction on the part of the government is likely to undermine the legitimacy of the debate as a whole.

Risk and Reason: Risk Communication and Nanotechnology – A Train-the-Trainer Model

By Vivian Ota Wang, Ph.D.

National Nanotechnology Coordination Office

Chair-Nanotechnology Public Engagement and Communications Working Group

National Nanotechnology Initiative, United States

Risk communication “is the exchange of information among interested parties about the nature, magnitude, significance or control of a risk” (Covella, 2001). The public’s understanding of science and technologies does not necessarily emanate from a lack of science or technology literacy but rather originates from personal beliefs, predispositions, and values that these technologies may challenge. The variety and complexity of nanotechnology and nanoscience applications presents issues that require a knowledge base and skill set about risk communication. The purpose of the *Risk Communication Train-the-Trainer* was to provide participants information about theoretical and practical approaches to risk communication when addressing the general public on issues of benefits and risks related to nanotechnology. Additionally, the training was to increase participants’ awareness and basic knowledge about the National Nanotechnology Initiative and nanotechnology so when faced with reporting and developing stories, they would have general knowledge, practical guidelines, and resources about ways of communicating about nanotechnology. The intended audiences were general communications, public affairs and other interested government personnel who were responsible for communications and public outreach. This session will present the National Nanotechnology Initiative Risk Communication Train-the-Trainer model and materials.

The Irish experience in nanotechnology communication, education and public engagement

By Pádraig Murphy

As in many other countries, nanotechnology has been identified as playing a key role in Ireland's knowledge-based economy, leading to transformative social and industrial development. However there is a lack of awareness and little public discourse about these technologies.

There is some engagement at policy and institutional level. Following the setting up of a Nanotechnology Task Force by the Irish Council for Science Technology and Innovation (now the Advisory Science Council), the *ICSTI statement on nanotechnology* set out a vision with a clear strategy, roadmap and definition for nanotechnology. Forfás, the legislative policy board to the Irish Government on science, technology and innovation affairs, is currently undertaking a consultative technology assessment of nanotechnologies, called Nanolreland, to aid public policy decision-making, gathering stakeholder views of potential in the field. In conjunction with these policy initiatives, Nanoteire, a consortium of Irish Universities, is positioning strategically for leading international nanotech research. The next step is public engagement, and it is here that many challenges exist for institutions and policy-makers. Scientific communication and education about the increasingly complex concepts of nanotechnology to the public are part of the process; the latest thinking within science communication and science technology and studies (STS) disciplines would suggest, however, that underlying social and cultural needs, values and assumptions need also to be addressed in the process of public engagement.

The aims of this paper to the OECD Working Party on Nanotechnology public engagement workshop are:

- To outline the context of nanotechnology in Ireland and global networks (eg emerging science, technology and innovation in the hi-tech sector and the collaborative potential of policy, industry, and scientific and social sciences research) and roles for, and concepts of, communication, education and public engagement;
- To give working examples of communication and education, such as the Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), the Science Gallery, University 'education and outreach' programmes and the Discover Science and Engineering NanoQuest 3D video game;
- To suggest ways in which tools from the social sciences may aid communication, education and public engagement, learning lessons from the tensions of other socioscientific debates (eg GM crops).

The Austrian Experience - Project NanoTrust Integrative Analysis of the State of Knowledge Regarding Health and Environmental Risks of Nanotechnology

By André Gzásó, Myrtil Simkó, Ulrich Fiedeler, Michael Nentwich
Austrian Academy of Sciences, Institute of Technology Assessment

Nanotechnology is an emerging branch of research and technology development. Up to now, safety aspects have not yet been thoroughly researched enough in order to allow for conclusive assessments regarding postulated risks. At the same time, concerns about potential risks are being raised and there are first signs of a public debate. Not least against the background of the experiences in the area of biotechnology, a **foresighted nanotech policy** is necessary, which is based on profound and well presented analyses. As documented in the first half of 2006 by two projects, on the state of risk and accompanying research (see ITA project and Joanneum Research project) there is massive need for research and communication. We aim to meet these needs in this project.

The heart of the research project is to continually survey, analyse and summarise the state of knowledge regarding potential health and environmental risks of nanotechnology. For the first time in Austria, these important aspects of technology development will be under systematic scrutiny and beyond single R&D projects, that is investigated on a meta level. At the same time, research gaps will be identified and differing assessments made transparent. This is what we call a **risk radar**, which will be the basis for a **clearing house** on questions of potential health and environmental risks. NanoTrust will be an information desk and **promoter of discussion**: Both for the general public, the administration and the nano research community a sort of service point will be established for questions regarding the assessment of security issues.

The project is funded for at first three years (09/2007 – 08/2010) by the Austrian Ministry of Transport, Innovation and Technology (BMVIT).

Project homepage:
<http://nanotrust.ac.at>



Improving the dialogue with society about scientific issues

Chief of "Science in society" project, CNRS-France

Delft Conference on public engagement with nanotechnology,
30-31 October 2008

By Jean-Pierre Alix

The OECD-GSF decided in 2007 to launch a new activity entitled « improving the dialogue with society about scientific issues ». The subject is rooted in government's preoccupations to optimise the interaction with the general public concerning issues which have an important scientific component. There are numerous examples such as : GMO, genetic testing, nano, nuclear waste, science and religion, global warming, ...

We can see some limits in the "golden age" model where science was considered as the basis of progress and communication of science to public more or less thought as a lesson.

Today's life is affected by science and technology in a large number of areas. The proposal to society coming from scientific culture and practice is not automatically accepted because it is perceived as an ambiguous mix of progress and risk. Society wants to say something about the future of science and technology. So cultures which are from science need to discuss with culture of science, and vice versa. Dialogues are a necessity.

Through a few steps, we studied questions arising in this new situation of science in society. Main findings are in new analysis of the science in society relations, and in the best way to define, conduct and finalize dialogues.

Such processes, which are still empirically based in most cases, could be processed in a better way and more efficiently. We will comment at which conditions a dialogue can be a success and how science policy could include such initiatives in the future.

Activities on Communication and Public Engagement with Nanotechnology at the European Commission

By Angela Hullmann

Nanotechnology is an emerging technology that has attracted much interest and attendance from the public in recent years. It has been considered as the new key technology, able to change our lives in many ways. In some areas, nanotechnology is still in its infancy stage requiring much more fundamental research efforts, in others products are already on the market and enter the public focus. Efforts in publically and privately funded research and product development have considerably increased in recent years and scientific and technological progress is developing fast.

As recent debates in the EU and elsewhere demonstrate developments in science and technology do not take place independently from the society. Various actors with different views are shaping the process and it seems very likely that some nanotechnology applications will raise significant ethical, legal or social concerns. This results in a number of important questions about the future of the technology: What will society look like when nanotechnology becomes more mainstream? Will the products be profitable? Are there any negative environmental or health impacts? Who controls the use of nanotechnology? How to deal with liability? Whom will the technology benefit or harm? What are the ethical problems?⁹[1]

Policy makers are challenged to make decisions on further priorities of publically funded research and on regulations. In order to respond to the society's concerns it is of crucial importance to enter into a dialogue on benefits and risks of nanotechnology, including ethical, legal, societal aspects (ELSA) and governance, involving great parts of the public and basing on informed judgement. ELSA of nanotechnology offer important insights to the interested public by helping to identify expectations and concerns and at the same time they are important for policy makers for responding to these needs in terms of good governance of research.

The societal dimension of nanotechnology research forms an integral part of the integrative, responsible and safe approach followed by the European Commission, as being laid out in the European Strategy for nanotechnology (2004), developed further in the Action Plan on nanotechnology (2005) and followed up by the first Implementation Report on the Action Plan (2007).^{10[2]} In these Commission Communications it is stated clearly that nanotechnology must be developed in a responsible way, within an open debate that involves the public and that enables interested people to reach their own informed and independent judgements. A milestone to this respect is the code of conduct on research in nanotechnology (2008) which specifies voluntary rules for European scientists and researchers active in nanotechnology.^{i[3]}

The European Commission has spent a considerable amount of money on European research projects in nanotechnology in the past 10 years, with increasing funding up to 560 million Euros in 2007. It is considered as being important that these projects are accompanied by measures that identify, analyse and communicate ELSA and that help to reach good governance in nanotechnology. In the Sixth Framework Programme for Research and Technological Development (FP6) between 2002 and 2006 and through various Themes and Actions, the European Commission has financed 20 projects in the field of ELSA and governance of nanotechnology. In FP7 between 2007 and 2013, these activities continue. In parallel and also benefiting from project's assistance and results, the European Commission is carrying out other activities such as the production of information materials and reports, organisation of workshops, and publication of related websites. For further information on nanotechnologies at the European Commission please visit <http://cordis.europa.eu/nanotechnology>.

Disclaimer: *The views expressed are purely those of the author and may not in any circumstances be regarded as stating an official position of the European Commission.*

1[1] See results of the Nanologue project, www.nanologue.net .

2[2] See following Communications from the Commission: *Towards a European strategy for nanotechnology* (COM(2004)338), *Nanosciences and nanotechnologies: An action plan for Europe 2005-2009* (COM(2005)243) and *Nanosciences an*

Nanotechnologies: An action plan for Europe 2005-2009. First Implementation Report 2005-2007 (COM(2007)505)

- 3 [3] See the *Commission Recommendation of 07/02/2008 on a code of conduct for responsible nanosciences and nanotechnologies research (C(2008)424)*