



NanoJury UK: Reflections from the perspective of the IRC in Nanotechnology and FRONTIERS

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Introduction: the context for NanoJury UK?

Nanotechnology describes a wide range of emerging technologies that aim to apply new possibilities to control materials at the scale of atoms and molecules. The challenge and potential of nanotechnology is to understand and harness material properties that differ at the nanometre scale. Examples of nanotechnologies range from electronic components already used in computers, to new developments in industrial materials such as plastics, to a wide range of possible uses in medicine.

Along with the possible benefits of nanotechnology come a series of important questions for scientists, governments and wider society. What research directions will be prioritised? Who will decide? How will possible health and environmental risks be researched and regulated? How will the political and ethical aspects of new technologies be addressed?

These questions have been raised by an important study on nanoscience and nanotechnologies by the Royal Society and Royal Academy of Engineering.¹ This report concluded that public dialogue on future developments of nanotechnology is crucial to create a more complete and democratic policy for nanotechnologies. The European Commission's strategy for nanotechnology also called for public dialogue as key to the responsible development of nanotechnology.²

NanoJury UK was set up as a collaboration to pilot public dialogue on nanotechnologies. From the start the NanoJury project believed that it is vital to include scientists in the dialogue process – both to contribute their knowledge of the

¹ Royal Society & RAE (2004) *Nanoscience and nanotechnologies: opportunities and uncertainties*, Royal Society and RAE, London.

² EC (2004) *Towards a European strategy on nanotechnology* (Brussels: European Commission).

technical issues, and also to learn from the process about the wider context for their work. In this short reflection on the NanoJury we discuss the role played by scientists from the IRC in Nanotechnology and FRONTIERS.³ We address the ways they contributed and what they learned from the dialogue process. We argue that active and early involvement of scientists is crucial to ensuring that they fully engage with and learn from the dialogue process. If this is successful, as in the case of NanoJury UK, public dialogue can be a productive way for scientists to reflect openly on the wider public aspects of their research.

Why did the IRC in Nanotechnology and the FRONTIERS Network of Excellence participate in NanoJury UK?

Both the IRC and FRONTIERS believe that publicly funded scientists have a collective responsibility to engage in public discussion about the purposes of their research. We also consider that learning about the wider social aspects of science and technology is an important part of the training of scientists in today's world. We were therefore delighted to have the opportunity to take part in NanoJury. This was the first public dialogue activity of its kind in Europe, and we were happy to support and learn from this experiment in facilitating citizens' deliberation on and recommendations for nanotechnology policy.

The early involvement of scientists in the dialogue process was important in ensuring that scientists could both contribute their knowledge of nanotechnology and learn directly from the dialogue. IRC and FRONTIERS scientists' involvement in the NanoJury process had three aims:

- ***Contributing to the dialogue.*** The aim was to have scientists directly participating in dialogue, contributing their technical knowledge and also engaging in joint exploration with citizens about the issues raised by nanotechnology research.
- ***Learning from citizens.*** Research on nanotechnologies involves cutting-edge science, but also an imagination of possible technological uses of the research. It is therefore useful for scientists working in this area to have some understanding of public attitudes as these will ultimately help shape any successful technologies.
- ***Reflecting on social aspects of science and technology.*** FRONTIERS and the IRC wanted to provide scientists with the opportunity to reflect on their role in society. Public dialogue provides concrete opportunities to think through complex interactions between science, technology and wider society.

³ IRC in Nanotechnology is a collaboration between three UK-based universities funded by UK research councils and government, www.nanoscience.cam.ac.uk/irc/index.html FRONTIERS is a European Union funded network of excellence of 11 partners from across Europe www.frontiers-eu.org/

What role did scientists play in the NanoJury process?

The NanoJury was a collaborative project. The Policy, Ethics and Life Sciences Research Centre (PEALS), Newcastle University, Greenpeace, The Guardian Newspaper, and the IRC in Nanotechnology and FRONTIERS jointly initiated the project. The participating citizens and scientists also played a role in shaping the project.

The co-ordination and facilitation of the NanoJury was the responsibility of Dr Tom Wakeford and his team at PEALS. Building on their significant experience in this field, they ensured that the process was balanced and rigorous. Their commitment to allowing citizens the space to deliberate the issues and voice their conclusions was critical to the overall success of the project. This was reflected in the comments by a team of independent observers based at the University of East Anglia.⁴

Nanoscientists contributed to the NanoJury process in four main ways:

- ***Sitting on the NanoJury oversight panel.*** This panel was responsible for helping steer the NanoJury to meet different partners' expectations, to allow citizens the space to deliberate issues, and maximise the relevance of the process to policy-makers.
- ***Contributing to a scientific advisory panel.*** This second NanoJury panel was made up of experts who advised the PEALS team on the scope and presentation of evidence. The panel's remit was to help ensure that the evidence and witnesses to the NanoJury represented a balanced view of the range of scientific understandings of nanoscience and nanotechnologies.
- ***Taking part as witnesses.*** Scientists also engaged directly in conversation with the NanoJury members as witnesses.
- ***Indirectly learning from the process.*** A less visible, but equally important part of the project was the opportunity it provided members of the IRC in Nanotechnology and FRONTIERS to learn about public attitudes to nanotechnology. This was possible through informal discussion with scientists who had taken part, and formal workshops that described the NanoJury process and its outcomes.

What have scientists learned from NanoJury UK?

Scientists at the IRC in Nanotechnology and FRONTIERS have learned much from the NanoJury. This process of learning can be divided into two different types of lesson. The first type of lesson relates to public attitudes to science and the potential value of public dialogue. The second type of lesson concerns greater understanding of the complexities of the wider social and political context for nanotechnology research.

⁴ Rodgers-Hayden and Pidgeon (2005) "'Nano Jury UK' was well executed and important for moving forward deliberation on new technologies" Report for policy launch of NanoJury findings, September 2005.

Lessons on public attitudes and public dialogue:

Scientists learned that given the chance provided by the NanoJury, participating citizens took the opportunity to learn and debate about nanotechnologies extremely seriously. Citizens engaged in reasoned deliberation and came up with thoughtful conclusions. This first-hand experience of the complex deliberative processes that led to public attitude formation was an important lesson for scientists.

The substantive conclusions of the Jury were also instructive. These included an interest in the potential of nanotechnology and an expectation that it would deliver some benefits for society. However this hope was tempered by scepticism of government commitments to monitor and regulate the complex and unintended consequences of the technology. Citizens also expressed concerns that nanotechnologies will not be developed in the long-term interests of society and would overlook the potential of technologies to address health and environment problems and create jobs. A strong conclusion was also that there should be more openness and debate about the direction of technological innovation.⁵

Lessons on social and political context for nanotechnology research:

The NanoJury provided an opportunity for scientists to think critically about science and innovation policy and its relation to the work that they do in university laboratories. This brought home the complexities of balancing competing visions of future technologies when uncertainties about future developments and their consequences are endemic.

Participation in the NanoJury process also meant that scientists had to think carefully about how to communicate their work to non-scientists, which led some scientists to reflect more deeply on the aims and purposes of their research. Scientists also witnessed that when it comes to thinking about the uses and regulation of nanotechnologies there is no sharp divide between hopes and worries of non-scientists and those of scientists. Scientists, when thinking as citizens, often face the same range of questions about the social management of new technologies as non-scientist citizens.

Outcomes: what difference has NanoJury UK made?

From the perspective of FRONTIERS and the IRC in Nanotechnology there are two sets of outcomes from the NanoJury. The first concerns the formal recommendations of the Jury, and how nanotechnology policy has taken these up, and the second concerns what scientists and publics have learned from the process.

The initial recommendations of the NanoJury were presented by participating citizens and collaborators to an audience of policy-makers in London. The NanoJury also fed into wider process of formal policy learning from public dialogue on nanotechnology. The Nanotechnology Engagement Group is collecting evidence from various public dialogue projects and will report to the UK government in the summer of 2007.

⁵ See NanoJury recommendations.

More immediately, scientists who have directly and indirectly participated in the NanoJury now have a better understanding of public attitudes, and their hopes and concerns for developments in nanotechnology. The process has also led to a deeper reflection on the wider social and political contexts for nanotechnology research. The NanoJury itself is just a small step in the direction of developing a more open and responsive culture of public science. In the case of research on nanotechnologies this includes a sense of responsibility to consider the wider consequences of research. For example, carrying out research on potential environmental and toxicological risks from manufactured nanoparticles, which is now taking place at the IRC in Nanotechnology. Scientists who have learned from the NanoJury process now know that carrying out such research will not, as some might have thought, give rise to public concern, rather it is likely to be taken as a sign of scientific responsibility.

Scientists who have learned from the NanoJury now have greater confidence in talking to non-scientific audiences. They understand that non-scientists do not expect scientists to know all the answers; rather, they respect a frank and open discussion of the uncertainties attending any process of scientific research. This enhanced capacity of scientists to reflect on the role of science in society, and their willingness to explore openly the wider social questions raised by nanotechnology research is an important outcome of the NanoJury.

In conclusion, FRONTIERS and the IRC in Nanotechnology have learned a great deal from participation in the NanoJury process. As an experimental initiative, there are lessons to be learned from the process, as discussed by other partners. We however, feel it is important to emphasise the positive potential of such public dialogue projects as part of a broadening of reflection and interaction by publicly funded scientists on the purposes and aspirations of research on emerging technologies.