

**Science Communication Conference
jointly organised by The British Association and The Royal
Society**

22-23 May 2003

This report was written by Sara Sleigh on behalf of the BA and The Royal Society



Science Communication Conference

jointly organised by The British Association and The Royal Society

22-23 May 2003

Executive Summary

Science is important to our society and is central to the running of democracy, bringing us a better understanding of the modern world, improving our health and the environment and creating wealth. But interactions between science and society are troubled by a number of issues. Members of the public, generally supportive of science and scientists, increasingly oppose particular developments involving science. The poor handling of controversies by scientists, businesses and politicians and the fact that new technologies often present difficult social or ethical dilemmas can exacerbate their opposition. The science communication community has a key, yet challenging, role in ensuring that scientists, the different publics and policy makers interact and work together in the assessment of science.

This year's conference, the second annual event of its type, was well attended by representatives from across the science communication community including practitioners, academics and decision makers. The energy and vigour of the community came across, with lively discussions taking place in all sessions and during the breaks. The conference atmosphere was one of consensus and willingness to rise to the challenges presented.

The conference explored the contributions of different sectors including museums, the media, schools, universities and learned societies to science communication through the theme of citizenship. The following five points summarise the conference's key conclusions:

1. Science communicators have a key role in communication but should not replace scientists on the front line. During debates of controversial issues, and when presenting risk and uncertainty, scientists need to be credible, honest, open to discussion and ready to acknowledge the values and opinions of others.
2. A cultural change is needed in the scientific community to formalise scientists' involvement in science communication activities and to provide them with more training in how to contribute to discussions of complex issues with the public, media and policy makers.
3. Many science museums accept an obligation to tackle controversial issues. One possible way to stimulate discussion on issues involving contemporary science is through the use of theatre.
4. The science communication community is maturing and there are many examples of good dialogue and consultation. However, better sharing of ideas and experiences within the community will help it meet the challenges faced. These challenges include:

- providing more discussion opportunities for publics to shape the direction of research and technical change;
 - developing a more sophisticated understanding of its audiences; and
 - reaching under-represented sections of society.
5. The amended Race Relations Act aims to extend opportunities for people of all ethnic groups, rather than simply to prevent racial discrimination. The science communication community is beginning to try new approaches to enhance the involvement of socially excluded groups and minority ethnic groups, despite the lack of clear and easy ways to do this. Delegates were encouraged to be proactive.

The conference identified the need for greater resources, networking, collaboration and sharing of good practice within the science communication community. Furthermore the science communication community needs to continue to improve links with social scientists researching issues involving science and technology. In the next year the aims of the science communication community should be practical and forward looking, addressing key issues such as increasing meaningful dialogue, recognising scientists who devote time to communicating, bringing scientists, social scientists and practitioners together to find common solutions, and increasing accessibility to diverse communities.

Report structure

Each conference session lasted about an hour and a quarter with short presentations followed by healthy discussion on all occasions. This report provides a full summary of the conference proceedings. Comments made by the speakers in their presentations and by the audience during discussions are combined in the summary. Discussions that were repeated in more than one session have usually been presented once. The audience's comments were too numerous to credit individually.

Conference Programme

Keynote address: A 10 year vision for science communication: interacting with publics about science and issues involving science

Sir Paul Nurse, Chief Executive, Cancer Research UK

Citizenship and Science (Chair: Professor Helen Haste, University of Bath)

Scientific citizenship in a changing world

Professor Alan Irwin, Brunel University

The Royal Society's People's Science Summit and speaking out meetings – models for involving the public in policy making

Dr David Boak, The Royal Society

'Science in Society' Consultation (Chair: Professor Robert Worcester, Chair of MORI)

Science in society: the OST's perspective

Dr Barbara Knowles, Office of Science and Technology

Different Perspectives (Chair: Professor Robert Worcester, Chair of MORI)

Who should the Nuffield Council on Bioethics consult and why?

Tor Lezmore, Nuffield Council on Bioethics

Covering controversy: behind the headline

Mr Pallab Ghosh, BBC

When is a citizen an expert and when is an expert a citizen?

Dr Anne Kerr, University of York

Keynote address: Missions and media: how much can science museum exhibitions be expected to accomplish?

Dr Alan Friedman, Director, New York Hall of Science

Inclusiveness – reaching new audiences with new approaches (Chair: Dr Gill Samuels, Senior Director, Science Policy and Scientific Affairs, Pfizer)

Are there colour bars in a digital universe?

Trevor Phillips, Chair of Commission for Racial Equality

joined by Dr Liz Rasekoala, African Caribbean Network for Science and Technology

Workshops

The black hole in science communication

Dr Liz Rasekoala, African Caribbean Network for Science and Technology

Regional collaboration for more effective delivery

Ms Lorelly Wilson, North West Science Alliance

What role can the science communication community play in consultations?

Dr Fiona Barbagallo, The British Association and Dr Gail Cardew, The Royal Institution

Issues involving science that we might communicate (Chair: Professor Helen Haste)

Back to the future: forecasting the past

Sir Peter Williams FRS, President of the BA

Science in its developing social contexts

Professor Robin Grove-White, Lancaster University and Chair of the Board, Greenpeace UK

A ten year vision for science communication

Science is important to our society. It has the cultural objective of giving us a better understanding of the modern world and it is key to improvements in our health and the environment, and to wealth creation. Science is therefore central to the running of democracy and, in order to ensure that policy making is properly informed and influenced, high quality debate among scientists, publics, politicians and policy makers must occur. Effective science communication makes such debates possible.

Understanding current interactions between science and society will inform better strategies for science communication. The pace and nature of the changes in science in the 21st century are unprecedented. Scientists increasingly 'play God', manipulating life forms and challenging anew what it means to be human. Furthermore, debates such as those surrounding BSE, foot and mouth disease and genetically modified organisms, that would not have occurred 30 years ago, now take place because of the public's increasing suspicion of authority. In this atmosphere, truncation and trivialisation of science, which are often particularly problematic for complex issues, must be recognised as unacceptable. Scientists must also work with the media to reduce the emphasis on confrontational presentations of topical issues and new data.

The situation is not yet in crisis, however, and a number of steps can be taken to improve debate between the relevant parties. Sir Paul Nurse raised two issues relating to scientists' involvement in dialogue and a third regarding practical issues for better debate, all of which generated a great deal of discussion.

Firstly, scientists need to become more involved in communicating and debating advances in their subject areas. For this to occur, a cultural change is needed. At the moment the demands of the Research Assessment Exercise often take precedence. Scientists are not afforded the time to participate in science communication activities, particularly as their participation is seldom recognised. Furthermore, scientists receive greater accolades for publications in prestigious journals than those in the mass media to the extent that they are reluctant to be involved for fear of damaging their reputations.

While funding bodies are working hard in the area of recognition for involvement in media activities, complete cultural change will be harder to achieve. A portion of a grant may be set aside for communication activities, enabling scientists to dedicate time to them. Offering scientists the choice of whether or not to take part in such activities was seen as key to avoiding further complications in grant applications. More work is needed in recognising science communication activities in the wider scientific community, for example through Fellowship of the Royal Society.

Secondly, scientists should be encouraged to develop their skills to engage effectively in public debates. Many scientists are not natural communicators and complex science is difficult to communicate to peers let alone those with little scientific knowledge. While training is by no means routine, in some cases mentoring is offered to ensure that proposals for activities are of high quality and that learning is shared between projects.

Thirdly, better debate should be encouraged by addressing a variety of issues including the need for the presentation of science in a less confrontational manner, for innovative ways of promoting dialogue and for better science education in schools. All parties involved in science communication including social scientists, ethicists, philosophers, scientists, the medical profession, the media and religious representatives must also be encouraged to work more effectively together. Clearly the science communication community has a key role to play.

Citizenship and Science

The House of Lords' report on Science and Society published in 2000 represented a turning point in the science communication field stating that '...this crisis of confidence [in scientific advice] is of great importance both to British society and to British science.' The depth of challenge to science and science communicators can be overlooked in this climate of social anxiety over technical change, poorly presented risks and scepticism and lack of trust in institutions.

Response to the challenge requires careful consideration of a number of issues. Alan Irwin raised the question of who should set the agenda for scientific dialogue and debate. If institutions do this, as is often the case, potentially thorny issues can be avoided easily and the agenda politicised. The public should be asked what they want from science, thus having the opportunity to influence the direction of research. Truthful presentation of risk was also discussed at length as the credibility of scientists and their institutions depends on it. An uncertain level of risk might be presented as a certainty, often by a politician. John Gummer MP's actions during the BSE crisis are a good example. Honesty, humility and a personal touch are needed when communicating risk and the audience was in general agreement that scientists are well placed to communicate in this way. Science communication specialists and media professionals have a key role in facilitating this communication, but perhaps should not replace the scientist on the front line. The interplay between social issues and science is also highly relevant when planning science communication activities. All of these points were revisited at later points during the conference.

The aims of The Royal Society's Science in Society programme directly address the challenge in the House of Lords' report. The aims of this five year structured programme of interaction with the public are to engage with a wide variety of people to build the public's trust in science and to learn the best ways of interacting with the public while ensuring that they have an influence over policy making. The programme encompasses a number of elements including dialogue meetings, which were the focus here.

Hypothetical scenarios around issues in genetics and health and the issue of 'Do we trust today's scientists?' formed the basis for a series of regional and national dialogue meetings that have taken place during the programme's first two years. The Royal Society worked with a company called Quest Associates during the first year of the programme and the Policy, Ethics and Life Sciences Group at the University of Newcastle in the second. These groups helped plan and facilitate the meetings that have taken place. This year the

School of Environmental Sciences at the University of East Anglia was also brought in to help evaluate the programme.

Both regional meetings and the National Forum were run on the premise that everyone participates on the basis of equality – in other words regardless of their background or perceived expertise – and feedback has been good. Scientists, who had been reluctant to participate due to scepticism as to what the meetings could achieve, felt that the experience had been worthwhile. This is a vital move towards the cultural change needed within the scientific community. As a direct outcome of the National Forum the Department of Health wishes to work with The Royal Society to ensure that the public are able to make informed choices about health. The Human Genetics Commission is also planning to examine the new issue of genetic profiling at birth. Both developments are indicative of the programme's impacts on government policy and actions.

One further aim of the programme is to help people acquire the skills to engage effectively in public debate about science, addressing another of the needs raised by Sir Paul Nurse. At present The Royal Society offers communication and media skills courses and encourages involvement in its dialogue meetings, therefore promoting 'learning by doing'. It recognises that new courses in the skills for effective dialogue, consultation and presentation of risk are also needed. Examples of the good work already going on in this area were brought forward in the discussion and highlighted the need for better awareness of these developments across the science communication community.

'Science in Society' Consultation

In the interests of realising the benefits of increased research spending, the government has allocated £1.5million to the Office of Science and Technology for Public Engagement in Science and Technology for 2003–2004. The OST approached the British Association for advice on how they could assess science communication activities in the UK, how effective these are, how to promote collaboration and best practice in the science communication community and how to govern its programme of work.

The OST has now published a consultation paper, based on the recommendations of the BA, in which they propose actions including a snapshot survey and pilot database of science communication activities, regular national public surveys to gain a better understanding of what the public wants from science and a needs analysis to tie these two activities together and identify gaps in provision. Support and funding for science communication activities also come in the form of a yearly media summary, continued support for this annual conference and evaluation of major activities, including a comparative analysis of National Science Week and the BA Festival of Science. A grants scheme consolidating the two different funding modes active currently, and an ad hoc advisory group to govern the programme are also planned. Conference delegates were invited to comment on these items during the discussion. They were also asked to comment on the OST's five proposed funding priorities including science in society, widening participation, collaboration and networking, good practice in science

communication and science in the media. The BA will present the audience's feedback to the OST as part of the formal consultation process.

Members of the audience were concerned that the activities database might duplicate ongoing projects such as SETPoints. They were also concerned that it would be difficult for the database to record everything given the diversity of people involved and the fact that the science communication network does not include all these people, particularly those in industry. However, it was noted that the database will aim to provide an overview in the first instance and will not duplicate existing information sources. More systematic data collection will follow with the onus on the science communication community to log activities, for example through web-based interfaces. The database is intended to inform providers as to the extent of involvement from currently under-represented groups.

How much money will be needed to fill all the gaps in provision? Has enough money been allocated? Currently, these questions cannot be answered, but the surveys being commissioned by the OST will look into overall spending. The surveys will also inform what 'a complete picture of the public's needs' might look like, as no data are currently available. There was a feeling that scientists should also be asked about their needs, although some research has already been done in this area (for example, The Wellcome Trust's survey of 1500 scientists in 2001). Industry does a great deal in the area of science communication, but was under-represented at the conference and it was felt that the overall science communication effort would be better directed if the gaps in provision were evident.

Members of the audience expressed the opinion that, wherever possible, the funding for science communication projects should be embedded within relevant research projects. One Research Council was quoted as spending 1% of their total budget to accomplish their mission that scientists should communicate their science to the public, but acknowledged that more could be done. Funding for training scientists to take part in dialogue was also seen to be essential. The multiplicity of funding bodies can overwhelm practitioners searching for the right place to apply for a grant. The OST's proposed networking fund could be used to coordinate the sharing of information regarding who to approach for funding for different types of project.

Standards of science communication activities are rarely discussed and the OST's proposals for evaluation were generally welcomed. Although the research councils already have some measures in place to evaluate the quality of activities, more could be done. Goals for science communication within grant applications also need to be measurable. This annual conference was seen as an ideal forum for the discussion of evaluations and for sharing best practice.

Different Perspectives

Since 1991 the Nuffield Council on Bioethics has been contributing to policy making and debate by examining ethical questions raised by advances in biology and medicine; two

examples are Pharmacogenetics and the Genetics of Human Behaviour. The Council appoints a working party to deal with each issue and uses public consultation as one method of informing the debate. Industry is actively consulted through the consultation procedure, but the Council does not receive industrial funding or recruit representatives of industry to its working parties. A variety of faiths are similarly consulted, but are seldom represented on working parties. The Council publishes potential conflicts of interest of working party members.

The consultations do not aim to be representative, with self-selected academics, members of institutions and the public responding to written consultation documents that are sent to interested individuals or institutions and are available to download from the Council's website. The process is limited by the relatively low response rate and the fact that consultation documents are written and are not suitable for a wide range of audiences due to their fairly technical nature. The Council's current consultation exercise on the ethics of research involving animals aims to reach a wider and younger audience by providing a shorter, more accessible version of the consultation document and facilities for on-line response.

The presentation of science in the mass media offers a complete contrast to the consultation processes of the Nuffield Council on Bioethics. Pallab Ghosh challenged scientists and the science communication community about their ability to adapt to the increasing pace of change in which the media has become a 24 hour 7 days a week monster in need of constant feeding. Scientists or their institutions often give slow and inappropriate responses to media enquiries and uncertainties presented as certainties were raised as a major issue for the credibility of scientists in emerging controversies. In order to deal with these issues, key institutions need to employ science communication advisors with high status and authority.

The current mantra is that science communication has moved away from the 'deficit' model, in which the public are seen as empty vessels in need of filling. However, the move to 'dialogue' may be superficial and in the journalist's eyes the science communication community still has work to do here. The media must take care not to base their coverage entirely around crises, although Pallab asserted that more high quality science is presented in the media now than ever before (he aims to present four items each week). This has allowed more opportunities for discussion of the social impact of science, which in turn will fuel better debate.

Lord Jenkin reminded the meeting earlier 'never [to] overestimate how much science the public knows; [and] never [to] underestimate their common sense.' Anne Kerr developed this theme by looking at our understanding of expertise and citizenship. Her research team organised focus groups to discuss the issue of DNA patenting, in particular how the patenting of two genes for breast cancer by the company Myriad would affect the UK. The groups included 16-year-old school students or genetic counsellors or clinical geneticists. In each case, despite differences in the depth of their knowledge of the subject area, individuals had an instinctive feeling about ethical commercialism and the balance between research and profit. The quality of people's moral arguments does not, therefore, depend on their age or background.

The challenge for science communication professionals from all disciplines is to gain a more sophisticated understanding of their audiences, which should be employed when planning programmes and methods for public consultation and dialogue. The activities' aims should not be to communicate *to* people or to reinforce false divisions between experts and 'lay' people.

How much can science museum exhibitions be expected to accomplish?

Science museums are big business, attracting people from a wide variety of backgrounds. People come away from museums with measurable learning gains, those with least knowledge gaining the most. But why is it that most museum exhibitions focus on fundamental science rather than contemporary issues of science and society? Firstly, the groups involved, including scientists, curators, public visitors, museum staff and funding bodies, all have different expectations. Secondly, the diversity of visitors' ages and backgrounds and short visit durations discourage treatment of complex, multifaceted contemporary or controversial issues. However, many museums accept an obligation to tackle these issues regardless of the fact that it is easier to avoid them.

Alan Friedman presented a number of experimental museum exhibits, which had had varying levels of success and had stimulated varying amounts of controversy. The Smithsonian Air and Space Museum's *Enola Gay* exhibition, which dealt with the ethics of strategic bombing, was never built in its intended form and was a spectacular failure. The Smithsonian Museum of American History's *Science in American Life* exhibition questioned whether science had lived up to 19th and early 20th century expectations and inevitably brings progress and the betterment of the human condition. The exhibition raised issues such as whether it was appropriate for university research to be funded by industry. It caused outrage within its major sponsoring organisations and another scientific society. However, those who chose to go to the exhibition were largely pro-science and the exhibition did not alter their opinions. The New York Hall of Science's *Understanding AIDS* exhibition received many complaints about its explicit nature, but was nevertheless highly successful in educating teenagers about using condoms to stop the spread of sexually transmitted diseases.

The use of theatre in museums is one of the most exciting prospects for presenting controversial issues. While funding bodies find it hard to accept that an exhibit will inevitably be biased, the fact that a playwright's position will be articulated in theatre is more acceptable. Theatre can be used to stimulate discussion on scientific controversies and, importantly, underlying social issues. The fact that most museum visits are relatively short will challenge playwrights. Science World's *Mine Games*, an innovative and successful experiment, used a hypothetical situation to demonstrate real controversy and the process of decision making. Unfortunately, despite its success, it was difficult to run and was closed after several years of operation.

Museums acknowledge that they will not reach every audience. Yet it is possible to encourage visits by under-represented groups. Many years of experience at the New York

Hall of Science have shown that a floor staff representative of the local population will encourage similar diversity among visitors. Specialist exhibitions may also attract previously under-represented portions of society although there is little evidence to show that these audiences return. Theatre was again cited as an excellent way of bringing people in to museums and can be as appealing to children as to adults.

It is difficult for a museum exhibit to cause the same level of emotion as, for example, theatre or books. Experimental exhibits have proved useful, but continued innovation is needed. In order to reduce the risk to funding bodies from unsuccessful experiments, dedicated funding should be set aside for the presentation of science and society issues in museums.

Inclusiveness – reaching new audiences with new approaches

The Race Relations Act is an important step forward in protecting people against discrimination. Since 2002, all public bodies have been obliged to conform to the Act by promoting equality, avoiding discrimination and proving their commitment through monitoring. But the Act is more than an attempt to prevent racial discrimination. It can be a litmus test for a whole institution. Racial discrimination often goes hand in hand with gender discrimination, racial and sexual harassment and other examples of poor management and poor institutional culture. The Commission for Racial Equality is concerned with building our institutions so that discrimination is never an issue, as there is no doubt that a diversity of backgrounds in society contributes to an enriched culture.

In order to foster an inclusive society free from discrimination, the science communication community needs to excite children from all ethnic groups about science and show them the potential for careers in science. This must be tackled both in schools and through the provision of role models in universities, the media and industry.

In schools some ethnic groups succeed more than others and current measures to lift the standards for all sadly leave some anchored on the bottom. The current school system performs particularly poorly for AfroCaribbean boys aged between 7 and 14. Specific measures for specific ethnic groups are needed; for example standards rose when Turks were taught physics in Turkish. Students from under-represented groups also need to be shown that the university environment will not be entirely alien to them. Universities should invite these students to visit as sixth-formers. The act of invitation alone will speak volumes.

Despite many efforts to break down the stereotype, the image of scientists as 'white, nerdy men in lab coats' is not one that will attract a diverse range of people to careers in science. Ethnic minority role models are needed to promote diversity in institutions. Examples from sport, in particular, show that such role models can make a big impact. The Festival of Science and Culture, organised by the National Space Centre, aims to bring together children and role models from ethnic minorities, as does the Science and Engineering Ambassadors initiative set up by the DTI and related actions. Further cultural

change will also be needed so that people from ethnic minorities feel confident and trusted in scientific institutions.

Workshops

Three workshops took place on the second day of the conference – ‘The black hole in science communication’, ‘Regional collaboration for more effective delivery’ and ‘What role can the science communication community play in consultations?’. Workshop reports can be downloaded from www.the-ba.net/scicomm.

Issues involving science that we might communicate

Sir Peter Williams invited the meeting to move forward to 2010 and from this perspective look back at what will have grabbed the headlines in the intervening years. Abstract ideas from astronomy and particle physics have always fired the public’s imagination and will continue to gain media attention. Discovery of the Higgs Boson particle and dark matter in the universe were just two examples. Bioscience, medicine and the environment will also continue to make headlines as they affect peoples’ daily lives. The challenge to conquer viruses will be ongoing and perhaps not a clear-cut victory for *homo sapiens*. The economic and competitive advantages of the green agenda will be more widely recognised and the US may even have adopted the Kyoto protocol!

Professor Robin Grove-White pointed to the likelihood of increasingly significant controversies involving science and technology in the decade ahead. Where science and technology previously offered us cars and telephones with their obvious lifestyle advantages, new technologies are likely to raise increasingly difficult ethical and social dilemmas. So a richer understanding of the ethical and political ‘meanings’ of the resulting controversies is likely to be vital for scientists and science communicators in the period ahead. These issues are often classed as ‘non-scientific’ but are very much about science in the real world. The debate around genetically modified organisms provides a good example. Many people are not flatly hostile to GMOs, but are wary, ambivalent or sceptical of the continued overconfident assertions of their safety and benefits by politicians and regulators involving scientific authority. Their concerns go beyond health and the environment to questions of farming practice, distribution of the benefits of farming and globalisation.

Given the escalating pace of change and our despair at the presentation of current and past controversies, such as BSE, MMR and foot and mouth disease, the need for better understanding of and new approaches towards such controversies is clear. The public need to be aware that the direction of technical change can be influenced. The absence of an adequate public language and the ‘deficit’ model of science communication, which is still used, present the science communication community with deep and troubling challenges.

The pilot ‘Science in the 21st Century’ curriculum has the potential to provide this common language for the next generation. However, no time has been built in prior to rollout for a

thorough review of the pilot programme and there are issues in preparing teachers and teaching materials for the discussion of ethical and social issues in science.

Conclusions

Better organisation, networking and sharing of ideas within the science communication community will help it to rise to the challenges put to it on both days of the conference. Effective leadership of the community is also essential. Communication between scientists, science communication professionals, ethicists, philosophers, social scientists, the medical profession, politicians, policy makers, industry and publics (including those with radical views) needs to be more effective and the science communication community needs to seek new ways to reach currently under-represented sections of society.