



**Science Communication Conference, 13 & 14 July 2006**

Jointly organised by the BA (British Association for the Advancement of Science) and the Royal Society.

This report was written by Sima Adhya, Hannah Devlin and Mary McGee Wood on behalf of the BA and the Royal Society.

## **Keynote address**

*Lord Rees of Ludlow, President of the Royal Society*

Sir Martin Rees gave a warm and inspirational welcome.

He went on to express his views on the issues which currently limit the quality of science communication. In his experience, one problem is that if a story reaches the front page, it's often distorted by editors who have no science background and little interest in science. On the other hand, scientists themselves are very often people who can only speak in acronyms, are almost "catatonic" and hence not always the best people for the job. He added that we must commend the skill of professional science journalists, as they are required to communicate the whole of science to a non-specialised audience, to tight deadlines.

Reflecting on his own career, Lord Rees said that he was lucky because the subjects that he was involved in sought to answer some of the big questions and fascinated everyone, like "Was there a beginning?", "How did life begin?", and "Is there life in space?". His handicap however was that he was "grey, white and male".

Lord Rees said that for science communication to improve, the system needs to change so credit is given to scientists for engaging with the wider public. It is necessary to change the mindset of the heads of departments so that scientists are encouraged to communicate their work. This not only has clear benefits to the public, but can also help scientists get their work into perspective. Robert Wilson, one of the discoverers of the 3K radiation background, which is the remnants of the beginning of the universe, only realised the significance of his work when he started reading about it in the New York Times.

In Lord Rees' view, science communication is also important for science. Darwin didn't need to popularise *Origin of Species* as it was an immediate best-seller. However, it was a shame that Darwin didn't know about Mendel's work, which was the foundation of genetics, as important ideas could have resulted.

Lord Rees observed that science often features in the media as background information when a natural disaster takes place, such as an earthquake, or health scare, and science issues "are not stories in their own right". This was partly due to the fact that the main stream channels cannot afford to host science stories, and because science is better suited to features and documentaries than to sound bite news. New media however such as web streaming could represent a new niche and provide a channel for more specialised debates.

In terms of science writing, there seems to be no formula as to what makes a successful popular science book. A wide range get through, even highly technical ones with lots of equations, e.g. Roger Penrose books. Hence this shows that it is possible for big ideas to be communicated without "mislead and distortion".

On issues of "pseudo-science", Lord Rees asked how much scientists should engage. He said it was not sensible to "deride astrology, as it makes scientists look humourless with

no sense of proportion". On the topic of alternative medicines, he said "every claim should be evidence based". For everyday important matters, such as child care and diet, "premature release of unsubstantiated research can be confusing".

Upstream engagement with the public was a good thing. This was done for the case of nanotechnology, and it allayed negative sides before a commercial interest developed.

In a poll it was found that people trust scientists. It was important not to erode this trust through commercial involvement.

Rees finished by stating that science was required to inform political debate, such as GM foods, and stem cell research, but that no policy involves science alone. There are always social, ethical, and economic issues as well, and in these fields, scientists have no special credentials. However, scientists should get involved in public debates, and feel less inhibited.

His talk stimulated comments from the audience, with the MRC press officer saying that scientists need to convince the press that their story is news-worthy, and to deliver the story in plain English, and that dumbing down was not necessary.

### **Session 3: Setting the context: progress towards embedding science in society**

*Prof Kathy Sykes, Collier Chair of Public Engagement in Science and Engineering, Bristol University*

"It's been an amazing year," said Kathy Sykes, summing up an overview of the progress made in promoting science communication in the UK since 2000, and especially in the past year.

The "key players" include government through various routes, primarily the DTI's Office of Science and Innovation (OSI), which helps to fund a number of organisations and schemes, and the DfES through schools and universities. Other funders of science include the Research Councils (RCUK) and the Wellcome Trust. Higher Education Institutions (HEIs), Learned Societies, and schools are all making important contributions.

Sykes identified the 2000 House of Lords Science and Technology Select Committee Report on Public Engagement with Science and Engineering (the Jenkin Report) as a critical point in the recent history of public engagement activity. The report found that, while the public were largely very positive about science, science communication was often too "top-down" – the "deficit model" – whereas scientists needed to listen to the public. Dialogue was needed to help to inform both government decision-making, and policy-making for research organisations.

"Public Engagement", Sykes explained, is an umbrella term for any Science in Society activities, from science communication in science centres or festivals to public dialogue. Any good engagement activity should involve aspects of listening and interaction. "Dialogue" she defined specifically as "a form of deliberative (i.e. over time) participatory engagement where the outcomes are used to inform decision-making".

Engagement – "a multi-dimensional approach to two-way communication with the public" – she depicted as a network of relationships involving research, enterprise, public relations, community-based projects, life-long learning, and education. Each comes with its own drivers, and all require an overall framework of good governance. This analysis proved useful in later discussion sessions.

Having set the scene, Sykes turned to the past year, starting with government activities, dominated by the Science & Innovation 10 year Framework 2004-2014 and its "Next Steps" interim statement in 2006. Funding for science communication has more than doubled, from £4.25m in 2005/06 to £9m in 2006/07. There is a new emphasis on dialogue taking place " 'upstream' in the scientific and technological development process, not 'downstream' where technologies are waiting to be exploited": thus the contrast between the public debate on GM crops, which was opened too late to be effective, and current early-stage discussions on nanotechnology such as the "Smalltalk" initiative.

The Research Councils and HEFCE are giving more weight and resource to public engagement activity. The Research Assessment Exercise, after the current 2008 round,

is expected to move to taking more account of “metrics” – although Sykes omitted the fact that the published proposal includes no mention of engagement. STEM subjects are to have higher priority in schools.

The 2005 Council for Science and Technology report *Policy Through Dialogue* has been accepted by the government, and all its recommendations agreed to. In 2006, CST published “Rigour, respect and responsibility”, an ethical code for scientists. The DTI’s “Sciencewise” programme “aims to increase and improve public dialogue on science and technology across Government departments and agencies”.

Funding bodies had also made progress in the past year. HEFCE had committed increased funding, and a greater emphasis on society and economy. RCUK’s Science in Society Unit had published their strategy document. EPSRC had set up a Societal Issues Panel. The Royal Society had published the results of a survey on “Factors affecting science communication by scientists & engineers”, to be presented in the following conference session. HEFCE and other funders were setting up institutional and departmental reward schemes for public engagement activities. JISC was also supporting research in the area.

Among the universities and schools, there were moves towards networking and sharing of best practice and resources. Other initiatives included science communication conferences, and public consultations such as the “Smalltalk” nanotechnology discussions.

In the following discussion, Frances Cairncross, President of the BA, challenged: why should *we* – that is, academics - do this, when the media do it reasonably well already? While some reservations were expressed as to how well the media really do cover science, more positive comments were made about the contribution of press officers and other professional communicators, who can work with scientists to put their message across effectively – one press officer described her role as “translating Physics into English”.

The problem of lack of respect for scientists participating in science communication was mentioned. Cairncross mentioned the view, from some researchers, that public events constitute “the Disney-fication of science”.

Sykes’ emphasis on the need for public dialogue to inform decision-making was taken up, and the point made that this is important for scientists as well as politicians.

There is a need to measure the impact of engagement on academics and universities. Some specific activities have been shown to improve student recruitment, but better evaluation is important – a theme which would be explored in a session on the second day.

#### **Session 4: Exploring the evidence - research culture and science communication**

*Chair: Frances Cairncross, President, the BA*

*Speaker: Dr Darren Bhattachary, the Royal Society*

*Panel: Prof Alan Irwin, Prof Colin Blakemore, Malcolm Press, Dr Saliha Afzal*

This session reviewed the results of the Royal Society's 'Factors Influencing Science Communication' survey and considered challenges to science communication in the future.

Darren Bhattachary began by giving some background to the survey, which came about as a result of the BA/Royal Society Science Communication conference in 2004. Its aim was to provide evidence for funding organisations and universities on which they can build a workable system to reward scientists for engaging with the public. The study comprised a survey of 1485 researchers in HEIs and 41 telephone interviews, designed to explore the views, behaviours and attitudes of scientists to science communication.

The speaker went on to outline the main findings of the survey. Public Understanding of Science was the top reason to engage (34%) whilst listening to and understanding the public was given as a reason by only 13%. This points to the perception by scientists that "engagement" is a one-way process. Scientists cited policy makers (60%) and schools (50%) as the most important audiences and journalists (31%) as the least important. Darren pointed out that "ultimately the main way to engage is through journalism/ broadcast media. Scientists need to be better equipped to do this". In terms of activity, 74% had taken part in at least one activity, 11% in at least ten activities. Most said they would like to spend more time doing public engagement with only 6% saying they just didn't want to get involved. It was also found that more public engagement was carried out by senior than junior researchers, 1-5\* than 5\* research departments and by those who had received training.

Scientists most often cited 'time constraints' as a reason for not doing more public engagement. The speaker suggested that research culture is negatively impacting scientists' ability to take part in public engagement activity. This reflects the lack of funding and respect for this as a professional activity. This was consistent with the response to what incentives would work - more money for departments, help with career and Head of Department support were all seen as strong incentives to participate in more public engagement.

#### *Panel discussion*

Alan Irwin began by referring to a Times article reporting "Scientists have no time to talk to the public". He said this highlights the need to re-evaluate what scientists' priorities are and begs the question how does public engagement fit with the research culture in universities? He also stressed the need to consider what institutions are going to do with feedback from the public.

Colin Blakemore cited the need for the voice of experts at the cutting edge and argued that the best way to achieve this is by making science communication a requirement for

both individual career progression and departmental grants. He ended by saying “we need to transform duty into obligation whilst providing recognition for science communication work”.

Malcolm Press agreed that public engagement should be made a criterion for career progression but emphasized that encouragement and reward should play an important role. He called for more prizes and awards from learned societies and for schools and media to invite scientific speakers. Both of these, he said, would increase the prestige of public engagement.

Saliha Afzal presented the scientist’s view, pointing to the disjointed career structure of scientists’ as being a problem. She also referred to the vulnerability that many scientists feel in relation to the media, saying “one misrepresented quote could destroy our careers”. She felt that the key was better science communication training for scientists.

The issues raised so far in the session were then passed to the floor for further discussion. A representative of RCUK raised the concern that increasing demands on scientists increases the risk of scientists letting you down. He suggested that teachers might find scientists often cancelling speaking engagements, as science would always take precedence over science communication.

On the issue of lack of involvement of younger scientists in public engagement, one delegate suggested that the problem is they get lost to science communication. She went on to say that by building science communication into the career structure of scientists, more good communicators would remain in science.

Finally on the issue of 5 star research departments doing less public engagement than 1-5 star departments, a researcher from Huddersfield pointed out that more credit should be given to the new Universities, such as his own, who are already engaging with the public. He also suggested that the cutting edge research departments could learn a lot from departments who are involved in science communication activities now.

## **Session 5**

(comprising 3 parallel sessions)

### **Session 5a: The role of science communicators in supporting science education**

*Chair: Professor Michael Reiss, Institute of Education*

*Speakers: Dr Derek Bell, Chief Executive, Association of Science Education*

*Philip Greenish, Chief Executive, Royal Academy of Engineering*

*Debra Dance, DfES*

*Daniel Sandford Smith, Education Manager, Institute of Physics*

This session aimed to take the STEM mapping exercise as a background and discuss the new opportunities it highlights to support science learning.

Dr Derek Bell posed the question “science for all: are we learning the lessons?” He made the point that Science for all has been an aspiration in science education for many years and a requirement when it was made a core subject in the curriculum. However despite some successes the reality has not always met the aspirations.

Pre national curriculum, science for all was an aspiration. In 1985, science became compulsory up until the age of 16 in England, Wales and Northern Ireland. The problem is that by making it something for all, it became over prescribed, and became “boring and irrelevant.”

He posed the question “what has school science education got to do with science communication?”

He stated that the 5 key challenges in making science for all were: the science curriculum; assessment; the importance of teachers; meeting student needs; and integrating ‘informal’ and ‘formal’. Looking forward there is going to be a new range of vocational diplomas for 14 to 19 year olds, and education is going to be one of them. There is a movement from prescribed content to something that is more open. Dr Bell said that school science should not be divorced from the ‘real’ world, and that improving ‘standards’ is not enough.

Debra Dance’s talk covered two key areas, which were the government strategy for school science, and other changes in secondary schools. She showed target figures for students taking A-Levels in each of the sciences and explained the government’s continued ambitions to get better results at Key Stage 3 and at GCSE. She also explained how the government targets the numbers of teachers with science specialisations in the fields they were teaching. Other strategies for improving science education for schools were described, such as new science labs: show labs, acting as exemplars, would be created with at least one in every government office region. The question of the role of science communicators in supporting science education was not covered in detail.

Philip Greenish’s talk addressed the question of how to inspire the next generation of scientists and engineers. He said that engineering is central to solving 21<sup>st</sup> century

challenges and crucial to the country's economy, but there was a shortage of skills and too few school leavers go into careers in E&T. There was a shortage of high calibre UK graduates in engineering and a shortage of teachers qualified in physical sciences. In general the public had a less than perfect understanding of engineering, and there were too many myths about what engineering was. In his talk, Greenish described three schemes aimed at addressing these issues, which were the National Engineering programme, London Engineering Project and The Technology and Engineering in Schools Strategy.

Daniel Sandford Smith's talk was entitled "Science Communication and Teachers". He gave an outline of what teachers say they want from science communicators and how the Institute of Physics works with Science communicators to try and achieve this.

Teachers wanted science communicators to be able to communicate at the right level, discuss science with examples that the pupils can relate to, talk about exciting science that inspires the pupils, be patient with less able pupils who may ask silly questions and leave pupils wanting to learn more about science. They should provide weird and interesting facts, provide equipment that schools may not have, and take groups on visits to 'bring to life' some aspects of Physics that may traditionally seem less exciting. Teachers also wanted to have specialists talk about certain areas of Physics on the curriculum in a novel way.

The ways in which the Institute of Physics is using science communicators for their Annual Schools Lectures Tour was described. The IOP was looking for enthusiastic science communicators to help give lectures and set up exhibitions around the country. Smith also described the resources and the materials that the IOP provided to help teachers.

Questions and comments were then invited from the floor. Steve Measure said that the framework of science teaching is only being tweaked - the roots are not being changed. He said that the idea of showing prospective parents numbers of science students at A-Level as an attainment metric for the school (a suggestion made by DfES Debra Dance) wouldn't help.

Another audience member suggested that it is necessary to look at ways that science communicators could engage with teachers.

That pupils and teachers are not being allowed out of schools was cited as a constraint against inspiring.

The question was raised as to why are people interested in science communication and not science teaching. A science teacher said that in order to help increase figures, good science communicators need to be sent in to help with after-school clubs.

## **Session 5b: Informing research: scientists' experience of dialogue**

*Chair: Prof Julia Goodfellow, Chief Executive, BBSRC*

*Speakers: Dr Carolyn Stevens, Senior Lecturer, London School of Hygiene and Tropical Medicine*

*Dr Maggie Leggett, Head of Public Engagement, BBSRC*

This session started with the questions: How is dialogue impacting on research practice? Can we involve the public in decision making? Have there been real impacts on scientific research and policy?

Carolyn Stevens' talk was titled "Whose engagement? – experiences of shared learning about science and society". She asked what our motive was for engagement – self-interest or, as often assumed, altruism? – and demonstrated convincingly the potential advantage to researchers of listening to public concerns. In her environmental health research, especially in transport studies in London, her group had been surprised at the response when they asked local communities what their priorities were. The questions were unexpected, ambitious, broad, and focussed on solutions.

For example, Sikh women in a gurdwara in Southall asked: "What is the distribution of accidents and crime on roads where stalls have been located on the pavements in Southall in comparison to other areas of Ealing?" Investigation revealed that indeed more people had bags snatched from passing vehicles where stalls forced pedestrians to walk closer to the traffic. The police accordingly imposed restrictions on the depth of pavement stalls. Children in a Wandsworth primary school asked about the distribution of local road traffic accidents and deaths, and themselves helped to explain the patterns and to find ways of reducing the number of casualties.

School pupils were particularly impressive in the breadth of their concern and the imagination shown in their questions, such as "What can we learn from ancient manuscripts about how to reduce malaria?", "Why is there more attention on West Nile Fever than malaria?", and "How do all the causes of asthma combine?". Interviewed, they showed appreciation for the freedom and trust involved in choosing their own research topics.

Scientists are only slowly adopting this perspective: 43%, according to the Royal Society survey, still think in terms of a one-way process of communicating science to the public. Stevens recounted her anger when a colleague described her inclusion, in research, of the views of the public as "sweet". There is a degree of uncertainty in science, and scientists need to accept that.

There is a need for support, both for scientists who want to support communities, and for communities who want to access scientists; trust, and a genuine two-way dialogue model; listening; and acting on what we hear. Scientists, in the words of one 15-year-old, need to "care about the people they are working with rather than caring about their reputation".

Stevens' presentation concluded with an impressive short film, made by school pupils, about chemicals and the potentially dangerous way in which they pervade our lifestyle.

Maggie Leggett then spoke on "Changing cultures – a Research Council perspective". BBSRC's mission includes communication with the public, as an important contribution to "Quality of Life and UK plc" – indeed all the research councils now include public communication in their mission statements. The aims are for science communication to be enabling and empowering, to support dialogue on an equal footing, and trying to get scientists to reflect on the wider context of their work.

BBSRC's Bioscience for Society Strategy Panel, which reports to their overall Strategy Board, gathers information about public attitudes and opinions through debates, citizen's juries, discussion meetings, consultation, focus groups, and public attitude studies. These studies have showed that the public care about why and how decisions are made, and on what criteria, and view the ethics of grant applications as important. Partly in response to this, ethical and societal issues are now considered before grant applications are funded.

The challenges in science in society include getting the right balance between raising awareness and dialogue; and listening respectfully whilst managing expectations; of how public opinion might feed into decision making. We need to engage less obvious people - not just the middle-class.

The discussion which followed looked at questions around who our "public" is. Interdisciplinary research leads us to engage with scientists "outside our comfort zone" and put us, to some extent, in the position of a member of the public ourselves. Successful applied research requires that we listen to our (potential) users, to ensure that we are providing what they want.

Stevens developed her earlier point about the non-authoritative nature of science: "I like science because you don't have to believe in the truth, fundamentally."

The mood of constructive receptiveness was tempered, though, by Julia Goodfellow's closing reminder that the prevailing culture is still an obstacle. For real dialogue to flourish, it is first needed for public engagement activity to be "not harmful" to a career in science.

### **Session 5c: The future of broadcast and new media communications**

*Chair: Juliet Upton, STEMPRA*

*Speakers: David Harrison, Ofcom*

*Prof Jonathan Drori, Department for Culture, Media and Sport*

This session explored the impact of new technologies and the new opportunities they create for science communication. David Harrison's talk looked at how the broadcasting market is changing, the technology driving market changes and what impact this is having on the consumer. Jonathan Drori then considered how science communicators could take advantage of these changes.

David Harrison began by telling us the primary driver for change in broadcasting is the switch from analogue to digital. The introduction of digital transmission is leading to a greater broadcasting capacity, in terms of the number of channels available and the quality of the broadcast. The switchover to digital transmission is also facilitating the convergence of broadcasting with other media such as internet and mobile phones. Digital storage means that broadcast is increasingly available on demand. Examples of on demand broadcast are podcasts and video on demand (VoD).

Consumer adoption of digital broadcasting technology has happened very quickly and is accelerating. Broadband internet is likely to have become a 'mass market service' (adopted by more than 50% of the total market) within 5 years, in comparison to the 30 years it took for mass adoption of TV between the 1950s-1980s.

#### *Television & Radio*

Over 75% of households in the UK now have digital television. The phased switch-off of analogue transmission is planned to take place from 2008-12. This will free up space for 14 channels. The space could be used for both more channels and higher definition broadcast (HDTV), which uses up more spectrum. Spectrum shortage is less of an issue in radio broadcasting than in television adoption and the adoption of digital radio has been slower.

#### *Internet*

The advent of broadband has increased the capacity for providing entertainment over the internet, with 41% of broadband owners regularly using the internet for this purpose. The internet has grown organically, which has led to little control over the quality of end-to-end connections. This makes it ill-suited to provide real-time broadcasting and better quality is achieved with downloads. The music download market has seen a rapid growth, with three legal download sites appearing in the top ten digital music services for the first time last year. Many established radio stations are making programmes available on-demand via their websites in the form of podcasts. The shorter download time with broadband has also seen the emergence of video download sites.

#### *Mobiles*

David Harrison illustrated the growing trend for mobile multimedia services among the young. Mobiles are currently used for sharing pictures, downloading songs and video calls. In the near future we are likely to see mobiles being used for video podcasting, VoD, eNewspapers and live broadcast TV.

Jonathan Drori's talk was entitled "Something appealing, something appalling- making interaction work for real audiences". This encapsulated the key message of his talk- how to design a compelling experience.

#### *Why bother with interactivity?*

Jonathan Drori pointed out that interactivity can allow you to jump out of the traditional richness of communication against number of people reached curve, where there is an inverse relationship between the quality of communication and the number of people

you communicate to. In an interactive environment, the more people you reach, the better the quality of the service. The example of Amazon was given - the more users, the more appropriate the recommendations for 'books you'll like' will be. The speaker stressed the need to ask the question "can everyone who comes to my website add value for future users in some small way?"

#### *Knowing your users*

Drori underlined the importance of knowing your users and their needs. He suggested research workshops to better define users, and the use of storyboards to develop 'user journeys'. He also pointed out that targeting an already well-defined audience can work well, giving the example of Amazon being an online WHSmith, with value added.

#### *Compelling experience*

Drori looked at how we can use compelling experiences as inspiration for new media. He listed the key components of a compelling experience as: defined, fresh, accessible, immersive, significant and transformative. He said if a new media experience does not have most of these characteristics it will fail.

Following the two talks, discussion of the future of new media was handed to the floor for discussion. The problem of funders not understanding new technology was raised. Drori suggested a solution might be running new media sessions for decision makers. Another funding issue that came to light was that funding is often linked to a particular medium. Harrison responded that there has been rapid technological change and the business model simply needs time to catch up. A member of the audience raised the point that new media might have important applications in policy-making, being well-suited to polling the public and stimulating discussion. The final comment was that "we need to connect the virtual world to the real world".

## Session 6

This session was split into 8 parallel sessions, with the strategy seminars being attended by report writers.

Within the inspire strand, talks included:

### **Role model schemes: inspiring the next generation of scientist**

*Chair: Prof Michael Reiss, Institute of Education*

*Speaker: Diane Beddoes, Fellow, Office for Public Management*

*Panel: Liz Wilcox, SEAs and Project Development Manager, SETNET*

*Dr Joanna Coleman, Public Engagement Manager, EPSRC*

*Dominic McDonald, Senior Science in Society Manager, RCUK*

*Dr Maggie Aderin-Pocock, Managing Director, Science Innovation*

### **Integrating formal and informal science education**

*Chair: Colin Johnson, the BA*

*Speakers: Dr Jim Ryder, Senior Lecturer in Science Education, University of Leeds*

*Karen Davies, Manager of Outreach and Interactive Galleries, the Science Museum*

*Dr Rosalind Mist, Project Manager, Ecsite-uk*

### **Inspire strategy seminar 1**

*Chair: Sir Roland Jackson, Chief Executive, the BA*

This discussion session, with nine participants, took up the issues opened in Session 5a, especially on resources for the teaching of STEM (Science, Technology, Engineering and Medicine) subjects. The principal strand of discussion concerned support for current school science teachers, but issues of recruitment and PhD student participation were also aired.

Overall, we lack a clear model of who is doing the communication, and a clear focus – should we be looking primarily at schools, or at the wider context? Why should teachers – or anyone – come to us (meaning academics in higher education)?

“Next Steps”, the Government’s 2006 interim statement on the 2004-2014 Ten Year Plan, recognises the need for more Maths and Physics teachers: we should take advantage of that. However we should not overlook the problems of retention of teachers, provision of teaching materials, and motivation to update their knowledge and skills.

Much of the discussion concerned formal structures of support for science teachers. More rewards and resources for teachers and other contributors are needed, it was suggested, and those we have would be more effective if better organised and better known. How do teachers know what is available?

The importance of good role models and career structures was discussed. The Chartered Science Teacher scheme, run by the Association for Science Education, is designed to pull together teaching resources. A framework for Continuing Professional Development

is important, and an understanding of what teachers really need and the pressures on their time. How much time is it reasonable to expect teachers to spend on CPD? One delegate enthusiastically described the "MyCPD" software tool and website (<http://www.freecpd.co.uk/mycpd>), a free resource which he was keen for teachers to use.

Science Learning Centres provide support for continuing teacher development (rather than initial training): the National Science Learning Centre was mentioned as a possible organisation to host or coordinate a central collection of resources. Effective sharing of existing resources was emphasised. The Research Councils could provide, and publicise, classroom materials (BBSRC already produce excellent teaching materials, but it was questioned how widely these are known about or taken up.)

Some reservation was expressed that, while these initiatives might be appropriate at secondary level, primary school teachers might need more guidance.

Pursuing the theme of dialogue, a survey was suggested to ask of teachers what *they* think they need. This should not be done immediately, but about a year from now, when the new GCSE syllabus is bedded in.

As well as supporting existing science teachers, there is a need for recruitment into the profession; here again good role models and career structures are important. The scale of need is enormous if we are to have enough numbers to meet the government's target that "Every child in every school in the UK should have access to good quality science teaching."

Another strand of the discussion concerned the contribution made by PhD students to science teaching in schools. There are various different parallel schemes for "ambassadors" or "mentors", and these need to be clarified. We should also ask whether, and how, PhD students benefit from this activity.

A delegate from Germany reminded us that we could usefully look beyond the United Kingdom for examples, and possibly also resources.

The group identified three recommendations for action:

- 1) Professional development: there is a need to encourage and reward teachers, and to support the recording and sharing of activities for other participants, e.g. PhD students going into schools.
- 2) Ask teachers what they would like, probably 12 months from now when the new GCSE syllabus is bedded in.
- 3) Better infrastructure support is needed for the sharing of resources and practice for existing teachers, in addition to the initiatives already proposed for attracting new ones. The National Science Learning Centre might be a suitable organisation to host or coordinate a central collection of resources.

It was also suggested during the discussion that the 2012 London Olympics offered an opportunity for a public celebration of science: not just the science of sport, biomechanics, nutrition, etc, but also associated subjects such as engineering, urban planning, public transport policy, and many more. This point was taken forward to the closing panel session, where we heard from the floor that the Research Councils are already beginning to make plans for such an event.

Within the involve strand, talks included:

### **Better policy? The impact of Sciencewise in government**

*Chair: Molly Webb, Demos*

*Speakers: Alan Mercer, Sciencewise Programme Director*

*Pippa Hyam, Director, Dialogue by Design*

### **Engagement or communication: different approaches for similar results?**

*Speakers: Melanie Smallman, Adam Nieman, ThinkLab*

*Alison Crowther, Dialogue Director, Sciencewise, DTI*

### **Involvement strategy seminar 1**

*Prof Kathy Sykes, Collier Chair of Public Engagement in Science and Engineering, Bristol University*

This session took the form of a group discussion of ideas raised in Session 5b (Informing research – scientists' experiences of dialogue). The objective was to turn these ideas into strategy recommendations and plans for the future.

The session began on a positive note with a Canadian delegate (Suzanne Corbeil) saying the UK is "in the lead" in terms of public involvement in science. The group was pleased but the general consensus was that there's still plenty to do, so we pushed on with the session. Kathy Sykes opened with a brief summary of ideas raised in Session 5b, emphasizing the need for "the science communication world to mirror the science world in being interdisciplinary and global". The ensuing discussion covered three main areas relating to infrastructure, international knowledge sharing and community outreach.

#### *Is the infrastructure working?*

The concern was raised that whilst there are many new science centres and there is now infrastructure in place for promoting public involvement in science, the system is not yet working smoothly. It was agreed there is a need for greater collaboration between Universities, science centres, science museums and organisations such as SETNET. One delegate who works at the science centre in Bristol pointed out that some science centres are in competition with each other. The group felt that whilst in some circumstances competition could be healthy, on the whole science centres could achieve more by working together. A strategic suggestion was that collaboration with outside organisations should be specifically recognised in future plans to reward HEIs for public engagement in science.

There was a common desire among the group for more feedback from the BA over the course of the year about how strategy recommendations are being implemented. It was

felt that this would further the goal of building a stronger sense of cohesion between the different elements of the science communication community.

#### *Sharing best practice internationally*

Following the initial comment about UK being “in the lead” it became clear that most present had little idea of how public involvement in science works outside the UK. The consensus was that there should be more international knowledge sharing.

Reference was made to the Dutch “science shops”, forums where communities were asked which questions they would like to see science address. Funding for the Dutch scheme has been withdrawn, although no-one was sure if this was because it was unsuccessful. However, one member of the group knew of a scheme to pilot science shops in the UK. This is a clear example of where international knowledge sharing is vital.

In terms of industry engagement with the public, it was pointed out that there needs to be an internationally comparable level of consultation if social good is going to drive enterprise.

The group recommended that next year’s conference include at least one international speaker to talk about a scheme for public involvement in science that has worked well in their country.

#### *Reaching communities*

It was agreed that greater effort needs to be made in reaching members of the public unlikely to attend science festivals or science centres. Lack of social science knowledge amongst those working in science or science communication was identified as a problem. It was suggested that the BA could put scientists in contact with people who have done groundwork in the community. This could be done via working groups over the course of the year.

The DISC project was mentioned as an example of working to involve a minority group in science. However nobody present had heard much about the results of the project. Dissemination of the results of the outcomes of this project would be of great value to people working towards similar goals as those of DISC.

Council meetings were identified as a good opportunity to reach local communities. Councils are contractually required to do a certain amount of public engagement – using some of these meetings to discuss science would mutually fulfil this requirement and our own. Furthermore the context of a council meeting would promote the idea that the public have a right to be involved in shaping the future of research. Both science centres and Universities could take advantage of this opening.

Finally the point was raised that whilst statistics show that girls and ethnic minorities are performing better at science in school, poor white boys are not. One way of motivating school children would be to provide work experience opportunities in science. This should be done through SETNET.

The session ended with a final thought from Kathy Sykes: "the infrastructure's there-use it!"

Within the media strand, talks included:

### **Adventures in new media**

*Chair: Aoine Saunders, the BA*

*Speakers: Grace Baynes, Head of Marketing and Public Relations, BioMed Council*

*Jimmy Leach, Head of Content Development, Guardian Professional*

*Dr Chris Smith, the Naked Scientists*

### **Pitching ideas: the recipe for success**

*Chair: Steve Mesure, the Creative Science Consultancy*

*Speakers: Andrew Cohen, Series Editor, Horizons*

*Prof Trevor Cox, University of Salford*

### **Media strategy seminar 1**

*Chair: Juliet Upton, Science Technology Engineering Medical Public Relations.*

This strategy meeting took place on the top floor of the IEE, in the Riverside room. There were roughly a dozen people present, and the group consisted mainly of press officers and media relations managers, but there were also a couple of scientists present.

After a quick introduction of all present, there was an individual brain storming session about how the media could engage with science. There was a lively and varied debate, the conclusion of which was three main ideas:

#### 1) New media.

Podcasting, webstreaming, myspace.com, blogging, mass text messaging and other new technologies were discussed. Did anyone present really understand how these new media worked? It was suggested that an audit was made of what these media were, who were the key players in these fields, and how we could work with them to engage the public with science news.

2) Press officers were the main interface between the media and the scientists. The experience of many of the group members was that some scientists didn't see the news value of their work, and on the other hand, sometimes press officers didn't have the confidence to tell their senior scientists that their stories were not newsworthy. Hence, it was important that press officers should be properly trained in the culture of the media so they would be better positioned to brief their company bosses and scientists on what makes a newsworthy story.

3) How do we evaluate the impact of new media on the public? For example, what exactly does the fact that a website got a certain number of hits actually tell us about the impact of that website? Better tools are required for evaluation of both traditional and new types of media.

## **Session 7: Opening Remarks day 2**

*Sir Roland Jackson, the BA and Dr David Boak, the Royal Society*

In this session the two speakers shared experiences from day 1 of the conference, followed by a short discussion.

Roland Jackson began by saying it was heartening to see lots of new faces from diverse fields. In particular the numbers of practising scientists and engineers attending the conference were up on previous years.

He said that one key issue that has come to light is that 'science communication' and 'public engagement' are used as umbrella terms. He said this reflects the many different forms and hence different processes and purposes that these two terms can represent and that this is a positive thing. However, he went on, we must also consider how to give our activities more precise definitions, as this will be essential for obtaining funding.

He ended by drawing our attention to the problem of interaction between the DfES and science communicators. He said the DfES appear unsure how and why they should be engaging with science communicators. They are often so curriculum focussed and concerned with internal school accountability that interactions with external organisations prove difficult.

David Boak started with the observation that scientists need more communication training and that it needs to start early in their careers. In this respect he said, "professional science communicators need to help the scientists".

He went on to stress the need to strengthen the relationship between science and social science. He suggested that more science PhDs should include some aspect of social science, in order that scientists are better equipped to reach new audiences.

The speaker then highlighted the need for evidence-based journalism in order to "move up the trust chain". He said we not only need the evidence, but also need to know where it has come from. Finally, he said, "we need to change the stereotype scientist". We should also see a young blonde girl when we think of a scientist, not just an Einstein look-alike middle-aged man.

In the discussion that followed the question was raised of how the informal can support the formal. Another comment was that "DfES seems to have lost focus". The criticism was that DfES were not talking about what science communicators can give.

Finally discussion touched on the issue of whether science communication should be mandatory for scientists. Colin Blakemore (session 4) was interpreted as having suggested that it should be compulsory for scientists to communicate. This was generally disagreed with - several contributions from the floor supported the view that it was wrong to force people. Darren Bhattachary pointed out that this was something that scientists had been strongly against in the outcome of the Royal Society survey. A final remark was that the culture should be changed to be "opt out rather than opt in" in terms of the participation by scientists in science communication activities.

## **Session 8. Reward & recognition**

*Chair: Sir Roland Jackson, Chief Executive, the BA*

*Speakers: Prof Ian Diamond, Chief Executive, ESRC*

*Roger Grinyer, Head of Corporate Communications, HEFCE*

*Dr Mark Lythgoe, Director, UCL Biomedical Imaging Centre, UCL Institute of Child Health*

Ian Diamond opened this session with a talk on "Reward and Recognition for RCUK researchers involved in Public Engagement". The Research Councils, he said, "recognise the need to secure and sustain a supply of future scientists to support the science base that is critical to the UK economy." We need to ensure that in 10, 15, and 20 years' time, the UK Science base is as good as it is now. "The Councils are committed to actively raising public awareness of, and engagement with, science and innovation."

RCUK's Science in Society Unit has recently released its strategy statement, with four aims, of which Diamond focussed on the third, "Encouraging researchers to engage with the public - supporting our community by providing training and funding". The SIS strategic aims are: to act as a single external point of contact for anyone needing information on Research Council Science in Society activities; to work with partners such as Learned Societies, Funding Councils, Industry, SIS deliverers, and central Government to develop sector activities, knowledge and resources; and to co-ordinate and delivers cross-Council public engagement activity.

RCUK aims to provide funding and training to enable researchers to "engage with the public effectively and sustainably", and to work with partners towards a more positive culture where researchers have respect and career rewards for public engagement activities. There is a need to involve younger researchers, and indeed the whole higher education community.

Diamond mentioned a number of activities supported by RCUK, such as a poster exhibit at the BA Festival of Science, "Researchers in Residence" which places young researchers in classrooms, and "Meet the Scientist" which offers training courses to build scientists' skills in public engagement. Various schemes and small grants are available from some of the individual research councils.

Planned future developments include unified frameworks for funding, training, and sharing of best practice across the research councils. There is to be a "statement of expectation" of the level at which RCUK researchers should engage with the public – Diamond sees it as reasonable that this should be mandatory, given that they are receiving public money. RCUK, HEFCE, the Wellcome Trust and others are discussing how best to achieve a national reward and recognition structure. For now, the HEI career structure remains a barrier: "We have to start to change attitudes."

Roger Grinyer spoke on "Recognising, supporting and rewarding public engagement activities". HEFCE are working with partners, especially RCUK, towards "a more coherent and coordinated approach to engaging with the public". Timing was essential, opportunities must be taken: "seize the moment". New initiatives would be evidence-

based, with pilot schemes properly evaluated, based on dialogue with the public, and non-burdensome to academics.

The need for culture change in HEIs, a running theme throughout the conference, was stressed again. There is an imbalance towards research over public engagement. Such activities as we have are fragmented and transitory, rather than institutional and strategic.

Grinyer then made the first public announcement of a new initiative from HEFCE and RCUK. Centres for Excellence in Public Engagement are to be set up, with the aim of "creating a culture in HEIs where public engagement is valued". The Centres' objectives are to raise the status of public engagement; to enable institutions to build on good practice and develop networks; and to develop "beacons" which achieve culture change.

Six centres will be set up, with distinctive themes, one in a co-ordinating role. Policy dialogue, interdisciplinary activities, and engaging young people will all be important. £8 million in funding will be available over four years, up to £300,000 per year for each centre. Institutions will be invited to bid to host the centres: a formal announcement of the scheme is expected in November, with outline proposals due in February 2007.

Mark Lythgoe spoke with some animation about the cultural barriers to public engagement and the "stigma" attached to it. Academics are under pressure *not* to take part in engagement activities. What is needed, he said, is not bribes but real value. The previous two speakers had identified "some extra money", but that, while better than nothing, was an "add-on": engagement needed to be central to science.

In discussion, it was suggested that individual institutions and vice-chancellors might, in fact, be aware of wider pressures than the research culture, and receptive to public engagement initiatives. The "budget line" for engagement in a research project could in time be as high as 10-20% of the grant. Meanwhile (as a delegate from New Zealand said, quoting Rutherford) "We don't have much money, so we have to think."

The session ended on a note of optimism that we are at a watershed, close to developing a strategy that will have a major impact, and that the culture change we need may be on the way.

## Session 9

(comprising of 3 parallel sessions)

### Session 9a: Measuring the impact of informal engagement activities

*Chair: Colin Johnson, the BA*

*Speakers: Joe Cullen & Fay Sullivan, the Tavistock Institute*

*Pat Langford, Operations Director, SETNET*

*Dr Laura Grant, Science Communication Unit, University of Liverpool*

This session explored the evaluation of public engagement activities, which is increasingly recognised to be important.

Joe Cullen and Fay Sullivan, speaking on "Developing evaluation approaches for 'science in society' initiatives", described a project commissioned by OSI and ESRC to develop a framework for evaluation, and apply it to SETNET as a pilot study.

UK spending on research and development is well below the EU average, and lagging on a global scale. But science is an increasingly important policy driver, and we do now have a UK Science Innovation Investment Framework.

The public have become suspicious of science, it is not widely understood, and "not cool". The "social construction" of science is important: there is no universal "scientific truth", rather, science is shaped by social processes, and can be damaged by "folk devils and moral panics" such as the controversies over GM crops and BSE. Science in Society models aim to move away from the one-way deficit model of science communication, and give the "scientific citizen" more say in "the construction of knowledge". "Collaborative knowledge" schemes such as Wikipedia and myspace.com are becoming more widespread. Understanding how science is constructed is important if evaluation of public engagement activity is to be effective.

Evaluation faces a number of problems. Science itself is evolving, and contested. There are different purposes for engagement, different power structures and stakeholder groups, new social forms and forms of knowledge. To decide *how* to evaluate an activity, one must first decide *what* one is evaluating and *why*. The answers to these questions "create the clarity and conditions to decide on evaluation questions and criteria".

Pat Longford, in "Evaluation – a future view", presented the work of SETNET in supporting school science teaching, and some of the frustrations. They do not yet have an "objective sense of evaluation", and do not "sit at the heart of Government policy in delivering STEM education". She listed some of the variables affecting pupils' attitudes to science: "Does my teacher inspire me?" "What are the expectations for people like me?" "What do my parents want me to become?" The market failures include inadequate careers advice, lack of connection between schools and local businesses / employers, and insufficient take-up by schools of the resources available to them.

The stereotypical image of a scientist is that of Einstein – an elderly white male – while the best known "engineer" in Britain is probably a car mechanic in Coronation Street. We

need to foster positive images of younger, ethnically diverse people of both genders as science students and scientists.

SETNET's aim is "Through partnership working, make an impact on the educational added-value and career choices of all young people, by demonstrating to them, their teachers and other appropriate professionals, the relevance of STEM in today's world and the superb opportunities it offers."

Laura Grant described a student impact study on the BA's CREST (Creativity in Science and Technology) programme, a SET accreditation scheme in which 11-19-year-olds conduct their own creative problem solving through mini research projects. The findings, primarily from questionnaires, showed that the scheme did have a positive effect on the skills and knowledge, and attitudes and aspirations, of the participants, although more so among those who had reached the level of a gold award or the national final.

The overall lesson, she concluded, is that there is not enough evaluation research in the public domain in this area to put the findings of this particular study in context. Further research would allow benchmarking, and provide an essential evidence base for the planning of future schemes.

The discussion touched on recurring themes of the conference. Should public engagement activity, and its evaluation, be mandatory for science researchers? Longford felt that "if you get public money, you should be able to prove that you're having a public impact", while others felt coercion was inappropriate. And what percentage of a project budget should be spent in this way? – effective evaluation is expensive.

It was also suggested that industry's input to outreach should be enhanced, and that senior researchers should be reminded of the value to them of going in to schools.

### **Session 9b: Risk, reputation and R&D – a view from industry**

*Chair: Dr Darren Bhattachary, the Royal Society*

*Speaker: Dr David Slavin, Head of Business Innovation Unit, Pfizer*

This session looked at how industry engages with the public in terms of risk, reputation and R&D. By examining the case study of an international pharmaceutical company, David Slavin explored the interactions between risk, reputation and R&D and in particular addressed the issue of how to foster public trust in a company, whilst promoting innovation.

#### *Current perception of the pharmaceutical industry*

The speaker highlighted the importance of reputation to industry and the gap between perceived and real value of pharmaceutical companies as regards stakeholders in society (e.g. investors and health care payers etc.) In fact surveys of the general public attribute only 28% credit to the pharmaceutical industry for the development of new medicines compared to the 92% of all drugs on the market that they develop compared with government or charitable institutions. Furthermore public trust in the pharmaceutical industry is "comparable to that for tobacco companies". Dr Slavin

suggested that the poor reputation, hence lowered perceived value, of pharmaceutical companies may be a result of the apparent conflict between the expectations of shareholders and societal stakeholders in the case of a business based on healthcare.

Critics have also argued that the huge R&D costs in drug development can lead to pressure from shareholders to bring drugs to market before their safety has been properly established. This is strongly refuted by the industry that knows such activity is neither allowed by regulation nor sustainable for any business - let alone the ethical conscience and licenses of thousands of individual medical doctors and scientists that make up these companies. However, the recent risk-reputation experience of COX2 inhibitors, among others, shows that this public scepticism is a recurring theme and part of the cycle of low trust. This was highlighted in a quote in the New England Journal of Medicine in September 2004 concerning Merck's Recall of Rofecoxib "*a pharmaceutical company that puts profits before patients' safety does not deserve the public's trust. And without this trust, the company is not viable as a business*"<sup>1</sup>

#### *Public perception of risk and its impact on innovation*

Risk research has shown that there are distortions or "social amplification" in the perception of both benefit and risk. Generally, benefit is perceived to be smaller and risk larger than in actuarial reality. This suggests that the public can more easily relate to risk/risk analyses as opposed to risk/benefit analyses, which are likely to be interpreted to the detriment of new approaches and technology. This form of risk communication should be considered for science and technology innovations across the board.

There is also a strong interaction between perceived risk and trust. Trust alone can explain 50% of how the public perceives risks. Three key components were identified as essential for high public trust in a company:

- 1) competence in activity
- 2) fairness and impartiality
- 3) efficiency at levels

Building public trust can also help mitigate "*evidence resistance*" - public refusal to act in accordance with the evidence. An obvious and serious example of evidence resistance is the continued reluctance of parents to let their children receive the MMR vaccine.

As well as requiring a legal licence, industry must obtain a "*social licence*", i.e. public trust, if new drugs are to be commercially successful. As such, if R&D is to remain innovative it will be necessary for the industry to use more thought out risk communication strategies, to use precaution when the risk is great and to give greater consideration to social and environmental values.

#### *The precautionary principle – will we be safe **and** sorry?*

David Slavin outlined the drawbacks of the misuse of the precautionary principle leading to over cautious regulation which is directly related to the trust issues and social amplification outlined above. He emphasised the need to take into account the risk of

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<sup>1</sup> NEJM, Volume 351:2147-2149: Nov 18 2004, Number 21. Merck's Recall of Rofecoxib - A Strategic Perspective  
Felix Oberholzer-Gee, Ph.D., S. Noorein Inamdar, M.S., M.B.A

'no action' as well as the risk of action when undertaking risk analyses. He suggested that by communicating benefits more strongly, in terms of risk-risk trade-offs, society will become more tolerant to risk. This will in turn pave the way for public trust and thus promote innovative R&D.

Dr Slavin ended his talk with the quote by Francis Bacon: "*If a man will begin with certainty he shall end with doubts, but if he will be content to begin with doubts, he shall end in certainty*" which illustrates these concerns on are not new!

The discussion following the presentation touched on a wide range of issues related to public engagement by industry. First came the suggestion that the precautionary principle could in fact foster innovation by encouraging scientists to 'think outside the box'. The speaker contended that the precautionary principle would therefore have to be applied to each new idea in turn, leading to no action. For each decision we must think in terms of "risk of no action" and not just "risk of action" alone. The question of whether industry should respond to controversy was raised with a question with reference to the film "*The Constant Gardener*". David Slavin agreed that there is often reluctance by industry to answer directly to controversy and that this was something that probably needed to change. Another question raised was how to address the "evidence resistance" problem. This was answered by a proposal from the floor that the public might be more receptive to evidence when presented by the scientists rather than a company's "media people". The speaker pointed to intellectual property issues often being a concern for scientists when speaking to the public but agreed company scientists should be freer to communicate the science behind innovation. Finally an observation was made regarding the parallels between industry and universities in terms of the lack of direct contact between the scientists and the media.

### **Session 9c: Is Media the Best Way To Get Your Message Out?**

*Chair: Fiona Fox, Director, Science Media Centre*

*Speakers: Tony McDougal, Climate Change Communications Manager, DEFRA*

*Peter Hambly, Director, Marketing & Communications, the Carbon Trust.*

*Prof Jacquie Burgess, University College London*

This session aimed to explore the planning, delivery and evaluation of PR campaigns on climate change issues and the evidence base for evoking behavioural change as a result of these activities.

Tony McDougal reported on the Climate Change Initiative, the Climate Change Champions competition and the Climate Change Challenge Fund.

Peter Hambly gave an introduction to the Carbon Trust and its remit. His presentation gave an overview of the various campaigns the carbon trust has run and how it measures the success of these campaigns – including in terms of raising awareness and prompting action. Market research showed that climate change and carbon emission reduction are increasingly seen as business issues.

Professor Jacquie Burgess's talk was entitled "The Media's treatment of climate change". She examined how the UK broadsheets had represented climate change over time. She concluded that media set 'the social limits to curiosity' in risk issues and that editorial values and ideology were fundamental in framing Climate Change discourses.

After the presentations the following questions were raised for discussion:

- Is the panel's impression that with climate, it is too late? It's gone too far and we might as well not change our behaviour now?
- Do the media sensationalise?
- Is the media was the best way to get a science message across?
- On the issue of journalistic balance, e.g. on the Today programme they always have someone from each side of the argument. Could this give the impression that the science community is 50/50 about whether climate change is really occurring?

Jacquie Burgess said that broadsheets are not necessarily the best vehicle for conveying the climate change message, as sometimes messages can get confused. For example the issue of the drought in the South of England becomes an issue of Thames Water not replacing old pipe work, but still making huge profits. The "climate message" is hence the lost as the emphasis is shifted to another story that might interest readers more. However Jacqui said, "The media is an important player but not the only one. But the media does set the agenda and the context about what to talk about". She added "to really change how people act regarding climate change, you need infrastructure so that people can change their behaviour, like in the recycling case, where it has been made much more easy for people to recycle. That's a very influential way to change people's behaviour."

Tony McDougal responded by saying that the media has a very important role, describing how 18-21 months ago, the newspapers, the Independent, the FT and the Guardian had led the media agenda, and made a difference here and internationally. But, like the rest of the panel, he agreed that media isn't the only way to get the message out.

Peter Hambly's view was that the media was essential in passing the message simply because it hits so many people.

Fiona Fox concluded the session by giving her view, which was that the media was the "least best way as it's sensationalised. But ignore it at your peril!"

## Session 10

This session was split into 9 parallel sessions, with the strategy seminars being attended by report writers.

Within the inspire strand, talks included:

### **Changing the face of science: widening participation in enrichment activities**

*Chair: Steve Mesure, the Creative Science Consultancy*

*Speakers: Dr Anil Kumar, Director, Education & Policy, the Engineering and Technology Board*

*Prof Salim Al-Hassani, Chairman of the Board, Foundation for Science, Technology and Civilisation.*

### **Moving up the ladder of learning: monitoring the impacts of progression projects**

*Chair: Stephanie Forman, the BA*

*Speakers: Annette Smith, Director of Regions, the BA*

*David Hellier, Strategy Manager (Water) Energy & Utility Skills*

### **Inspire Strategy seminar 2**

*Chair: Sir Roland Jackson, the BA*

There were nine people present in this meeting. The discussions were open and varied.

Some general positive comments were made:

- Café Scientifiques are now widespread over the UK, but in Brighton, a Café Scientifique for children is now running – this will hopefully become more widespread.
- A national postdoc association has been set up, to provide a network for all post doctoral researchers. Previously, there have only been regional ones, e.g. in London and Durham. This should give postdocs more of a voice.

During the conference, one view was that science communicators were often more senior staff members. It should be made easier for junior researchers to apply for research grants, e.g. at the postdoc level. This would mean that they could “write in” science communication as part of their proposal. As it is, junior researchers need more senior PIs on the applications, and hence generally cannot dictate the level of science communication that they propose to do.

During the conference, the idea of setting up Centres of Excellence for public engagement with science was raised. One concern was placing all these centres in universities, risked giving the message that public engagement was not so important for government funded research institutes or industry. It was recommended that this should be addressed before these centres were established.

It was also recommended that there be a “bottom up” approach to science engagement, where the public can seek science advice or information when they require it. This could

be similar to a citizen's advice bureau for scientists. A potential problem is that so many scientists have different opinions about things, and hence give different advice. This could lead to difficulties for the scientists and the public.

Within the involve strand, talks included:

### **Energy, science and the public: mapping activities and impacts**

*Chair: Nigel Eady, the BA*

*Speakers: Dr Jason Chilvers, Lecturer in Environment and Society, University of Birmingham*

### **Involve Strategy Session 2**

*Prof Kathy Sykes, Collier Chair of Public Engagement in Science and Engineering, Bristol University*

This discussion session, with 12 participants, looked at the range of objectives, activities, and participants in public engagement with science. The term "public engagement" describes an intended outcome, but covers a wide range of different activities. Similarly, "Knowledge Transfer" is a very wide term, and should be seen as including transfer of knowledge to communities, not just in its usual specialised sense of transfer of research results to industry.

The diversity of "the public" includes (at least) school pupils, university students (undergraduate and postgraduate), adult learners, teachers, producers and consumers of science media, policy-makers in politics and in industry, R&D industry professionals, and researchers in other disciplines, both actual and potential. This brings a need for "joined-up thinking" and "quality control" in supporting diverse public engagement activities. It was suggested that their common objectives and purpose made definitions unnecessary, but this was not universally agreed. The complementary roles of different types of participant should be clearly articulated: for example, we need expert scientists to create models, which good teachers can then use with students.

A slide from Sykes' talk the previous day was found helpful. It showed "engagement" as a network of two-way communications among various communities: research, education, life-long/flexible learning, community-based projects, public relations, and enterprise, each with their own activities and drivers. This might be seen as a model to be adapted by different types of organisation according to their own circumstances. It was suggested that the next conference might be organised around the various objectives of science communication.

The role of press officers was discussed at length, with some strength of feeling. As professional communicators, they should be seen as having an important part to play in the flow of knowledge and ideas between science researchers and the public. Public relations work needs to be done well, and respected.

The six UK "Science Cities" (Birmingham, Bristol, Manchester, Newcastle, Nottingham, and York) were mentioned: they have the goal of developing deeper links between business and the science base, and ensuring that science and technology drive

economic growth. One participant who was in the process of setting up a spin-off company pointed out that for “enterprise” it is essential to listen to users and potential users, since in the end they must like the product enough to buy it.

A comment was made, somewhat in passing, that HEIs should be encouraged to make statements about “cultural involvement”.

The discussion was found useful to those present, and Sykes took forward the themes of the need for clarity of definitions, and the importance of innovation and enterprise, to the panel which constituted the closing session.

Within the media strand, talks included:

### **PR Partnerships: Einstein Year’s media impact**

*Chair: Sue Hordijkenko, the BA*

*Speakers: Caitlin Watson, Physics in Society Manager, Institute of Physics  
Richard Knight, Managing Director Mission 21*

### **Using TV drama for issues communication**

*Chair: Joanne Coleman, the BA*

*Speaker: Jill Rawlins, Director of External Affairs, Alzheimer’s Society*

### **Media Strategy Session 2**

*Chair: Fiona Fox, Director, Science Media Centre*

This session was an open discussion aiming to come up with strategy recommendations based on ideas raised in session 9 (Is the media the best way to get your message out?). After a short brainstorm, three key issues were identified as discussion topics.

#### *How to connect the media with young scientists?*

The Royal Society survey found that senior researchers carry out the majority of public engagement activities. In terms of engagement through the media, the anecdotal experience of the group was consistent with the RS findings.

One problem cited was that when looking for a quote or an interview, the media are often unwilling to speak to PhD students or postdocs, preferring to speak to professors despite the greater involvement of the younger scientists in the research. The group suggested that the responsibility here lies partly with more senior scientists to delegate media work as appropriate. Another suggestion was that press officers should make clear who has carried out the research.

More encouragingly, several members of the group (young scientists) had had positive experiences engaging with the media. One pointed to the database provided by the Science Media Centre as a good opportunity for young scientists to make themselves available to the media.

### *How to overcome scientists' fear of getting involved with the media?*

Fear of misrepresentation and misinterpretation by the media was agreed to be a significant contributor to the unwillingness of many scientists to engage with the media. The group discussed how a better mutual understanding could mitigate this problem.

Fiona Fox told the group about the media training sessions run by the Science Media Centre. Several members of the group also knew of media training sessions run by research councils. However it remains the norm for scientists to receive no media training.

One member of the group suggested that parallel to schemes for scientists to work in the media, journalists should be sent to work in science. After some debate it was concluded that few professional journalists would be prepared to take part in such a scheme, however it was a possibility for trainee journalists.

Press officers were identified as being well placed to help scientists deal with the media. The suggestion was made that press offices make media help documents available e.g. "Ten things you should know about the media", which would aid scientists new to dealing with the media.

### *Should public engagement be mandatory for scientists?*

With new government funding being provided for public engagement by scientists, a big question is whether science communication should be mandatory, and if so whether the requirement should be placed on individual scientists, departments or research grants.

The first question raised was what scientists would be obliged to communicate - how should we define public engagement? One argument for making public engagement compulsory is that since research is largely publicly funded, the public have a moral right to hear about it. Does it then follow that only public engagement relating to scientists' own research would be recognised in this context? The group didn't think so. It was broadly agreed that a wider range of activities should count towards the fulfilment of any mandate.

The group then went on to consider what kind of obligation (if any) would be appropriate. A comment met with general accord was that "public engagement activities need to be made *possible* for scientists, not compulsory". This observation served as a good reference for the discussion and the group deliberated over how to strike such a balance. It was pointed out that making public engagement a requirement for funding brings with it a responsibility on the part of funders to provide science communication training. Furthermore a requirement would make science communication more embedded in the career structure of scientists. The conclusion was that there should be a stronger requirement than at present for scientists to engage with the public. It would be best if this was done on a grant basis, such that the principal investigator could delegate public engagement if desired. It was also suggested that opting out should be possible, but would have to be justified.

Aside from making public engagement a requirement, it was pointed out that a lot could be achieved by persuasion. In order to do this it will be necessary to demonstrate that engaging produces the best science. The BA would be well placed to call for case studies

and evidence to this effect, and to conduct outreach to heads of departments. Finally the group hoped that the University of Norwich will extol the virtues of the BA conference for science, scientists and the University.

## **Closing session**

### **Summaries from the strategy seminars**

This session summarised the strategy recommendations emerging from the conference and identified mechanisms to take them forward. There was also a voice of the conference which consisted of the three report writers who, between them, attended most of the sessions. Over the 2 day conference, there were strategy seminars for each strand, and the chairs reported back.

#### Inspire strategy seminar

Sir Roland Jackson commented on the need for professional development for teachers so that they benefit from the skills of science communicators. There are good resources for teachers available but no central point of coordination for them. It was suggested that they use the Science Learning Centres.

In terms of the new science GCSE, teachers should be asked what they want and then again in 12 months after they have had a chance to get used to the new curriculum. Positive feedback that the Café Scientifiques are good, and there is now a Junior version in Brighton. There is also a network of postdoc associations.

It was noticed that the older university staff tend to do all the science communication. Postdocs don't get direct funding as they have to name a PI on any application and they therefore rely on being allowed to do science communication.

There are Centres of Excellence are being set up in universities, but this gives out the message that science communication is only important for universities rather than also in industry and research institutes.

Conference attendees felt there are no easy mechanisms for the public to access science, e.g. science Citizens' Advice Bureaus.

#### Involve strategy seminar

Professor Kathy Sykes noted that there now seems to be clarity about definitions, a more mature approach to engagement, i.e. dialogue is only one approach. Possibly use University of Bristol slide as themes for next year, i.e. purpose clustering rather than method.

Sykes also recommended that there needs to be more joining up of events/schemes, maybe working together over the year through working lunches, perhaps use SEAs and SLCs.

In the area of social exclusion there is a major gap: poor white boys. We need to capture good practice, e.g. the DISC project. There are other ways of getting to communities. Can we learn from the science shops in the Netherlands? An interesting science shop project is being started in Glamorgan.

We need to pick up on the innovation, enterprise and engagement agenda. We can learn from knowledge transfer and enterprise. We must not be risk averse and must seize the opportunity to shape the future.

#### Media strategy seminar

Both Juliet Upton and Fiona Fox felt that we don't know enough about new media. We don't understand its potential impact. We need to define new media, its benefits, and its disadvantages. We need to learn how to engage with it and evaluate its impact. Then we need to engage with the new media community.

Little has been said about press officers. We need to build better relationships with them and raise their profile. We need to help them to understand the media culture. We need to build their confidence. They can't often say, "No!"

One big question to be raised was how do we evaluate media impact? Another question aired was should everyone do science communication? There is a great fear of it. We prefer, "It is not obligatory for all to do science communication but there should be rewards for all to do it." The BA needs to prove that science communication is really valuable and show the benefits through case studies and examples. This then needs to be disseminated to Heads of Departments (HoDs) and University Vice-Chancellors.

Fox said that we need to get more young scientists into the media. Press officers and HoDs need to defer to the real experts e.g. the PhD student or the postdoc. We should do this not just with national media but also websites and magazines.

However, to encourage more young scientists into the media, we need to address scientists' fear of the media. We need to give media training to all scientists for all types of media experience and seek safer experiences for those just starting out in this arena.

#### Voices of the conference

On the question of obliging scientists to do science communication or merely proving incentives, Hannah Devlin asked if scientists are obliged then what exactly will they be obliged to do? Will they communicate their own science or their general science area or the process of science? This needs careful thought.

There is a huge range of ways of engaging people, e.g. new media. Scientists are often technically minded and we need to make use of this. Devlin pointed out that there needs to be outreach from the BA to HoDs to show the possibilities that engagement affords and the skills it provides.

Sima Adhya reported that the conference delegates felt that the strand sessions were very good but dividing into 9 seminars gave too much choice, although it did make the seminars more interactive. Adhya mentioned that this year's conference was more mature, it didn't just focus on dialogue.

Mary McGee Wood commented that there is a great diversity of people here: academics, industry, media, press officers. It is a great aspect of the conference. However senior scientists are missing. Only Mark Lythgoe spoke as one who is really at the coalface.

We need to unpack science engagement and answer questions like what it is and who are the different publics? We then need to find appropriate approaches for different types of people.

McGee Wood reminded everyone that there is a huge opportunity with the Olympics coming to London in 2012 and that we need to start planning now.

#### Comments from the floor

A representative from RCUK said that they had started early planning for 2012. They also said that RCUK have already written in to their grants that it is expected that awardees will do communication work. Currently, there are a lot of mapping exercises going on through RCUK, e.g. BBSRC.

Suggestions from the audience were that it is vital to arm scientists when they are PhD students/postdocs with the skills to communicate. Also there is a dichotomy of men not being good at communication and also changing the image of scientists. PhD students and postdocs are experts in very narrow areas and it is often hard to get them to communicate as they have low self esteem. Science communication activities will help to empower the young scientists. The skills are important for lots of reasons.

The discussions about the media raised the point that for media training to be effective you need to have an experience with the media immediately after the training. This could be done by doing interviews with a press officer for internal university magazines, for example.

It was exciting to hear of the HEFCE Centres for Excellence in Science Communication in UK universities, however people questioned how will these tie in with the SLCs? They need to work together and not be separate.

In order to encourage young scientists to get involved in science communication, the Café Scientifiques are a good way, especially for nervous postdocs. Those who are scared of communication need to get the bit between their teeth and get on with it, as usually young scientists find it is not so bad once they have had a go.

A final comment from the floor was a request to invite the public to the conference in the future.

#### Final summary

Each of the speakers was then asked to provide a sentence that sums up their overall message to come out of the conference.

- Look at what has been done previously before doing anything yourself

*Kathy Sykes*

- There needs to be a national resource to find information about science communication

*Juliet Upton*

- We need to go out and talk to scientists and Heads of Departments

*Fiona Fox*

- We need to teach scientists how to package their work for the media

*Hannah Devlin*

- Middle management need to be convinced of the need for science communication if we are to have any impact

*Sima Adhya*

- There need to be resources and infrastructure to support science communication

*Mary McGee Wood*

Roland Jackson finished by extending his thanks to everyone who took part, particularly the speakers and also the teams at the Royal Society and the BA for so superbly and ably putting together arrangements to make the conference a success.