

Finding and projecting the voice of science and engineering

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Introduction

Scientists and engineers today have a very different role from the one they played in public debate and policy-making 20 years ago. They are expected to do much more than hand down technical assessments from their 'ivory towers', and now need to compete for prominence and credibility alongside other viewpoints and interests. While this can be an uncomfortable experience, particularly for those individuals whose training and experience is focused solely on their research and its applications, scientists and engineers are beginning to understand the importance of finding their voices in public debate.

This is particularly true when it comes to matters affected by public opinion, such as the regulation or funding of research. Scientists and engineers must earn their 'licence to practice' by managing more successfully their participation in the debates about the ethical, social and political implications of their activities. They increasingly have to justify their motives, objectives and methods to the outside world, marshalling their supporters and facing up to their critics and opponents. This means that they have to understand the rules of the game, and the tactics used by other parties, when it comes to public debate.

One important arena in which scientists and engineers have to perform better today than they have done in the past is within the media. Science and engineering issues now receive much more coverage in news and features in the print, broadcast and online media, and journalists play a crucial role in framing public debate about the implications of research. Not only are reporters and their editors more aware of science and engineering issues, and their implications for public debate, but more of the individuals and organisations seeking to influence public opinion through the media are promoting their causes by challenging or embracing the work of scientists and engineers.

Media relations now represent an important aspect of the work of many individual scientists and engineers. It is also a crucial activity for the institutions to which scientists and engineers are affiliated, particularly during debates in which the voices of scientists and engineers needs to be represented. In his book on 'Political Communication', Brian McNair pointed out:

As the role of the media in mediating between politicians and public has increased, so has the importance of those publicists, press agents and others in what we may refer to as the political public relations industry. Brave (and probably doomed to failure) is the organisation which ventures into the contemporary political arena without a more or less sophisticated understanding of how the media work and the professional public relations machinery capable of putting that knowledge to good use. For all political actors, from presidents and prime ministers to trade union leaders and

terrorists, this is now recognised to be a major prerequisite of successful intervention in public debate and governmental decision-making.

Three major issues over the last ten years have illustrated the challenges that scientists and engineers, and the institutions to which they are affiliated, face in finding their voice in public debates that are played out in the media: genetically-modified (GM) crops and foods, stem cell research and cloning, and climate change.

GM crops and foods

During the 1990s, the UK media began to cover the issue of GM crops, as environmental groups began to suggest that the products being marketed by agricultural biotechnology companies (eg Monsanto) could have adverse impacts. However, this story rarely made headline news while it was confined to the category of 'possible environmental problems'.

In late 1998 the complexion of the GM story in the media was radically changed, when one of the programmes of the 'World in Action' current affairs series featured Dr Arpad Pusztai, who described work he had been carrying out into the consequences of laboratory rats being fed GM potatoes. He said on camera that he had observed adverse health effects and damage to the organs of the rats, and claimed that the UK public were being treated as guinea pigs because GM foods were being sold to consumers.

This programme grabbed a few headlines when it was first broadcast, but soon began to drop down the news agenda. However, those environmental groups which were campaigning against GM crops because of concerns about their wider impacts were able to seize upon Dr Pusztai's views to make the case that GM foods posed a threat to human safety.

In addition, Dr Pusztai's employer, the Rowett Institute, whilst being initially enthusiastic about the media attention, soon after suspended him. In early 1999, environmental groups organised a multiply-signed letter to the media claiming that Dr Pusztai had been punished for speaking out against GM foods (http://www.ncbe.reading.ac.uk/NCBE/GMFOOD/pusztai_press.html). This presented the media with a new twist to the debate (i.e. the putative whistle-blower and the alleged attempts to silence him), and gave new momentum to the campaigns of the environmental groups. The environmental groups and media started to connect GM to health concerns (<http://news.bbc.co.uk/1/hi/uk/357987.stm>), even falsely suggesting a link to the rise in antibiotic-resistance in the population (http://www.foe.co.uk/resource/press_releases/19990602123830.html). Some national newspapers launched open campaigns against GM crops and foods (www.parliament.uk/post/pn138.pdf).

The direction of the media coverage about GM created a great deal of consternation among large parts of the scientific community. The companies against whose products the environmental groups were campaigning had largely disappeared from the public

debate and were rarely quoted in the media. Whenever academic scientists intervened in the debate, usually to clarify technical issues or correct mistakes, they were often cast in the opposite corner to spokespersons for the environmental groups, and found themselves portrayed as being 'pro-GM'.

The Royal Society, the UK's national academy of science, found itself in a challenging position. In 1998 it had published a policy report on GM crops for food use that was largely ignored by the media, even though it highlighted research in the area indicating that GM technology itself was not inherently harmful, but also recommended that applications of the technology should be properly regulated, particularly with respect to potential impacts on human health and the environment.

When Dr Pusztai's work received media attention, the Society pointed out that his research had not been published in a journal and so had not been subjected to scrutiny by his peers. After calling many times for Dr Pusztai to submit his work to a journal, realizing that a major public controversy was developing largely because of work that had not been subjected to peer review, the Society decided to make its own decisive intervention. The Society assembled its own independent working group to examine Dr Pusztai's research. In May 1999, the Society announced that Dr Pusztai's research was "flawed in many aspects of design, execution and analysis" and that no conclusions could be drawn from it about the safety of GM technology (<http://royalsociety.org/displaypagedoc.asp?id=6170>; <http://news.bbc.co.uk/1/hi/sci/tech/346651.stm>).

It is interesting to consider whether the Royal Society's handling of Dr Pusztai was a success, by exposing the flaws in his research, or a failure, because it added to his reputation as a 'whistle-blower' that the scientific establishment was trying to silence.

While many within the media accepted the Society's assessment of Dr Pusztai's work, the environmental groups did not, and started to speculate about whether it had been influenced by agricultural biotechnology companies (<http://www.gmwatch.org/profile1.asp?PrId=113>). Having stuck its head above the parapet, the Society was unable to duck beneath it again and found itself stuck at the centre of the media debate. Further controversy arose when *The Lancet* journal decided to publish some of Dr Pusztai's research with a co-author (<http://news.bbc.co.uk/1/hi/sci/tech/464416.stm>), but apparently against the advice of at least one of the reviewers of the paper, who aired his criticisms publicly (<http://news.bbc.co.uk/1/hi/sci/tech/472192.stm>). A war of words between the journal and the Royal Society developed, with the editor accusing the academy of acting like a 'Star Chamber' and alleging to *The Guardian* in a front-page story that he had been threatened by a former vice-president of the Society (<http://www.guardian.co.uk/science/1999/nov/01/gm.food>).

Despite the Royal Society's efforts, it is widely perceived that the scientific community, on the whole, failed to get its views across to the media during the height of the GM controversy at the end of the 1990s. The agricultural biotechnology industry attempted to

set up an 'independent' organisation, CropGen, to promote pro-GM views by scientists (<http://www.cropgen.org/>). One other significant consequence was the eventual founding of the Science Media Centre at the Royal Institution of Great Britain (<http://www.sciencemediacentre.org/consultation.htm>), which has significantly altered media coverage of science in the UK since the height of the GM controversy by offering academic scientists a more effective platform for promoting their work and views to journalists.

Another key development to arise from the GM controversy in the late 1990s was the production by the Royal Society, Royal Institution of Great Britain and the Social Issues Research Centre of guidelines for the both scientists and journalists about media coverage of scientific issues (http://www.sirc.org/publik/revised_guidelines.shtml). These guidelines were prepared in consultation with a number of leading science journalists, but have been largely ignored or rejected by the media.

In summary, the key points arising from the interaction between scientists and the media on the GM crops and foods issue are:

- academic scientists found it difficult to correct inaccurate and misleading reporting without being portrayed as pro-GM (versus anti-GM environmental groups);
- scientists and the institutions to which they were affiliated found themselves under scrutiny for any potential vested interests relating to the agricultural biotechnology industry that might compromise their integrity;
- scientists recognised the need to have a better platform for promoting their views to the media; and
- scientific institutions attempted to counter misleading reporting by focusing on guidelines for the conduct of scientists and journalists, but largely failed.

Stem cell research and cloning

The influential report in 2000 by the House of Lords Science and Technology Committee on 'Science and Society' suggested that the announcement in February 1997 of the creation of Dolly the sheep through cloning was 'sprung on a world which was wholly unprepared for her enormous ethical implications' (<http://www.publications.parliament.uk/pa/ld199900/ldselect/ldsctech/38/3808.htm#a51>). In the ten years since, the scientific community has been very active in pushing forward both the frontiers of research into cloning technology and the related area of human embryonic stem cells, and the public debate about the ethics and regulation of this work.

Of particular note was the UK Chief Medical Officer's consultation in 2000 on potential changes to the Human Fertilisation and Embryology Act to allow so-called therapeutic cloning and research on human embryonic stem cells. The Royal Society, like most other scientific and medical institutions, responded to the consultation with a technical submission (<http://royalsociety.org/document.asp?tip=0&id=1455>). However, it also recognised the potential for public opposition, prompted and harnessed by 'pro-life' and other campaign groups, to any changes in the Act and so became much more active in the

public debate. The Society joined forces with organisations like the Medical Research Council and patients' groups to present the case in favour of the research, holding briefings with Parliamentarians who would vote on the proposed changes, and producing more media-friendly documents for dissemination (contrast the Royal Society's submission to the Chief Medical Officer's consultation with this document published nine months later: <http://royalsociety.org/document.asp?tip=0&id=1445>).

The campaign reached a successful conclusion in early 2001 when both Houses of Parliament voted in favour of amending the legislation to allow licensed research involving human embryonic stem cells and therapeutic cloning.

However, the scientific community was rather less successful at countering a series of media frenzies surrounding claims about the creation of the first human baby through 'reproductive cloning'. Such stories generated public anxiety about the extent to which laws and regulations were able to keep socially unacceptable research practices in check, and led to calls for a worldwide ban on all cloning. Both Panos Zavos (<http://news.bbc.co.uk/1/hi/health/3406129.stm>) and the Raelian cult (<http://edition.cnn.com/2002/HEALTH/12/27/human.cloning/index.html>) attracted worldwide media coverage in 2004 by making rival claims to be the first to clone a human baby, despite offering absolutely no evidence in support and having bypassed the usual scientific process of peer review and publication in a journal. Attempts by the scientific community to pour scorn on the unfounded claims were relatively unsuccessful with news bulletins leading with the unsubstantiated stories on numerous occasions.

In summary, the key points arising from the interaction between scientists and the media on the cloning and stem cells issue are:

- scientists and the institutions to which they were affiliated successfully used the media to lobby for changes in legislation to allow research in this new area;
- scientists focused on the potential benefits of the research, which was essentially a technical issue, but had a limited contribution to the debate about the ethical and legal implications; and
- scientists were relatively unsuccessful in stemming false stories in the media about human reproductive cloning which affected public confidence in the regulation of the research.

Climate change

Shortly after being sworn in as President of the United States in 2001, George W. Bush announced that his administration would not ratify the Kyoto Protocol, which commits developed countries to reducing their emissions of greenhouse gases, citing concerns about the "incomplete state of knowledge" about the causes of climate change (<http://www.whitehouse.gov/news/releases/2001/03/20010314.html>). This announcement was made a matter of weeks after the Intergovernmental Panel on Climate Change (IPCC) had published its assessment of the scientific literature and concluded: "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities".

The public challenge to findings of the IPCC by the political leader of the world's strongest scientific nation was met head-on both by the United States National Academy of Science, which was commissioned by the President to review the work of the IPCC and which eventually endorsed its main findings, and by 16 other national academies (including the Royal Society), which signed a joined statement backing the IPCC and its findings (<http://royalsociety.org/news.asp?year=&id=2528>).

One striking feature of the debate in both the United States and the United Kingdom has been the way that campaigners against measures to reduce greenhouse gas emissions have used uncertainties in climate research to justify their views, in the same way as President Bush.

In 1998, members of the American Petroleum Institute drafted a 'Global Climate Science Communications Plan' (<http://www.climatewatch.org/index.php/csw/details/cei-tv-spots/>), stating that the "Project Goal" was: 'A majority of the American public, including industry leadership, recognizes that significant uncertainties exist in climate science, and therefore raises questions among those (e.g. Congress) who chart the future U.S. course on global climate change'.

Such a strategy, focusing on the exploitation of uncertainty, was also found in the advice offered in a memo to Republican Party workers in 2003 from the Luntz polling company (<http://www.luntzpeak.com/memo4.html>): in their words -

The scientific debate remains open. Voters believe that there is no consensus about global warming within the scientific community. Should the public come to believe the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty a primary issue in the debate, and defer to scientists and other experts in the field.

In the UK, groups like the Centre for Policy Studies and the Scientific Alliance have also highlighted uncertainty (<http://www.cps.org.uk/cpsfile.asp?id=681>) as part of their opposition to measures to reduce greenhouse gas emissions.

On the other side of the debate, environmental groups have attempted to underplay uncertainties in the scientific evidence, particularly by attributing individual weather-related disasters to climate change, in order to promote action against greenhouse gas emissions.

In the United States, the Sierra Club drew a link between Hurricane Katrina and climate change (<http://sierraclub.typepad.com/carlpope/2005/10/index.html>), with its director, Carl Pope, in October 2005 urging his members to use the storm to make the case for action against greenhouse gas emissions:

“Ride the wave of public concern created over extreme weather by [hurricanes] Katrina and Rita. Force the country to seriously consider the costs and consequences of preparing

for such disasters. Invest heavily in disaster preparedness. *Preparedness for extreme weather will prime the public to demand prevention of global warming.*”

Similarly, in a section headed on its website as “Cause for concern: extreme weather and climate change explained” in November 2007, Greenpeace stated: “Europe’s continent-wide heat wave and fatal forest fires has focussed attention on global warming” (<http://www.greenpeace.org.uk/climate/extreme-weather-and-climate-change-explained>).

Media coverage of climate change science in the United States has largely benefited so-called climate change ‘sceptics’, by giving a misleading impression of the weight of evidence and of opinion among climate researchers, often portraying a two-sided debate about whether greenhouse gas emissions are driving global warming. This has been attributed to attempts by journalists to provide ‘balanced’ coverage (<http://www.fair.org/index.php?page=1978>).

In the UK, the media coverage has been less misrepresentative, although the main right-wing national newspapers (the Mail and Telegraph titles) have given more prominence to the views of ‘climate change sceptics’, usually through comment and analysis articles (<http://www.melaniephillips.com/articles/archives/000255.html>; <http://www.telegraph.co.uk/opinion/main.jhtml?xml=/opinion/2006/04/09/do0907.xml&Sheet=/news/2006/04/09/ixworld.html>).

However, other parts of the UK media have also found ‘balance’ difficult, on occasions valuing impartiality over accuracy in the reporting of climate change science. A report by the BBC Trust in 2007 stated (http://www.bbc.co.uk/bbctrust/assets/files/pdf/review_report_research/impartiality_21century/report.txt):

“Impartiality always requires a breadth of view: for as long as minority opinions are coherently and honestly expressed, the BBC must give them appropriate space.”

Similar reasoning at Channel Four led to the broadcast of ‘The Great Global Warming Swindle’ in March 2007 (http://www.channel4.com/science/microsites/G/great_global_warming_swindle/index.html). The programme generated many complaints about its inaccuracy and is the subject of an ongoing investigation by Ofcom, the broadcast regulator. It also prompted a debate within the science journalism community about the relative importance of accuracy and ‘freedom of speech’ (<http://www.the-ba.net/NR/exeres/F3AA3031-F103-48F6-A031-13A4F5BE9D22.htm>). At the time of writing (March 2008), the adjudication from Ofcom is eagerly awaited (<http://www.independent.co.uk/news/media/reporters-feel-the-heat-over-climate-change-793586.html>).

The media’s coverage of the viewpoints of ‘climate change sceptics’ has been a contributing factor to the public’s misunderstanding of the extent of agreement within the scientific community about the causes of climate change. An Ipsos MORI poll in June 2007 found that 56 per cent of the British public believe ‘many leading experts still

question if human activity is contributing to climate change' (<http://www.ipsos-mori.com/polls/2007/climatechange.shtml>).

The poll results are in contrast to measures of scientific views which show a high level agreement, usually described as a “consensus”, between climate researchers about the likely causes of climate change. For instance, a survey found that of 928 papers on ‘global climate change’ published between 1993 and 2003, none were inconsistent with the conclusions of the IPCC report in 2001 that “most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations”. (<http://www.sciencemag.org/cgi/content/full/306/5702/1686>). Unfortunately, this widely-quoted report has led to the suggestion in places that the “consensus” is unanimous among all scientists, which is not true.

Scientists and the institutions to which they are affiliated have found it difficult to position themselves in the debate on climate change because of the merging of science and politics in the media’s coverage of the issue. More often than not they have found themselves aligned with the same environmental groups that attacked the scientific community during the GM debate.

The Royal Society has been particularly active in the policy-making and public debate on climate change, and implemented a three-pronged media relations campaign in 2005:

- preparing and publishing ‘A Guide to Facts and Fictions about Climate Change’ (<http://royalsociety.org/page.asp?id=2986>);
- rebutting media coverage that did not accurately convey the weight of scientific evidence and scientific opinion on climate change (eg <http://royalsociety.org/news.asp?year=&id=2992>); and
- promoting a joint statement on ‘Global Response to Climate Change’ signed by the national science academies of the G8 nations, ahead of the Gleneagles summit (<http://royalsociety.org/news.asp?year=&id=3226>).

An analysis of the impact of the campaign reached the following conclusions:

- Even on an issue such as climate change, where it may be difficult to find a new angle, it is still possible to mount a successful media campaign.
- A successful campaign requires time and effort, with buy-in from high-profile spokespersons and support from other staff not directly involved in media relations (e.g. policy advisers).
- The same main message can be conveyed a number of times by targeting different parts of the media separately and finding news ‘hooks’.
- Messages can be conveyed effectively through key phrases (or soundbites) eg “denial lobby”, “fiddling while the world burns”, etc
- Opportunities can be missed if spokespersons are badly briefed, do not buy into the key messages, or are simply not available for interviews.
- Good coverage can be secured by judicious use of exclusives for ‘friendly’ journalists, producing high quality media releases written in a news style, and issuing releases under embargo.

- Effective campaigns mean carrying out both well-planned proactive activities as well as rapid responses to external events, and effective proactive activities increase the number of reactive opportunities (ie media will seek comments on other occasions).
- Effective campaigns include activities that raise visibility and awareness without necessarily generating immediate coverage.
- ‘Rebutting the opposition’ can be an effective method of conveying key messages.
- Websites are becoming an increasingly important public relations tool for disseminating messages, and are competing with and affecting media coverage.
- Coverage arising from media campaigns is almost never uniformly positive, but a successful campaign means the good coverage should outweigh the bad.

In summary, the key points arising from the interaction between scientists and the media on the climate change issue are:

- the media have on many occasions misled the public by seeking to ‘balance’ views about climate change, effectively valuing impartiality and freedom of speech over accuracy;
- media coverage of climate change issues has been influenced by opponents and supporters of measures (such as the Kyoto Protocol) to reduce greenhouse gas emissions;
- campaigns against measures to reduce greenhouse gas emissions have tended to over-play uncertainties in the scientific evidence;
- campaigns in favour of measures to reduce greenhouse gas emissions have tended to under-play uncertainties in the scientific evidence, particularly through the attribution of individual extreme weather events to climate change; and
- scientists have sometimes found it difficult to position themselves within the debate, but the Royal Society made an impact through the execution of a professional media relations campaign.

Conclusions

The issues of GM crops and foods, cloning and stem cell research, and climate change over the last decade have illustrated the challenges facing scientists and engineers in finding and articulating their voices in public debates, particularly through the media. Whilst there are examples of failures, there have also been some notable successes. The challenge now is to recognise and learn the lessons from both sets of experiences in order to participate more effectively in future debates.

Further reading

Bauer, M.W. and Burchi, M. (eds) 2007. *Journalism, Science and Society: Science Communication between News and Public Relations*. Routledge, Abingdon (contains a number of papers by professional journalists and public relations specialists, including a contribution from Bob Ward about ‘The Royal Society and the debate on climate change’).

Davies, N. 2008. *Flat Earth News*. Chatto and Windus, London (a revealing account of the relationship between the public relations industry and the UK media, including references to some major science and engineering issues, such as climate change).

McNair, B. 2003. *An Introduction to Political Communication*. Routledge, Abingdon (a concise guide to the main issues relating to communication within the political arena in the UK and elsewhere).

Moser, S.C. and Dilling, L. (eds) 2006. *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*. Cambridge University Press, Cambridge (contains a number of papers addressing the issues surrounding the communication of climate change science).