

# **Fourth Annual Science and the Public Conference**

**Science and the public: uncertain  
pasts, presents and futures.**

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**ABSTRACTS**

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## The social construction of 'junk' science

Forensic science presents a prime example of 'public engagement' for science and technology studies. Interesting tensions emerge in the ways that the authority of scientists and science is portrayed, maintained and challenged. These include legal cases where scientific authority is apparently unassailable contrasted with cases of scientific misconduct or even 'quackery', where the authority of the scientific expert witness is challenged and discredited. It is not just a question of a challenge to the moral authority of scientists but is also a challenge to the moral authority of the science itself, reflected in the designation 'junk science'. Although 'junk science' appears to have originated in the legal arena where expert scientific witnesses are charged with the crime of allowing ideological or profit motives to cloud their expert judgements, the term has rapidly become popular to describe disputed scientific judgements e.g. in medicine, global warming etc. In this paper I reflect on the social history of 'junk' science through the example of forensic sciences to reflect on ways in which the moral authority of scientists and science is negotiated and maintained.

Keywords: forensic science, junk science, experts

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### Science journalism on the internet'

It is becoming increasingly apparent that tectonic shifts are reshaping the landscape of science journalism, not least with respect to the growing convergence of 'old' media with 'new,' internet-based media. Today's science reporter is increasingly expected to be multi-skilled in order to work comfortably across a range of digital platforms while, at the same time, warding off the challenges posed by ordinary citizens – not least the bloggers and YouTubers of 'the iPod generation' – threatening to storm the ramparts of the journalistic profession. Precisely how, and to what extent, the internet is transforming science news is deserving of our close attention.

This paper begins by examining Nisbet and Mooney's (2007) article 'Framing Science' (*Science*, 6 April, 2007) and the remarkable controversy it generated amongst science bloggers in the immediate aftermath of its publication. In tracing the ensuing debate amongst interested stakeholders across the blogosphere, the paper will identify a range of issues about the ways in which the internet is redefining what counts as 'science news' in online environments. Next, the results of a case study where e-interviews were conducted with self-described science bloggers will be presented. On the basis of an analysis of their perspectives on the relative advantages and limitations of this emergent form of reporting, the paper will offer an assessment of its possible implications for the future of science journalism.

Keywords: science journalism, blogging, gatekeeping, news values

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The National DNA Database on trial - avoiding the usual suspects

The National DNA Database (NDNAD) is a key police intelligence tool that helps to identify offenders, secure convictions and provide leads in criminal investigations. The DNA of an individual can only be taken: voluntarily, by an individual agreeing to submit a sample; on arrest for the majority of criminal offences; or upon conviction for most criminal offences.

Currently, the NDNAD contains DNA profiles from 925,385 individuals aged under 18 at the time of arrest. The project team aimed to engage with and collect the views of young people about the NDNAD, in particular those who had been arrested and had a DNA sample on the NDNAD. To do this, the project team developed a model to engage young people aged 15-19 years with the wider issues surrounding the NDNAD – a mock trial held in Cardiff Crown Court.

Both the mock trial format and the decisions the young people reached about present and possible future DNA sampling and retention procedures will be discussed. The model was successful in engaging young people with the complexities surrounding DNA databases and facilitated their discussion of issues such as retention, sampling, age, severity of crime, etc. The young people also discussed their verdict with the Human Genetics Commission and the Welsh Assembly Government. The talk will conclude with the successes of the project and some of the issues in engaging with this harder-to-reach audience.

This project is a collaborative project by University of Glamorgan, Wales Gene Park, Techniquet and Swansea University and funded by the Wellcome Trust.

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How to turn your parents green: the knowledge politics of children's ecology books

This paper examines the recent boom in children's 'green' books. It considers publication contexts as well as the books' content, including the ways 'ethical' production methods are emphasised for marketing purposes. Ecology is not a new topic for children's media though. Some researchers have argued that the recurring environmental emphasis in children's media is simply a way to put off the issue for another generation; others blame children's writers' over-use of a Romantic concept of the child. We might equally argue that today's children will be those who have to deal with the consequences of climate change, or at least argue that it is an awareness of this which drives many writers of contemporary children's ecology. It is also interesting to see books attempt to mobilise a 'parents are rubbish' discourse as motivation for ecological action. In terms of the implied relationship to science, there is a strong message of necessary compromise in many of these books, especially when it comes to technology. Several books show pictures of smog producing power stations alongside those invoking a technological sublime at the prospect of new energy technologies or scientifically-mediated images of nature. There is also an emphasis on the need for detailed knowledge to make ecologically-sound consumer decisions, and several books are keen to show off the scientific basis of their claims. However, although the knowledge contained in these books may largely come from science (and is explicitly labelled as such), in many respects it is communicated as knowledge to be used and, on occasion, collected, by citizens. These are kid's books in a science for 'public understanding' mode, not PR for scientific careers, perhaps reflecting a resurgence of PUS which comes with recent boom in environmental concern.

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Producer meets consumer: popularizing household electricity in the early twentieth-century in barcelona.

After the first wave of electrification devoted to industry and public illumination in the early twentieth century, Catalan electricity producers had to find new consumers to sell their energy surplus. Therefore, from the perspective of popularization, strategies used to convince domestic users of the benefits of electricity -the use of electric devices and/or a good electric room-illumination at home- can be profitably analyzed.

The popularization of electric devices and their technical specifications was not simply an encounter between expert authorities and common people. Thus, analysing how and why people incorporated these technologies in their lives will allow us to incorporate several perspectives borrowed from previous studies on the popularization of technology.

Our study starts with the concept of *advertiser* stated by Cowan (1976) but we described it as the catalyser that facilitated the introduction of domestic technologies and caused social change in the household. Our advertiser can be viewed as an actor, as an action, as a process or as a document. All in all, it can be any element that takes part in the growth of electricity consumption.

In our case study on the early thirties in Barcelona, we analyse the roles as advertiser of the 1929's International Exhibition, pamphlets, books, publications specifically devoted to domestic applications of electricity, advertisements, exhibitions rooms, radio talks, personages and public, to devise a complex map of interactions in the process of popularization that includes critical reflection from genre, market or design perspectives.

Reference: Cowan, R.S., (1976) "The "Industrial Revolution" in the Home: Household Technology and Social Change in the 20th Century". *Technology and Culture*, 17: 1, 1-22.

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Brooking no excuses: university staff and students are encouraged to develop their engagement

This paper will explore the internal and external factors that have prompted the University of East Anglia's decision to give Public Engagement into a more central role within the Universities Corporate Plan. It will illustrate how the SEARCH Action Learning Programme facilitated the design, implementation and delivery of new Staff and Student Development Programmes that aim to provide the confidence, skills and mentorship that will encourage staff to develop their engagement activities. We will use a SWOT analysis to discuss the strengths, weaknesses, opportunities and threats of the Public Engagement Practitioner. As part of this, we will explore how many of the issues we face as Science communicators with the public are similar to issues encountered by Communicators within the Arts and Humanities disciplines. Finally we will outline and detail our future plans, opportunities and vision that will enable us to move this agenda forward.

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Governmental bioethics between the technological model and reflexive government

The paper will examine the emergence and the operating principles of *governmental bioethics* as one of the most salient manifestations of a new understanding of science governance. It is considered here as an outcome of discourses that problematized science and technology since the late 1970s. The term governmental bioethics refers to the whole range of bodies, discourses and procedures such as national ethics councils, parliamentary ethics commissions, or public consultations on “ethical issues”, that are meant to inform and guide political decision-making with respect to ethical considerations. We will discuss governmental bioethics as a form of *reflexive government* that grew out of the problematisation of older, more elitist and expertocratic forms of science governance. In contrast to older forms of science governance, we argue, it is concerned with the management and the organization of *processes* rather than with substantial interventions into developments of science and technology. New procedures in this context, marked by openness, transparency and participation, should be understood as new technologies of management and conduct in the Foucaultian sense, in that they are meant to govern at a distance, advising public and the individual in the ways of *proper talk*. Rather than understanding the rise of ethics and as a challenge to government’s commitments to techno-scientific ‘progress’ - and the identification thereof with social progress - governmental bioethics serves the stabilization of these commitments through inclusion, involvement and mobilization. Provided it takes place within the framework of ‘proper’ ethical talk, ethics and public participation can be employed to pursue rather than oppose system stability.

Key words: governmental bioethics; science governance; reflexive government; proper talk

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Science and society: whose responsibility?

To what extent are scientists responsible for the use society makes of their discoveries and inventions? The current state of debate is uninspiring. Some simply blame the scientists. From white phosphorus and shells tipped with depleted uranium in Iraq to GM foods to nuclear power: it's scientists' fault that we're in the mess we're in. Others insist that it's up to society to decide how to use the knowledge that scientists offer: the mess we're in is the politicians' fault, and our fault for putting up with them. But both sides in the stand-off are wrong. Of course society - that's to say, you and I - is responsible for what is done in our name. When Fallujah is shelled, or prisoners in some secret CIA prison are tortured with electric cattle-prods, or neo-liberals use evolutionary psychology as a means of foisting their vision of human nature on the world, it's absurd to blame Einstein for having helped split the atom, or Faraday for having harnessed electricity, or evolutionary biologists for discovering the genes that are the mechanism of heredity. However, that is no excuse for, say, Franz Haber, the inventor of mustard gas; or the anonymous group of scientists working for GlaxoSmithKline who falsified the side-effects of Seroxat; or transplant surgeons advocating a market in body parts as a means of dealing with shortages of available organs.

Taking account of both these responses, I shall develop an argument to the effect that, while our responsibilities as citizens are equal, the extent to which we are culpable when we fail to meet them depends on who we are.

Key words: Responsibility, science, society

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## Framing natural disasters and extreme weather in factual entertainment television

In an era of climate change and conceptions of the “risk society” critical attention to the mediation of the environment has arguably never been greater. In the context of natural disasters and extreme weather events, much of this attention is focused on normative approaches regarding the media’s role in disaster management and mitigation. In turn much of this research, concentrating on the news media, combines technico-scientific models of disaster management and mitigation with paternalistic models of news media responsibility. Technico-scientific models of risk management and mitigation, have been challenged, particularly with regard to natural disasters and extreme weather often seen popularly as “acts of God”, by ideas of the “uncertain society” and of “post normal” science. Such approaches highlight the importance of wider factors in the dissemination and understanding of certain kinds of risks, beyond conventional science and risk analysis, and point to the importance of looking beyond the narrow boundaries of news media coverage when examining the mediation of natural disasters and extreme weather. In fact, the representation of natural disasters and extreme weather in the wider media has rarely been discussed. Some research has addressed the distinct cycles of fictional disaster movies, very much within the film studies’ approach of genre analysis, but the significant body of media representations of natural disasters and extreme weather between these two poles of news media reporting and fiction films has been essentially ignored. This paper addresses this gap in the research literature by focusing on the category of factual entertainment television programmes about extreme weather and natural disasters. Through a consideration of series such as 'Perfect Disasters', 'Britain's Wild Weather', 'Savage Planet', 'Mega Disasters', and others, the paper will explore how natural disasters and extreme weather are framed.

**KEY WORDS:** Natural Disasters, Factual Entertainment, Framing, Uncertain Society

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Media representation of the scientifically aware public in the South Korean news coverage of the Hwang affair

Using material drawn from South Korean news coverage on therapeutic cloning research between 2004 and 2006, this paper will investigate how and when publics are represented as scientifically aware or not.

When a team of researchers led by Hwang Woo-suk from Seoul National University announced that they had cloned a human embryo for the first time, media attention was centred almost solely on the scientists. This monopoly of media attention changed dramatically when the media began to turn their attention to wo/men on the street in the second breakthrough (11 patient-matched human embryonic stem cell lines created using 185 eggs). The South Korean general public was often portrayed as not only proud and hopeful about this scientific breakthrough but also as knowledgeable.

However, this almost idealised portrayal of the general public – as pseudo scientists and as scientifically aware ‘world-class’ citizens – took another turn when Hwang’s team’s breakthrough was revealed to be a fraud. In the media discourse the public divided into two or more groups: the ‘general’ general public and the scientifically aware public. The latter group was represented as calm and logical and making decisions based on scientific evidence, whereas the general public was strongly associated with emotions such as confusion, disappointment and anger.

I will argue that the dramatic changes in portraying the public initially as scientifically aware and then as unable to make ‘rational’ judgements could partly be explained by the fact that the South Korean media had shown unquestioning support for Hwang’s research. When the media were on the same side with the general public they painted the public as ‘scientific enough’ so their opinion could be valued. However, the image of the emotional public was used when the media had to distance themselves from both Hwang and his supporters.

Keywords: South Korea, rational public, emotional public, ‘world-class’ citizens

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Equasy, micromorts, and falling under a bus: scientific expertise, media accounts and lay constructions of risk comparisons.

The risk comparison made recently by Professor David Nutt, chairman of the UK Government's Advisory Council on the Misuse of Drugs, suggested that addiction to horse-riding, or what he characterised as *equasy*, could be considered to be more dangerous than ecstasy use. This could be understood as an attempt to provide a rational basis for the public understanding of health risks based on the relative number of deaths caused. Other media representations of the risks from ecstasy use, making comparisons for instance with other illegal drugs and utilising the micromort measurement scale for 'microrisk analysis', similarly represent a particularly minimalist form of 'technico-scientific rationality'. From this perspective, risk is "treated as a taken-for-granted objective phenomenon" (Lupton 1999: 2) which is identified and measured by experts, and disseminated by them (successfully or otherwise) to the public via the media. To the extent that media accounts fail to reproduce these 'objective' comparative analyses of risk, they are criticised as failing to provide accurate and rational information and of misleading the public in scientific controversies such as the health effects of illegal drugs. However, the 'sociocultural' approach emphasises instead the social construction of scientific risk analyses, and the consequent importance of lay public perceptions of risk. This paper analyses the risk comparisons made by non-experts (in focus group discussions) in their own understandings of different health hazards. These are discussed in relation to both the technico-scientific risk comparisons mentioned above, and the media coverage of such accounts. The paper argues that while media representations of risk comparisons often reproduce the narrow scientific rationality of expert accounts, lay risk comparisons employ a wide range of 'social rationalities' in negotiating their understandings of health risks.

Keywords: risk, media, ecstasy, social rationality, technico-scientific rationality

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When future journalists and scientists wonder about the science communication to the public

This study discusses a project carried out at the «Université Libre de Bruxelles» within a programme aimed at developing the awareness of students in journalism about the importance of covering scientific research in the media while making scientists themselves more sensitive to the issue. Each of 55 students in journalism had to meet one scientist of the university from a broad range of disciplines. First, students were to write up a press release emphasizing one or several points of interest in the activities of the scientist or of a team of scientists in such a way as to arouse interest and enthusiasm among the public. This requires that the scientist is able to explain his research accordingly. As a second exercise, students were to write an article in a format suitable for a general-interest daily and in such a way as to be attractive and accessible to an audience of non-specialists. Within the context of these assignments, our study is two-folded. First, we conducted interviews among both students and scientists to identify the difficulties they had met in their relation. We compared these results with difficulties between scientists and journalists showed in previous studies (lack of understanding, over-simplification from the journalists, poor communication from the scientists, etc.). The first exposure of student-journalists to such difficulties sheds new light on the somewhat problematic relationship between journalists and the scientific community. Secondly, we will analyse the press releases and the articles written by the students, comparing discourse and themes between the two. This aims to find how future journalists proceed in their attempt to capture the attention of the public in both roles. This part of the study is a work in progress but we will be able to discuss the results during the conference.

Keywords: science journalism, science communication to the public, relationship between journalists and scientists, interdisciplinary and educational project.

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Interdisciplinary projects for public engagement - some points on a divergent spectrum of expectations

Material Beliefs was an EPSRC funded interdisciplinary project that brought together designers and bioengineers and in some cases groups of publics, for public engagement with science and technology (PEST). Over two years, four collaborations produced a diverse series of public engagement events. This paper outlines the collaborative processes involved in Material Beliefs and the implications of collaboration for public engagement.

The project aimed to provide a framework of resources in which designers and engineers could experience working together while creating opportunities for different publics to interact with the collaborations. The aim was to provide access to unfinished bioengineering research, and enable publics to question, challenge, discuss or hack. The collaborations sought to "help imagine what the social dimensions might be, even though the eventual applications of the science aren't yet clear" (Wilsdon, 2004)

Over the course of the project it became apparent that a range of motivations, agendas and expectations were overlapping across collaborations and individual participants. In this paper the views of the Material Beliefs participants are presented as a spectrum of intentions, where public engagement was simultaneously conceptualized as a box ticking exercise, an opportunity for personal growth, a public relations opportunity and a critical device with which to develop bioengineering research. These differences in approach suggest alternative models for collaboration and the need to appreciate the overlapping nature of motivations around public engagement.

Reference: Wilsdon, J. and R. Willis (2004). *See-through science: why public engagement needs to move upstream*. London, Demos.

Keywords: *Public engagement of Science and Technology, Speculative Design, Laboratory studies, co-production*

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#### Participating publics in genomics research

The introduction of new technologies, like genomics and nanotechnology, requires public acceptance, in particular when it concerns issues of health and food. In fact, the public itself demands a role when it comes to issues of science and technology more in general. It finds itself interested in science and technology, yet considers itself poorly informed. At the same time, studies show that more knowledge of for example biotechnology does not lead to more support, but rather to more criticism. The question is how to cope with these increasingly critical publics. More insight in the relationship between publics and science is needed. In a focus group study publics in various roles (inexperienced public, active consumers, patients and experts) were asked when and how they wanted to be engaged in biotechnology and genomics, and what that means for the communication about biotechnology and genomics in particular, and science and technology more in general. Results showed that all publics agree on the idea that interest in an issue such as gene research is related to one's personal involvement in the issue. People limit their interests to a few issues. There is a need for information for all publics, but this does not imply that active information-seeking behaviour will follow. However, the communication process should entail more than mere dissemination of information. Transparency and openness are considered important conditions in the communication process. Patients and active consumers empower themselves by taking a more active role in the communication process, and, by engaging actively in the broader policy and technology debate. Meanwhile, experts point to the need for knowledge about the issue and the necessity to educate the general public.

*Key words:* public participation, public engagement, focus group, genomics

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Drug addicts or pathological consumers? shifting expert representations of the smoking public

Over the last 25 years a scientific consensus has arisen identifying the 'smoking epidemic' as firstly a manifestation of nicotine addiction. This re-problematisation of smoking as nicotine drug addiction is not something that has arisen through disinterested scientific research. Rather it is something that has emerged in connection with (1) controversies surrounding the development, and then discrediting, of 'safer cigarettes' as harm reducing technologies and (2) efforts undertaken to confirm the therapeutic value of nicotine substitutes as tools of smoking cessation.

Following on from this situation, we find that broadening agreement over the identity of smoking as nicotine addiction has done little to guarantee agreement over the identity of the smoking public. The medicalisation of smoking policy pursued in the smoking cessation clinic with the aid of a growing range of nicotine replacement therapies has remained incomplete. In part, this is because the very use of 'medicinal nicotine' to help 'cure' smoking has helped to advance a further shift in the understanding of the smoking problem as more fundamentally tied to matters of drug delivery than drug addiction. Rather than nicotine addicts in need of better treatment, an increasingly potent expert vision of the smoking public today is that of nicotine consumers in need of better means of self-protection. The personal enslavement implied by nicotine addiction is only to be seen as genuinely pathological and self-destructive so long as it remains connected to the archaic practice of cigarette smoking. It is the toxicity of cigarette smoke that kills, not the relatively harmless pleasures of nicotine. In the paper, the complicity of both the tobacco and pharmaceutical industries in advancing this new vision promoting the development of competing collections of 'smokeless' nicotine delivery systems will be described in detail.

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Space as entertainment?: The interactions between space and the media,  
1945-1970

Beagle 2 caused a multimedia storm despite its failure, and the space community is still basking in the glow of renewed space enthusiasm, but how did this situation come around?

This paper will address the coverage of British space science in the public eye. A brief outline of British space exposure will point to the postwar-space age period as vital in space communication and worthy of further investigation. Using high-profile events in space science and in cultural outlets as sites of investigation, it will be demonstrated that the aspects of space communication that are commonplace today were developed in this period by following the actors' actions, agendas and developments in the mediation of space science. Issues of globalisation, nationalism, technological spectacle/display, modernity, social responsibility of science, telecommunications and broadcasting developments, professionalisation of science journalism, inter-media rivalry, and space advocacy networks, coupled with space policy retreat and public opinion led to a re-designation of space science as entertainment *or* news depending on actor needs. It is hoped to answer the questions of what effects space science had on the media and vice-versa.

Keywords: space science, media, public, space age

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Aspects of a public culture of science: displaying objects and engaging with science in mid 19th-century England

The collecting of scientific objects, instruments and technological apparatus, in mid nineteenth-century England reveals an object-centred scientific culture and a strong relationship between objects and the shaping of scientific activities. On another level, such type of collection was located in a range of spaces where science was performed, challenged and communicated to wider non-specialised audiences. The 'science museum' acquired a new public role through the use of its scientific heritage in national and local exhibitions of that time. The role of international exhibitions was instrumental in creating a new relationship between the space, the displayed objects and the audience. Most of the scientific heritage was re-defined as national heritage in order to build a national museum for physical sciences around the 1880s. In this paper I look at the material culture of science as it was displayed in the museum and the international exhibition of mid nineteenth century analyzing display typologies with the purpose of discussing the relationship of science and the public through the medium of exhibitions.

Key words: science collections, exhibition narratives, science communication history, museum visitors

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Science for the people: science articles in “popular” and “quality” newspapers

This presentation aims to discuss the public understanding of science and technology, namely, it aims to question the last 30 years of science and technology, in Portuguese newspapers.

Taking Science and Technology published in national newspapers has representative and source of the whole science and technology media coverage, this presentation goal it is to build a landscape of Portuguese science and technology media coverage, between 1976 and 2005.

It seems clear that for scientific activity to be understood, the communication of science plays a central role. The representation of science by the mass media possesses, thus autonomy before the scientific activity playing, relatively to this, different social functions.

Starting with the approval of the first Portuguese democratic Constitution, this paper analyses science and technology newspaper coverage, in Portugal.

This has been a period of major changes in Portugal, namely in science and technology. In 1976, Portugal had almost no investments in science and technology and science and technology weren't an important issue. What has changed since then? Are science and technology noticeable now? Does science sells newspapers? Are science and technology popular issues?

Based on, a quantitative and qualitative, analysis of thousands of newspaper articles published in four major national Portuguese newspapers (two “popular” and two “quality” newspapers), this presentation develops a portrait of what has been the media coverage of science and technology, and discusses trends and transitions, between 1976 and 2005.

This discussion it is a chapter of a wider research that aims to discuss and characterize the presence of science and technology in the Portuguese newspapers.

Keywords: Science and technology, newspapers, popular, quality, Portugal

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Two aspects of one culture: the Janus faces of science and fiction.

This paper will argue that fiction has advantages over other media as a vehicle for exploring scientific results and concepts.

I will use a variety of examples to show that science's reliance on 'cause and effect'-type explanations lends itself well to being explored by story-telling and time-based narratives. Furthermore, the effort required to read and engage with fiction allows complex and subtle themes to be considered, which other media are not able to bring out. Much debate around the dissemination of science is triggered by the wish to 'explain' it. Fiction's treatment of science can be pedagogic in purpose, but this approach can have drawbacks; for example it can turn art into propaganda. I will use Brecht's play 'Life of Galileo' to illustrate this.

A traditional scientific narrative deliberately avoids reference to narrator or context. In such narratives, non-scientific influences on decisions and outcomes are invalid. However, the impact of scientific discoveries goes beyond science itself. For example, Galileo's discoveries shattered religious beliefs as well as scientific ones. The scientific narrative cannot engage with such an impact. Furthermore, it is clear that scientists are influenced by non-scientific motives when making decisions, but again the scientific narrative cannot permit the discussion of such motives. Fictional narratives, by contrast, need not exclude non-scientific influences and impacts. I will use the famous 1919 solar eclipse experiment carried out by Eddington to show this. I will also discuss the limitations of other media (for instance, the recent television drama "Einstein and Eddington") in exploring the full complexities of the scientific process.

One potential drawback in using fiction to explore science is the apparent need for scientific narratives to seek certainty, in contrast to fiction's ease with multiple interpretations. I will use the example of the wave function in quantum physics to show that this gap is caused not by science itself, which is perfectly capable of tolerating multiple interpretations, but by the scientific narrative form.

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'Einstein and Eddington', BBC2, 2009.

Keywords: science, fiction, narrative

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East is east, west is west, never the twain shall meet: Fang Lizhi's resistance to Deng Xiaoping's vision of science in China

Despite an illustrious history of scientific and technological achievement, China was producing little in the way of science under Mao Zedong (1943 – 1976). Mao's ideological orthodoxy fuelled the persecution of scientists pursuing 'bourgeois-idealist' fields such as quantum physics or Mendelian genetics. School and university curricula were highly politicised, with manual work and Party loyalty highly regarded and few incentives for scientific and intellectual furtherance. China's geopolitical isolation also restricted the movement of ideas and people, cutting the nation off from important technological advances in the wider world.

After Mao's death in 1976, reformer Deng Xiaoping commenced a leadership campaign for a more open and materially prosperous China. Outlining his vision at the Third Plenum of the 11th Chinese Communist Party Congress (CCPC) in 1978, Deng claimed that developing a scientific and technological 'elite' was vital to China's development. Deng promised scientists a liberal intellectual environment, greater funding and a more meritocratic educational system, in order that they may deliver economic growth. Yet Deng's vision of the purpose of science conflicted with some scientists' image of themselves as being engaged in a self-justifying pursuit of truth. Furthermore, dissident scientists like astrophysicist Fang Lizhi claimed that Deng's reforms were worthless because science could only truly prosper in the context of democracy.

This presentation would outline the disparity between China's dissident scientists, led by pro-democracy dissident Fang, and its Communist leadership, led by Deng. Discussion of the disharmony reveals much about the difference between the Chinese State's expectations of science, and the expectations scientists had of and for themselves. Discussion of the period also contributes to our understanding of how science is affected by, and at times negates, its political context.

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### Carbs versus Fat – Changing the Meaning of Healthy Diets Through Science Communication.

What constitutes a healthy diet has always been issue of controversy and never more so than today. Deeply intertwined with practices and processes of popularisation at least since the mid 19th century when William Banting published his *A Letter on Corpulence* (1863) the question of what to eat in order to lose weight and secure health has given rise to a voluminous popular science literature. In a landscape full of advice, from official government guidelines to tabloid headlines, the link between diet, health and weight has emerged as both a key concern for 'responsible citizens' and a highly profitable market segment. This paper focus on a Swedish movement that in line with dieting schools like that of Banting and Dr. Atkins claim that conventional orthodox advice promoting low fat diets are counterproductive and unhealthy. Instead the problem is identified as one of excessive amounts of carbohydrates and insufficient fat. Claiming that 'the establishment' is upholding what they know is harmful and cruel guidelines based on faulty science they address the public directly as something like a guerrilla science movement. Assuming a radical enlightenment stance, they argue that the truth of their message cannot be silenced and that they are determined to take the issue of fat versus carbohydrates 'to the streets' where the public are asked to join them in their struggle against unhealthy ideas about what we eat. Often this is done in a provocative and aggressive manner causing official actors to respond in kind – which further strengthens the movement's attempts to position themselves as renegade truth-tellers defying the corrupt 'establishment'.

The health movement I study is a contemporary one; in Sweden it goes by the name of LCHF (Low Carbs - High Fat) and has recently become increasingly aggressive in public discourse. At the same time the idea that a healthy diet is one where carbohydrates are substituted with fat is by no means a new one, but routinely presents itself as such. I study it by means of their various public communication efforts - like books, blogs, TV-appearances and news paper articles - which I read as attempts to position both the movement and their "establishment"-opponents. The idea is that public communication here is the main way for this movement to combat the "establishment" and bring healthy diets, and increased understanding of the link between diet and health, to the public.

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Pressure groups, Luddites and moralists: on the 'hijacking' of public consultation in the hybrid embryo case

This presentation will compare the censorious accusations, in UK broadsheet newspaper editorials, that pressure groups had 'hijacked' public consultation in relation to the animal-human hybrid embryo debate, with approving reports from the same sources that scientists had launched a 'major public relations assault'. I will discuss the ways in which the use of terms such as 'pressure group', 'Luddite' and 'moralist' constructs the UK public as disinterested, secular and committed to scientific progress. I will argue that this construction of 'the public' has asymmetrical effects on the ways in which different interest groups' claims are mediated and adjudicated in policy arenas.

I will also explore the ways in which 'the government' was represented as founding its legislative decisions on misguided and fearful understandings of public opinion, while the HFEA was represented as being more responsive to the needs of the scientific research community because of its own public consultation processes. I will conclude by questioning whether 'the public' is likely to find out, as The Independent claimed 'exactly what was at stake' through uncritical mediation of the public relations activities of 'the scientific community'.

I will use this case study to reflect on the role of science journalists in the construction of 'the public' of science and of science policy.

Keywords: pressure groups, scientific community, public consultation, public relations

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#### Public engagement at the Royal Observatory, Greenwich

This paper unites two important themes of the conference by offering both a historical and a modern perspective on the public engagement activities undertaken at the Royal Observatory, Greenwich, first as a scientific institution and then as a museum. We will begin by examining early attempts to enrole public interest in and support for the scientific work undertaken at Greenwich, before tracing the ROG's increasing public remit and the transformation of the Greenwich site into a museum. Looking to the present and beyond, we will then provide an overview of the ROG's displays, planetarium and public programme, particularly in relation to 2009's International Year of Astronomy.

With 1.3 million visitors during 2008 the ROG should have the ability to engage a large and very diverse audience with both the history of astronomy and the latest discoveries in space. This dual focus creates unique opportunities and challenges that are reinforced by the reuse of the old Observatory buildings in a 21st-century museum context. While celebrating the successes of the ROG, and expounding on future plans, we will also raise important discussion points about how the history of science relates to science communication, how sites of scientific heritage can best be used and maintained and how communicating science to the public has developed over the last 150 years.

Keywords: Engagement, Astronomy, Museum, History

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Examining the role of journals in translating evidence during a public health scare using the MMR controversy as a case study

The publication of a paper by Andrew Wakefield in the *Lancet* in 1998 spurred a public debate about the safety of the MMR vaccine. For the next few years, MMR remained a focus of controversy in the UK, and MMR uptake declined despite both Government assurances and new epidemiological evidence about the safety of the vaccine. On the ground, primary health care practitioners found themselves in the front-line when it came to advising parents on the safety of MMR, but they described a crisis in confidence as they tried to keep up-to-date with the research evidence on the vaccine in the face of widespread public doubt about its safety. Scientific and clinical journals are an important vehicle in the dissemination of research findings. The debate surrounding MMR safety provides a case study in which to examine how key journals and magazines translated evidence about the MMR vaccine to health professionals. Using content analysis we examined all editorials and commentaries which mentioned the vaccine (n=860) in key practitioner journals from the time that the MMR vaccine was introduced in 1988. Our analysis raises questions about journals' role in translating evidence and offering evaluative comment and guidance when evidence is contested and controversial as during a public health scare.

Keywords: public health scares, content analysis, health professionals and role of journals

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Atapuerca - the making of a magic mountain. Popular science books and human-origins-research in contemporary Spain

Atapuerca in northern Spain is arguably the most important prehistoric site in Europe. The little mountain near Burgos yielded by far the most and the oldest hominid fossils (ca. 1,2 million years old). The thesis of this paper is that the enormous success of the excavations cannot only be explained by the sheer quantity and quality of the finds.

What is striking is the multifold attempts of the researchers themselves to popularize their work in numerous articles in newspapers and magazines, guided tours through the site, TV documentaries, exhibitions and – this will be my focus – popular science books.

Within the last ten years the three leaders of the Atapuerca team, Juan Luis Arsuaga, José María Bermúdez de Castro and Eudald Carbonell, have in sum (co-)authored more than twenty popular science books. They did not only write the “typical” books about how they found what kind of skull and what that means for “our” origins. Their publications also include exhibition catalogues, a history of the excavations, a novel, a children’s book and several rather philosophical or epistemological works.

The paper will try to pinpoint in how far these books helped to create the magical mountain of Atapuerca, a site that in the meantime represents the (imaginary) beginning of Spanish history.

The following questions will be addressed: What narratives do the authors use to tell their “story”? Do the authors construct some kind of Spanish national identity? How do they use the popular format to expound their own paleoanthropological theories? Do they argue differently in comparison with their scientific papers? How do they address controversies within human-origins-research? Do popular science books function as “enlarged battlefields” and as a meta-forum to expose new ideas?

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Observation for, by, and of the people: the philosophy and politics of Mass-Observation

In addition to the coronation of King George VI, May 12th 1937 saw the first coordinated work of Mass-Observation (M-O), a radical anthropological movement which fused positivism, surrealism, and literary theory. As the Royal procession wheeled around London, hundreds of observers — most of them ordinary members of the public — were recording conversations, making detailed accounts of the behaviour of the crowds, and attempting to capture the spirit of the day. The resulting book *May the Twelfth*, edited by Humphrey Jennings and Charles Madge, is a remarkable surrealist-inflected re-presentation of the work of the observers. This paper offers a reading of *May the Twelfth* considered as a literary work, a reading that I set against the anthropological and methodological debates that surrounded the formation of M-O. I argue that a proper characterisation of M-O requires an analysis of contemporary notions of the philosophical status of scientific and poetical language. The logical-positivist background of English literary criticism at the time allows a unification of the disparate and conflicting aspects of M-O's work in gathering and presenting data. The complexities of a science that attempted to unite poetry and anthropology, that valued the untrained and participant observer in equal measure, and that tried to reconnect the science and its public are recast as complexities in the positivist account of language. Ultimately the proliferation of positivism was ideological, and so I conclude with an account of the emancipatory politics of M-O.

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The ISOTOPE Project: Informing science outreach and public engagement

Over the last 20 years social researchers have been consistently critical of simplistic deficit-informed approaches to engaging members of the public, citing (mainly ethnographic) research findings that allude to the importance of engaging a wide range of actors, with differing expertise, in dialogue, consultation and deliberation about emerging (and well established) socio-scientific issues. Culminating in the publication of a number of important policy documents since the turn of the millennium, the pioneering work of these social researchers has seen a re-alignment of government and institutional policies in relation to public engagement.

Informing Science Outreach and Public Engagement (ISOTOPE), is a NESTA-funded interdisciplinary research project based at the Open University, UK. The project aims to address the emerging context for a more theoretically informed, evidence-based approach to science outreach and public engagement (SCOPE). In this light, the ISOTOPE project team includes social scientists, educational technologists with expertise in the design, delivery and evaluation of web-based technical solutions, and scientists with practical experience of SCOPE from a number of scientific disciplines.

In adopting this interdisciplinary collaborative approach, the ISOTOPE project team is using action research methodology to inform the co-production of an open source web portal of theoretically informed evidence-based advice for those interested in participating SCOPE activities. In this presentation we will discuss the data collection methods and results from the first two phases of the study; the results of which are informing the informational resources being developed for science engagement practitioners.

For more information about the Informing Science Outreach and Public Engagement (ISOTOPE) Project, visit the home page at:  
<http://isotope.open.ac.uk>

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Screening science, building the nation: popular science programs on Israeli TV (1968-2000)

Israeli television began broadcasting in 1968 and up until 1993, the Israel Broadcasting Authority (=IBA), a government-operated agency, had a state monopoly on the sole television channel, the First Channel. During this 25 year period, several original popular science programs were aired at prime time and enjoyed an extremely high rating. From 1993 on, when multi-channel TV became available, along with neo-liberalism and globalization, these programs attracted fewer audiences and were marginalized.

This paper focuses on the form, content and producers of these various programs, combining various archival materials and in-depth interviews with science journalists, anchors, producers and scientists. First, using existing scholarly literature, it examines the changes in the scientific content of these programs and portrays the historical dynamics of the transformation of science presentations. Second, drawing on interdisciplinary research on science and ideology in national contexts, this paper discusses the dominant Zionist discourse which pervaded these programs and the programs' role in the larger project of nation-building. It shows how science and ideology were interwoven in the production and the actual content of these ultra-popular programs during an era when TV became a dominant cultural form in Israel.

More broadly, this paper aspires to problematize many of the conventional assumptions about science's public messages in the 21st century.

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Living outside time: astronomy and physics in the writings of Mary Butts  
(1890 – 1937)

The journals, essays and fiction of Mary Butts reveal her life-long and prolific dialogue with scientific subjects. Butts engaged with the scientists and philosophers of her time in a number of ways. She read popular works, such as A. N. Whitehead's *Science and the Modern World* (1926), and was familiar with James Jeans' *Eos: or the Wider Aspects of Cosmogony* (1928). She actively participated in discussions with scientists and science writers, such as J. W. N. Sullivan, and with other intellectuals, such as Aldous Huxley with whom she shared an interest in the concept of time. She mulled over their ideas in her journal, interpreting them with a fresh and independent focus, and extending and developing them in novel directions. While the insights expressed in the journals are at an early stage and therefore usually incompletely formulated, she presents her crystallised analysis in the essays and the ideas find creative expression in her fiction. Modern physics provided Butts with a valuable system of concepts and imagery with which to articulate her experience of modernity, but she was no mere passive receptor of scientific ideas. She regarded herself as a participant in a quest for knowledge that many would shy away from as the preserve of experts. This paper explores Butts's engagement with the mathematical sciences focusing on how Butts reworks ideas from astronomy and theoretical physics according to her personal needs. It demonstrates that her interest in, and affiliation to, the new physics is intricately woven into her concern with freedom in general: physical, intellectual and moral. And it illustrates how Butts appropriates the vocabulary and system of ideas generated by the mathematical sciences for communicating, and systematising, a 'perception not easy to discuss for lack of terms' (Butts, *Death of Felicity Taverner* 180).

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## Vermin, victims and disease: public controversy over badgers and bovine TB in the UK

In the wake of a series of high profile, acute controversies concerning livestock diseases in the UK in recent years, risks associated with animal disease have come under increasing levels of media, public and policy scrutiny. While these episodes have largely been high profile, acute crises, it can be productive to examine how animal disease risks are debated and managed in ongoing, chronic risk situations. Such a case is provided by controversy over the transmission risks of bovine tuberculosis (bTB) between domestic cattle and badgers. Since the early 1970s, when links between the disease in the two animals were first drawn, the extent of these transmission risks, and consequent policies of culling wild badger populations, have been contested by a variety of actors including farmers, veterinarians, politicians, animal activists and environmentalists.

In the UK, badgers have been a protected species since 1981, and are a highly cherished wild animal with an important place in British popular culture. As such, any suggestion of state-aided culling of these animals is highly controversial, and so actors in the debate have increasingly turned to science to provide them with evidence to support their positions. Despite commissioning what may have been the largest field based experiment ever, the UK government has found that science has not provided the clear evidence they required to formulate policy, but has instead exposed further the messy reality of interactions between badgers, cows, TB bacilli, the natural environment and human beings.

Unlike much science, this research has always been conducted under the scrutiny of specific local, stakeholder interest and wider publics. This paper presents findings of an analysis of media coverage of the badger/bTB situation in the UK, showing how participants in the controversy have represented animals such as badgers, cows and farmers in multiple and contradictory ways.

Keywords: animal disease, farming, wildlife, policy, science

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Forensic fictions: the construction of forensic medicine in television dramas

Television exists in the very heart of contemporary culture with surveys showing that a majority of people watch it more than 25 hours a week. Amongst fictional television programmes, forensic medicine crime dramas rival, and currently exceed, hospital dramas as the most popular medicine-based genre. The popularity of non-fiction forensic medicine shows in the late-1990s, such as *The New Detectives*, directly led to the development of the fictional *CSI: Crime Scene Investigation* which focuses specifically on the work of forensic scientists. In its first year *CSI* was the most watched primetime television show in the USA and still remains the second highest rated television programme. The success of *CSI* has led to an emphasis on forensic medicine as the primary tool for solving crimes in police procedurals in numerous contemporary programmes. There is growing empirical evidence that the amount of forensic medicine on television is impacting the public's medical literacy and influencing jury behaviour in criminal cases. There has been, however, little academic attention paid to the production context for these texts. Given television's importance in contemporary culture and the increasing popularity of forensic based medical dramas we need to understand how television creators make decisions about incorporating forensic medicine especially those influenced by the advice of medical consultants. The aim of this paper is to provide a preliminary analysis of how entertainment producers make decisions regarding the depiction and role of forensic medicine in entertainment texts; to understand how entertainment professionals interact with medical experts and utilize medical expertise; and to track how the use of forensic medicine in television has developed over time. Television programmes to be discussed include *Dragnet*, *Quincy, M.E.*, *Numb3rs*, and *Bones*.

Keywords: Media, Television, Medicine, Forensics

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Cover stories: a visual content analysis of Nature front covers

First published in 1869 Nature Magazine celebrates its hundred-and-fortieths birthday this year. During this period the renowned scientific journal has produced more than 7,000 front covers. This paper presents the preliminary results of a visual content study analyzing the differences between Nature front covers by taking a random sample of covers from each decade from 1869 to 2009. Historically, images have always been an integral part of science. As the new printing revolution in the nineteenth century took on, for the first time making periodicals available for the mass market, journal covers became one of the most important ways of attracting readers in the struggle for existence. However, in scholarly studies of visual communication journal covers have been largely neglected. Covers of a professional journal such as Nature, provide us with an extraordinarily rich resource for exploring and analyzing the importance and interrelations between scientific content, visual technologies and marketing. In this paper I will analyze trends and patterns of visual and textual communication in Nature covers, present general similarities and differences between the covers, and argue how these scientific visual and textual representations relate to central question in contemporary studies of science communication.

Keywords: image; communication; content analysis; Nature Magazine

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## Synthetic Biology from the lab to public mind: intuitive logics in a natural experiment

Evaluation of new technologies involves general ideas about how we ought and want to live. In everyday life, this can happen from very different perspectives. Often, everyday people have been construed as intuitive scientists or intuitive economists, striving for epistemic goals or for maximising utilities. As such, people were expected to be interested in scientific details and to employ risk and benefit analyses to evaluate technological developments. There are, however, at least two other possible metaphors to understand everyday people: intuitive prosecutors and intuitive ethicists. Intuitive prosecutors are concerned with fairness, the balancing of social interests, and with distributional and procedural justice. For intuitive ethicists, the existential need to believe that the rules governing our worlds are not just the arbitrary preferences of powerful groups but rather are anchored in core values that legitimise collective practices has to be acknowledged. Based on data collected in a natural experiment in the 'Communicating Synthetic Biology' project (COSY), this contribution sets out to analyse the role of different intuitive logics for evaluating an unfamiliar technology. Synthetic Biology is an important emerging field applying an engineering perspective to biology, which is gaining increasing prominence. In this project scientists in the field of Synthetic Biology were asked to write press releases, which then were offered to journalists who wrote newspaper articles on SB, which in turn were presented to everyday people in focus groups. As synthetic biology has received little public and media attention so far, it provides a unique opportunity to study the intuitive logics 'in the making': What intuitive perspectives are being taken? And what role do the intuitive logics play in structuring the new and unfamiliar field of Synthetic Biology?

Key words: synthetic biology, public perception and evaluation, knowledge transformation, intuitive logics

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Disputes about fish: science communication among stakeholder in European fisheries governance

The communication of scientific expertise has become a crucial and sometimes controversial issue in environmental governance. This paper investigates environmental communication in European fisheries management. Establishing sustainable fishery systems has become a serious concern for environmental policy all over the world, posing new challenges for science communication in this domain. The European Commission's (EC) fisheries policy is said to be one of the most science-based regimes. However against the background of alarmingly declined fish stocks, the EC has reformed its Common Fisheries Policy to involve more voices into the governance process apart from science. Due to this reform, stakeholders from the fishing communities, various NGOs and consumer groups are invited to give their additional recommendations about e.g. quotas and sustainable management of fish stocks to the EC. The study presented here analyses how scientific knowledge about fisheries management is communicated, understood and used by the different stakeholders involved. It shows how different ways of knowing about the environment (e.g. fish stock-size) can conflict and complicate the policy process in such an 'opened' governance system: Fishermen, scientists and NGOs have different interests, knowledge-backgrounds and values coupled to fish and nature and respectively assess the 'health of nature' differently. In focus are the factors that contribute to the perception and understanding of scientific knowledge as opposed to other kinds of knowledge in the fisheries sector. The crucial question for fishery regimes is whether new participatory governance approaches can promote future sustainable fisheries management or if they only mirror the well-known problems of a Tragedy of the Commons. The broader relevance of studying the communicative processes in fisheries management is to better understand the role of science in environmental regimes: How do some regimes manage to implement scientific expertise while others fail to do so?

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Colouring in the black-box: alternative renderings of scientific visualisations in two comic book cosmologies.

This paper contributes to the recent interest in scientific visualisation by considering two examples of the uptake of scientific images in the popular medium of comic books. One issue that has emerged from some of the recent literature is the extent to which scientific images are 'black-boxed' and, as such, take on the quality of authoritative and definitive representations of reality. Despite – or because of this – such images may then be used in more public contexts to provide legitimacy to alternative (broadly, 'non-scientific') beliefs. In the cases considered here, the black-boxing of scientific images for such purposes is both supported, but also contested by virtue of their re-location within a different medium to that of their original production – a medium that some argue is not suited to realism because of its evident artificiality. The comics in question, however, are relatively unusual in being examples of the use of this medium to set out the cosmological visions of the creators concerned (Dave Sim, in his comic *Cerebus*, and Alan Moore in *Promethea*). Thus, there is about them, in some measure, a realist appeal, something that is directly contributed to by images drawn from science, including images of the earth and the human foetus. However, these images are re-presented in rather different ways in each case in conformity with their different kinds of realist rhetoric and morally encoded aesthetics that signify the character of the respective cosmologies. Thus, it is argued that although scientific images may be black-boxed, this is only the beginning of a potentially colourful career, filled in by quite different renderings.

Keywords: scientific visualisation; comics; realism; public images of science

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Between a rock and a hard place: 'the deficit model', 'the dissemination model', STS, science and publics

There has been a notable stream of critical scholarship which has problematized 'the deficit model' as a frame for analysing the relationship between publics and science (Irwin and Wynne 1996). Indeed, this model has come to be identified with a particular branch of Science and Technology Studies (STS) research – Public Understanding of Science (PUS)— and with a set of institutional initiatives designed to address the issues it has highlighted.

This presentation will briefly consider 'the deficit model' and address the ways in which the carving out of public understanding of science (PUS) as a distinctive area of science and technology studies has had implications for the work on 'publics' within STS. Although PUS is regarded by some as a sub-field of the broader field and although some researchers move between PUS and STS, I think it is worth considering the consequences of the designation of this as a distinct/separate area of research and scholarship.

Moreover, I will argue that far less attention has been given to another model which has also inhibited STS research on science and publics. This might be labelled the 'dissemination model' and, as I will demonstrate in this presentation, this model dominated mainstream STS research as PUS emerged. This presentation will examine the significance of this other model of the relationship between science and publics in restricting and demarcating STS. I will consider these two models together as part of a broad exploration of how demarcations and divisions within STS have inhibited the conceptualisation of science and publics.

Keywords: STS, PUS, demarcation, 'dissemination model'

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### Normalising extreme technologies: the discourse of planetary engineering

In recent years, a number of scientists have proposed global-scale engineering projects as ways of mitigating global warming. These geo-engineering schemes aim either to decrease the amount of sunlight reaching the earth or to increase the absorption of carbon dioxide from the atmosphere. Such proposals include ocean fertilization, carbon sequestration direct from the air, injecting sulphur dioxide into the atmosphere, and erecting an array of discs in space. This paper will examine the ways in which these speculative ideas are drawn into the realm of the imaginable and the do-able in media representations of planetary engineering and in the discourse of the scientists who propose and promote such schemes. I will argue that commonplace rhetorical devices, such as the use of domestic and natural metaphors, serve an ideological function in normalising untested (and untestable) technologies and diverting attention away from social and economic solutions to climate change.

**KEYWORDS:** media, geo-engineering, climate change, rhetoric

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Chemical science has given to the world bright hues: dyes in nineteenth-century professional, public, and domestic cultures of chemistry

The mid- to late nineteenth century was a period of great change in the field of dye chemistry, encompassing many developments in the production of colours across the spectrum. Textile manufacturers offered a wide variety of colourful dress textiles to middle-class female consumers in both Great Britain and the United States. Contemporary attention to science informed reactions to these dyes, which were considered visible evidence of scientific progress. This paper will examine practical and linguistic overlappings among professional, public, and domestic cultures of chemistry, focussing on dyes. These shared ingredients, recipes, and words point to intriguing associations among the histories of chemistry, textiles, and dress.

Mid-nineteenth century women's magazines included dye recipes and instructions, many of which shared ingredients and methods with those used by professional colourists employed by textile manufacturers. As industrially-produced synthetic dyes became available in the 1860s and 1870s, both colourists' notebooks and women's magazines indicate increasing experimentation with and use of these products. These sources also reveal the changing language of colour during this period, as popular names of dyes, such as 'mauve' and 'magenta,' appear with increasing frequency. For general readers, many contemporary periodicals described the production of bright dye colours from the waste product of coal-tar as a kind of modern-day alchemy, demonstrating the advances possible through science. As the *Englishwoman's Domestic Magazine* proclaimed in December 1871, these colours could even help improve appearances: 'chemical science has given to the world bright hues in scarlet, and blue...enhancing the natural beauty of woman.'

Keywords: dyes, chemistry, women, periodicals

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Lack of norms, mimicry and the spread of educational innovations: the UK spinoffs

Using panel data on the population of English and Scottish universities (113) and their spinoff firms (1409) over a period of 15 years, we show how lack of norms in a field highly dependent on pressures for institutional conformity led to the rapid diffusion of practices that amounted to a management fashion. In the late 1980's the UK government liberalized the market for intellectual property exploitation and pushed universities for greater technology commercialization. In response, universities started founding independent spinoff firms as alternatives to licensing their research, since high dependence on state funding dictated that they appear legitimate and prudent to state legislators. However, government legislation and discourse acted as triggers of institutional change without being backed by norms and guidance on what constituted appropriate university behavior with regards to technology transfer. Despite persistent opposition from the academic community that saw spinoffs as altering the mission of contemporary education towards "big business", spinoffs spread rapidly among the majority of universities. We contend that this happened as universities were guided by mimicry and massive media coverage of spinoffs, rather than rationality. Specifically, our results indicate that universities adopted spinoffs in a process of rapid contagion as they tried themselves to define the spinoff industry through mimetic processes. When government monitoring and norms were finally introduced, some universities quickly abandoned the practice as they were unable or unwilling to comply with the new technical requirements (i.e. high spinoff profitability and growth prospects), thus bringing the management fashion to a sudden end. This paper has important implications for the design of national systems of innovation, the sociology of science, and institutional and diffusion theories as it shows the conditions under which fads and fashions can spread even in non-profit organizational settings.

Keywords: spinoffs, diffusion, media

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"Can somebody please make up their minds?" How the media represent the risk of drinking during pregnancy

This paper presents a detailed look at a particular media story that ran from around May 2007 to March 2008 in the United Kingdom. During that time, two public health bodies, the Department of Health (DoH) and the National Institute for Health and Clinical Excellence (NICE) were updating their advice booklets for antenatal care, first in May, the DoH, and later in October, NICE. This caused some interest in the national press because of an apparent discrepancy between NICE's updated advice particularly on drinking alcohol with the earlier formulation by the DoH. While both agencies had before advised that very low amounts of alcohol during pregnancy are fine, the DoH has in May 2007 changed to advise complete abstinence. NICE on the other hand, essentially kept to their old advice when they published their draft revised guidelines in October. This was the story as it appeared in many of the newspapers in October: Two government bodies issue conflicting advice to pregnant women, and this is irresponsible and confusing. In this paper I will look closely at the two sets of advice from the DoH and NICE, and what they actually said. This will be compared with their interpretation in the news reporting and the ensuing op-ed coverage of the UK national press. Since both agencies as well as the experts involved in the story insisted that the strengthening of the advice was not due to any new evidence having emerged about the dangerousness of low level alcohol consumption in pregnancy, this story will examine the social aspects of how risks seem to be increasingly amplified, and what role, if any, the media play in that development.

Keywords: Risk, media representation of risk, NICE, health advice

Kate Roach

The Penny Magazine, popular science and social class in the 1830's. can history teach us anything?

The Society for the Diffusion of Useful Knowledge, (SDUK) was an early champion of activities associated with boosting the public understanding of science. Their brainchild, the Penny Magazine (1831-1845) aimed to reform society through the dissemination of 'useful knowledge', largely scientific and technical. The publication was an example of 'improving literature', written by the middle classes for consumption by the lower orders as a means of quelling dubious morals and radical ideas.

The Penny Magazine provides a classic demonstration of the deficit model of science communication. It doled out a stream of detailed factual information, lacking in opinion or analysis, to a presumed empty-headed, passive reader. Present day efforts to raise PUS steer towards a dialogue rather than deficit model, while moral improvement is no longer seen as a plausible outcome.

However, there is overlap in PUS discourses then and now. The Penny Magazine avoided political content of any kind. Barring mainstream STS approaches, a striking factor of more recent drives to educate the public scientifically is that they seem equally apolitical. Public outcries over scientific issues are seen as faulty understandings rather than as concerns over how techno-science is used and controlled in society – the House of Lords (2000) report on Science and Society has been criticised for doing exactly this.

Furthermore, the example of the Penny Magazine encompasses class asymmetry. Likewise, many vociferous advocates of PUS today come from top end academic institutions, which despite all efforts to the contrary, remain largely middle class. Class interactions are not the same now as in 1830, but the question is raised as to whether efforts at PUS are a smokescreen utilised by a privileged class to obfuscate debate over the political dimensions of knowledge? The example of the Penny Magazine would suggest that they might be.

Keywords: Useful knowledge, Class, Popular Science, Penny Magazine

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Travelling from the lab to the farm through a new educational website

CReSA is a private foundation created for conducting research and technological development, studies and education in the sphere of animal health. One of the priorities of the CReSA's website is the diffusion of knowledge, scientific advances and results from research to the scientific community and other professionals related to the agri-food sector.

The last PISA report (2007) points out a recession in sciences level of the Secondary Education students in Spain. Our initial hypothesis was that current issues (mad cows, avian flu, bluetongue, etc.) could arouse their interest for the science for resolving these problems with economical and social importance. Beyond the purposes above described, another priority of CReSA is promoting the social spreading of the scientific and technological culture, as a tool of competitiveness and improvement of the life quality of citizens. Therefore, CReSA has recently developed a educational website ([www.saludenlagranja.com](http://www.saludenlagranja.com)) to teach the society the most relevant animal diseases and the purpose of the veterinary science for improving the animal health and the food safety for human consumers.

Owing to the fact that the principal targets are the students, the website has been designed with attractive visual effects and clear, high quality divulgation contents. The users can be familiar with the etiology, transmission, symptoms, diagnosis, treatment and prevention of the most relevant diseases and they can know what the scientists do for solving these problems. The principal objectives of this website are motivating their interests towards the research, consolidating the public image of the research as an activity that generates development and life quality, orientating the students interested on scientific careers, increasing their scientific vocations and guaranteeing the future competitiveness.

The present work shows that it is possible communicating science to different targets through two different websites (specialized public and general public) in a high technological research center.

Keywords: science, communication, website, society

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Cultural projection of medicine: medical dramas and public understanding of, and expectation for, medicine in Japan

This presentation will explore how a popular motif within the Japanese medical drama genre influenced Japanese perceptions of medicine. According to assessments by the OECD and World Health Organisation, during the last two decades Japan has enjoyed one of the best health services in the world. Despite such high evaluations, however, the Japanese general public has considered their medical service to be untrustworthy and unreliable, perhaps more so than in the majority of developed countries. This perception was reflected in Japanese academic and media discourses about medical services in the 1980 and 1990s, which tended to invoke, albeit implicitly, a general image of medicine rather than actual surveys across hospitals. Shiroi Kyotow [White Leviathan-like Tower], a novel by T. Yamazaki (1965, 1969), depicted both the aspiration of medical professionals for success, and their conspiracy against a legal case of negligence. Owing much to the popularity of this novel and its dramatised versions for television (1968, 1978, 1990, 2003), Shiroi Kyotow has developed into a metaphoric expression for the manipulative and secretive nature of the Japanese medical system. It symbolises shady medical professionals and communities that are dedicated not to patients, but to their own fame and to medicine for its own sake. I will demonstrate how Shiroi Kyotow is perceived amongst the Japanese population, and how this established image was inscribed in the academic and public debating on medical policies and ethics from the late 1980s to the early 1990s.

Key Words: Public expectation for health care service; Public understanding of medicine; Representation of medicine in fiction and TV drama; Public debating on medicine and health care service.

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## Public acceptance of evolution and the rise of evolutionary discourse

In August 2006, the *Science* journal carried an article on the public acceptance of evolution in Europe and the United States. This generated heated public debate in the Finnish media. The article appeared to show that people in Finland, who had previously done very well in the European surveys measuring scientific literacy, were having serious difficulties with the basic Darwinian truths. According to the survey, only 65 percent of the Finnish population accepted the basic tenets of evolutionary theory while 30 percent had serious doubts.

The results of the survey were widely debated in the Finnish media: there were references to “superstitious Finland”, claims that “evolution is not a matter of faith”, that “Finland is not a West European country in relation to evolutionism”. An outsider might well wonder why the outcry. According to *Science*, Finland ranked 17th among 34 countries and was not given any special attention. Nevertheless, the result was unexpected in a secular high tech nation that had consistently rated among the top performers in European comparative surveys of public understanding of science and public education. In the Finnish media, the explanations offered for the country’s unusually low ranking referred to declining standards of public education and the rise of religious or other anti-science movements.

In this paper we analyse the debate that was stirred up on evolution in major Finnish newspapers, from August 2006 to May 2007. We argue that this debate was not only about the public acceptance of evolution, but became a metonymy of (the supposed decline of) natural sciences. The leading discourse in this debate, which we call popular science discourse, was based on the deficit model of public understanding of science and the canonical account of science communication echoing science wars and other previous international controversies around the role of science in modern society.

We argue that the claim of “declining public acceptance of evolution” in Finland was based on rather thin and ambivalent data. This was in fact the first ever survey on evolution issues in Finland, and there were no points of comparison with previous data. Moreover, the results were based on one single question “Human beings, as we know them today, developed from earlier species of animals”. In fact, the Finnish respondents had done very well with another claim measuring public understanding of evolution: “The earliest humans lived at the same time as dinosaurs”.

We argue that the survey published in *Science* provided a platform for a critique of religion and anti-science movements typical of earlier international debates. In addition, based on previous studies on communicating evolutionary psychology in the UK, we suggest that this debate reflected the rise of popular evolutionary discourse based on mechanical account of human condition. The debate was taken as an opportunity to promote evolutionary psychology as a new form of rationalist discourse and legitimate social science.

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Investment strategies in the genomic domain: the life cycle of homo oeconomicus

The current dominance of Evolutionary Psychology as an explanation of and justification for modes of human behaviour that accord with neoliberal subjectivity has distinct resonances with 19th century Social Darwinism and mid 20th century Sociobiology, both of which emerged in parallel with socio-economic structures that, similarly, demanded the acceptance of particular readings of 'human nature'. However, there are significant differences that enable a critique of contemporary evolutionary approaches to behaviour which goes beyond accusations of 'bad science' or that pits a social constructionist approach against an essentialist paradigm. This paper will argue that, in the context of the knowledge economy, narratives of genetic investment make sense, not only of competitive individualism but of the commodification of science itself under the terms of university audit culture and the demands of the 'free market' for forms of inquiry which lend themselves to establishing resources for economic exploitation. Drawing on Michel Foucault's analysis of contemporary forms of governmentality, I will argue that evolutionary psychology can be understood as responding to what he calls the 'grid of homo oeconomicus' under the terms of which 'any rational conduct or behaviour whatsoever [becomes] the possible object of economic analysis'

Keywords: Genetics, psychology, neoliberalism, economics

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Crossing personal, institutional and disciplinary boundaries : science and engineering engagement and university culture change

The paper is in four parts.

- The first locates the SEARCH project, exploring briefly the research phase which scoped some of the emergent issues in undertaking engagement from the perspectives of grassroots scientists and engineers. This highlights some of the issues inherent in defining engagement, the tensions between practitioners' beliefs about the role of engagement and the institutional drivers for engagement. This section serves to wet people's appetites to access the full report ( [www.researching-change.org/search/indexpages.htm](http://www.researching-change.org/search/indexpages.htm)) and highlight the reasons for the questions which drove the second phase of the work.
- The second part of the paper explores the structured action learning methodology and process consultancy which has underpinned 27 action projects within 17 UK universities. It offers discussion about some of the outcomes of this work: exploring issues of system and individual change, power and the location of engagement within universities, the identities and self-conceptualisations of those involved in engagement. In itself this offers many challenges to in thinking about organisational support for engagement.
- The third explores some of the programme outputs and outcomes offering a few case studies and the ways in which fundamental engagement questions have re-surfaced and have been being re-appraised.

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Imagining Bio(techno)logy: What ethicist could learn from bio art.

In the past decade artists and designers have discovered the life sciences. They have become a voice in the public debate on biotechnology. By presenting a fluorescent rabbit or by exhibiting semi-living sculptures made of tissue culture, bio artists like Eduardo Kac and the Tissue Culture and Arts project introduced tangible images of biotechnology to the public domain. These works are the living proof of a bio art revolution that is taking place right now. And, as can be concluded from their thought provoking critiques on 21st century biopolitics, to fuel the public debate is what bio artists are after.

The “birth” of this critical bio art movement takes place in a time where the traditional bioethics is going through a crisis. A much heard complaint is that bioethics is suffering from an imagination deficit. As a reflective discipline, bioethics is not as dynamic and lively as its object of reflection. It does not share its explosive creativity. Or maybe biotechnology is simply evolving at too high a pace for bioethics to keep up with it. An additional problem for (bio)ethicists is that they are outsiders to the practices they have to reflect upon. They usually do not have hands on experience with biotechnology.

Bio artists, in contrast, are operating from within the laboratories. They work with biomaterials, they do the real thing. But does this make them better equipped to do bioethics than philosophers? In this paper I will critically examine the value of bio art to bioethical debates. I will do this from the perspective of a bioethicist. What new questions do bio artists raise about biotechnology? What can bioethics learn from bio art about real science? And what can the public learn from bio art?

Key words: bioart, bioethics, biotechnology

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Expertise at the science-policy-public nexus: a biographical-narrative approach to experts in virology

In Science and Technology Studies (STS) various rich bodies of literature have developed around the theme and problems of expertise. Disregarding the differences in field of studies of expertise, two commonalities stand out: first, most maintain a separation between the science-public nexus and the science-policy nexus. Second, they approach the scientific experts from an external perspective. The expert remains faceless and anonymous. In accounting for the role taken up by the scientific experts, one should heed the fact that 'being a scientific expert' is not solely structured by institutional, regulatory or journalistic frameworks, but also by the expert's biography. We will demonstrate how expert biographies constitute the science-politics-public nexus.

This paper employs a biographical-narrative method to the study of expertise in policy making and public debate in the field of virology. For over two decades, the interest in virology from politics and the media has been immense, as several crises in infectious diseases took place. For several virologists these crises created a 'turn to visibility': a moment when they become highly involved with policy making and visible in public debate. Since the first turn to visibility in the early 1980s, three virologists have had a lasting and varied career as experts. We will first describe and analyze the roles of these three virologists at the science-politics-public nexus as they dealt with the scientific, political and public aspects of these crises. On the basis of these analyses of sequential roles, we present a preliminary process typology of these experts that is the starting point for further studies.

Keywords: expertise, science communication, policy studies, biographical-narrative approach, virology

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### “Keine Grotte ohne Lotte” – Underwater documentaries in the 1950s

In the 1950s, in the wake of Monster and Science Fiction movies, underwater documentaries, as well as underwater scenes in motion pictures became increasingly popular. TV-series like “Sea Hunt” or movies like “Creature from the Black Lagoon” procured their success from rather classical myths and both romantic and erotic fantasies, and the growing number of underwater documentaries proffered pretty much the same canon: romantic Wanderlust, adventures in exotic places, and bikini-clad women.

While science played an essential role in the plot of fictional movies and TV-series, those dramatic elements became likewise essential for documentaries of Frenchman Jacques-Yves Cousteau or Austrian Hans Hass. Especially the latter frequently staged his attractive wife Lotte Hass in swim-suits in his photos and films, making a contemporary critic in the eminent German weekly “Der Spiegel” scoff: “Keine Grotte ohne Lotte!” (Engl: No grotto without Lotte). The undersea, however, soared in popular culture in the 1950s, anticipating much of the “Space Hype” of the following decade. Adventure, escapism, and subtle eroticism provided for an “Other World” as an alternative to a dull urban life and Cold War paranoia. Both fictional and non-fictional films contributed to this notion, and both fields inspired each other.

This paper will outline the history of underwater film in the 1950s, and examine the complex interactions of science and culture therein. The technology developed for underwater film considerably furthered the branch of marine biology, whereas the latter in return prepared ground for the popularity of underwater films. The paper will look at the way science and scientists are depicted in feature films, and how adventurism etc. is used in (semi-)scientific documentaries to appeal to a wider audience. The underwater documentaries of Cousteau and Hass have paved the way for this branch of scientific popularization up to the present day, and their narrative is worth to be examined more closely to understand the unwaning interest in “Discovery Channel” etc.

Keywords: underwater, documentary, science, popular, film

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Science, technocracy and the public sphere: Arendt and Bell as social forecasters

This paper examines the relationship between science and the public sphere as this is represented in the work of Daniel Bell and Hannah Arendt. The intent of the paper is primarily historical: to gain access to two influential perspectives from the 1960s and 70s on the relationship between science and the public sphere. However, I also argue that both theorists left enduring insights that are of relevance to the contemporary theorizing about the relationship between science and the public sphere.

Bell and Arendt are considered in relation to each other, since there was a significant cross-fertilization of ideas between them, and important commonalities in their backgrounds and public dispositions. Both were nominally left-wing, Jewish, public intellectuals who often found themselves espousing positions associated with cultural and political conservatism. Though neither had significant training in science, they both wrote extensively about both the distinctiveness of scientific thinking, the future of technology and the relationship between science and the public sphere. Bell coined the term 'post-industrialism' to describe a range of future shifts in the class structure, occupational groupings and research priorities that would affect the public-private split, and accorded special significance to the role of science in bringing this about. Arendt regarded the 'openness' of scientific discourse as a crucial determinant of a viable future public sphere, and was highly critical of what she perceived as the growing gap between scientific and lay knowledge. Both thinkers feared and forecast a potential 'technocratic' future. Exploring and juxtaposing their perspectives raises interesting questions about how the relationship between science and public sphere has altered since the 1970s, and how their work connects with recent sociological perspectives on science and the public sphere.

Keywords: science/public sphere/Arendt/Bell

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The Institute of Unnecessary Research: public engagement in science through art and performance.

The Institute of Unnecessary Research (IUR) is an international interdisciplinary group of artists, scientists and researchers, involved with innovative research, disseminated through participatory art and performance, to diverse audiences.

Traditional approaches to the public understanding of science suggest that it is about encouraging scientists to explain their work to a receptive public. This is perhaps mistaken. The public is not always receptive – sometimes rightly so. Public understanding is not just a matter of being told something by an authority. Also most discussions of public understanding of science do not give an account of what ‘science’ is.

The public is aware that information dissemination is controlled by many factors, including commerce, politics, and cultural assumptions. This is worsened by media attention to ‘big science’ or to scientific work that can be cynically linked to profit. In short, the ‘public understanding of science movement’ often seems to neglect public understanding in general. Public understanding would be a necessary precursor to the public understanding of science.

The IUR engages with the very nature of what constitutes scientific research through artistic practice, directly widening participation in those debates as well as bringing about a deeper appreciation of contemporary scientific research.

The word ‘unnecessary’ in the name of the Institute is a very important reminder that science should be driven by curiosity and not by the military or large corporations. The IUR demonstrates that we all can and should debate about the direction of research, its ethical implications, and what exactly science should be.

The IUR is made up of various ‘departments’ specific to the interests of each member of the group, and include ‘Joy’, ‘Ethics’, ‘Neurofeedback’, ‘Tissue Culture’ and ‘Magic’. Past events have included performances at Shunt Lounge and The Whitechapel Gallery in London as well as science festivals, hospitals and academic settings.

Keywords: Art, Science, Performance, Research

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Linking science communication with pedagogy-using curriculum design in higher education for change

The last two years has seen a fundamental shift in the way that public engagement is viewed and undertaken by Universities. Scientists are increasingly being asked to explain to funders how they intend to engage the public with their research. Alongside this there are societal issues surrounding the application of science which need to be addressed. Interestingly, the School of Biological Sciences (BIO) at the University of East Anglia (UEA) has decided to embrace this change and seen it as an opportunity to develop staff and student interest in science communication. We have developed a third year undergraduate module in Science Communication, and a second year module, Biology in Society, with the aid of a Bioscience Subject Centre educational development grant from the Higher Education Academy (HEA). The Science Communication module provides the students with an opportunity to understand the philosophy, background and history to the way that science has been communicated in the UK using illustrative case examples. The students also undertake a project with one of our partner organizations, for example in Science Week 2008, the students organized a family event called 'Totally Amazing Me' held at the Inspire Science Discovery Centre in Norwich. In 2009, they organized an event with the Norwich castle Museum called 'Ingenious Investigators'. The events were organized as part of the Mobile Family Science Laboratory project, funded by The Wellcome Trust. BIO has now expanded its communication portfolio, and is offering an undergraduate degree Biology with Science Communication starting in 2009. This roundtable discussion seeks to explore the reasons why BIO has moved in this new direction and how the changes were implemented and received by both staff and students. It will also seek to understand the barriers faced by institutions that have a science culture driven by research oriented goals and how steps can be taken to dovetail a philosophy of science communication with research led science.