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Paper Abstracts

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Paper Abstracts

Martin W Bauer (London School of Economics), "Some Observations on a History of Science Communication"

There exists no historiography of science communication. One may consult Gregory & Miller (1998); Gregory (2011); Thorpe C & J Gregory (2010); then further Knight (2006) for the 19th century in England; Jacques & Reichwarg, 1991 for France, und Burnham (1987) and Lewenstein (1993) for the USA; Papanelopoulou, Nieto-Galan & Perdiguero (2009) for South Europe; Wu & Qiu (2013) give a first impression on the new China; Bauer (2012) tried to fixate the long waves of SC. Trench & Bucchi et al. (2014) stand for efforts within PCST to develop a comparative history of SC since 1970. , There are also special editions of history journals that take on this topic: e.g. History of Science, 1994, 32; 3, no 97; or ISIS, 2009, 100.

This lack of historiography is no surprise as SC is a specialist practice of „communication", which in turn is confusingly developing research field. SC has been practiced as long as there is science. How then can the history of SC be conceived? Based on five thematic fields, I will try to point out topics that should be considered in any history of SC. This effort is therefore programmatic and expresses a desire addressed to the history community

- SC as part of the history of science; focus Enlightenment and the 19th century
- A brief history of SC's as a professional activity
- On SC's intellectual history
- On the history of science communication genres
- Towards a periodisation before and after the restart in the 1980s

Daniel Belteki (University of Kent), "The Transit Circle in Transition: The Changing Public Image of the Airy Transit Circle during the Second Half of the 19th Century"

The Airy Transit Circle frequently appears in books written about the history of the Royal Greenwich Observatory since the products and the work carried out with the telescope contributed to the increasing reputation of the observatory during the second half of the 19th century. However, the existing literature about the history of the instrument neglects discussions about the public image of the transit circle. Therefore, the proposed paper attempts to investigate how the public image of the transit circle transformed and often varied over the first 50 years of its life depending on the physical (and fictional) space within which it was exhibited. In addition, the aim of the paper is to highlight the friction between the technical gaze of the men of science already acquainted with the transit circle

and the public understanding of the work of both the instrument and the observatory. This is achieved through an examination of articles and images about the telescope in periodicals and the replica models presented to the public at exhibitions, museums, and meetings of societies. Furthermore, the paper examines two case studies in more extensive detail. The first case demonstrates how for the first 30 years of the instrument's life its visual representation was dominated by its designer's technical drawing, but suddenly changed in the 1880s. The second case compares two distinct descriptions by the Astronomer Royal and by his First Assistant accompanying the model of the instrument exhibited at the South Kensington Museum, thus demonstrating how they considered communicating to the public what the instrument was differently.

Alper Bilgili (Acibadem University), "Was Darwin Responsible for the Fall of the Ottoman Empire?"
Despite the vast literature on Darwinism and race, the issue of the reception of Darwin's opinions on race in a non-Western context has been little studied. In the Turkish case, Darwin's remarks about Turks have been explained with references to British-Ottoman relations, and Darwin has subsequently been blamed by Turkish creationists for stoking anti-Turkish sentiment within Europe. It has been alleged that such sentiments manifested in the 19th century British occupation of Egypt, the demise of the Ottoman Empire and contemporary Neo-Nazi arson attacks in Germany targeting Turkish migrants. Consequently, Turkish creationists perceive Darwinism to be not merely a false scientific theory, but also a political-ideological instrument of Western hegemony wielded against Turkey and the Islamic World. Turkish Darwinists who responded those claims, on the other hand, have portrayed Darwin as an egalitarian who could overcome prejudices of his social class. Yet, further scrutiny proves both accounts to be over-simplistic. This paper aims to throw some light on the context within which Darwin expressed his opinions on Turks and thus contribute to the broader discussion of the relationship between Darwinism and race. But more importantly, through analysing the symbolic meaning attached to Darwin by Turkish creationists it will be revealed that long-run tradition of Turkish opposition to Darwinism could partly be explained by political concerns.

Tim Boon (The Science Museum, London), "Scripts, Performances, Monuments and Encounters: Manifesto for a Project on the Public Culture of Science"
In this presentation, I will outline the structure for a proposed synthetic account of the public culture of science in 20thc Britain. Drawing together the implications of my previous work on the moving image and museum mediations of science and technology, I propose to use the categories of scripts, performances, monuments and encounters as I iteratively explore the operation of the public culture of science, especially making comparisons between two of the most powerful and popular vectors of this public culture: TV and museum display.

The category 'scripts' alludes to the ways that accounts of scientific matters for public consumption are constructed in human relations. Both moving image media and museums use the 'script' terminology, in which documents are the grounds upon which representations are stabilised before being created. 'Performances', in the Erving Goffman sense of the performance of self, are both literally one of the modes of science communication – think of TV presentation – but also one of the contributors to the formulation of 'scripts'. I am using the term 'monuments' to refer to the 'cooked' products of scripts and performances, that is individual displays and programmes that persist as representations of the contingency that produced them, often decades afterwards.

'Encounters' are the occasions on which the public encounter the 'monuments'. These, as the literature attests, are not simple filling of deficits, but complex exchanges of values, knowledge and understanding. Together, I propose to use scripts, performances, monuments and encounters to structure a book that will embody a compact account of a substantial domain.

Angela Cassidy (Kings College London), "Building a Public Controversy: Advocacy, Media and Politics in UK Debates over bTB since 1971"

Where do public controversies come from? While studies of public and media debates over science and technology are a staple research topic, there is a tendency for investigations to start when a topic becomes 'hot' in the mass media. In this paper, I will investigate the prehistory of such a public controversy via my research on the contemporary history of bovine TB (bTB) in the UK. While government policies to cull wild badgers (Meles meles) in order to control bTB in cattle are now highly controversial and attract widespread media coverage, debates over these policies have been ongoing since the early 1970s. However, it is only since 2010 that the badger/bTB controversy has transitioned from a series of localised controversies (geographically and/or of specialist concern) into a highly polarised and public debate. In this paper I will trace the forty year history of this controversy and identify the key factors contributing to this transition. These include: a long-term, repeating cycle of policy=>controversy=>research=>expert-led review=>escalating disease rates; legitimacy struggles over expertise; failed expectations; and the breakdown of mechanisms for direct interaction and engagement between key actors. I will also present data on how the badger/bTB issue has been covered in mass media, illustrating the roles of specialist media and their audiences, non-governmental campaigners and politicians in driving the further polarisation and public visibility of the debate. This case study can inform wider questions of how public scientific controversies are made by identifying the factors precipitating the movement and uptake of an issue into the wider public sphere.

Huiping Chu (University College London), "Who Visits Science Museums in China?"

In 2009, US scholar John H Falk published his book Identity and the Museum Visitor Experience. In this book, he introduces the concept of the "the Museum Visitor Experience Model" and categorises visitors into five groups: Explorer, Facilitator, Experience seeker, Professional/Hobbyists, and Recharger. This theoretical model is the result of empirical work arising from his research, based mostly in the US. There is no relevant research on this topic conducted under other cultural and social backgrounds, particularly in China.

I have done more than 1200 questionnaires in three science museums in China to collect enough statistically significant data and face-to-face interview work also has been done. Based on the results I have gotten, it is clear that female visitors have advantages both in numbers and education levels. Also, more non-science background visitors than science background visitors. More important, Chinese visitors do not have so five motivation categories as US museum visitors but seven. I will discuss my results and conclusions. Further more, I will try to do a deep analysis on the reason of these phenomena.

My project could be an attempt to explore how to apply this western science communication theory in Chinese cultural background, and it could contribute to the science museum study in China

by introducing a new theoretical model and help the English science communication world know the situation of China's science museums.

Trevor Collins, Victoria Pearson (speaker), Gareth Davies, Simon Sheridan, Richard Holliman, Helen Brown, Mark Russell and Jenny Hallam (Open University), and Anthony Steed (Denbigh School), Using Live Video Conferencing to Enable Authentic School-University Engagement"

We report on the impact of hosting a live video link between a school classroom and research lab, delivered as part of the Research Council UK-funded School-University Partnership Initiative under their 'Bringing Cutting Edge Science into the Classroom' scheme. This 'Labcast' connected a teacher and university researcher at The Open University's Ptolemy lab to 25 A-Level Physics students (UK Key Stage 5) and a teacher at Denbigh School in Milton Keynes. The aims of the event were to: provide students 'access' to an authentic laboratory/researcher without impacting on the school timetable; engage students with 'cutting edge' research via the curriculum; and provide a development activity for the teacher and researcher.

The design and development of the content for the event was a collaborative venture between the researcher (from the Ptolemy instrument team) and an early career Physics teacher. The co-design of the event was essential to ensure that the cutting-edge Science was suitably curriculum-focused and accessible. The focus of the Labcast was on the Rosetta probe's Philae lander, and the format incorporated passive student elements (e.g. watching the researcher's and teacher's presentation, their interview style dialogue and use of video clips), and more interactive elements (e.g. a lab experiment mirrored in the school and a problem solving activity concerning the selection of the Philae's landing site).

The analysis of the students' evaluation questionnaire responses, and interview transcripts with the researcher and teachers, revealed that students gained an authentic perspective of contemporary research (e.g. in terms of the time, cost and inter-disciplinary nature of space missions). The students and teachers both stated that this was a productive use of their lesson time that helped them see how the science they were learning in the classroom was being applied. The teacher and researcher both separately reported gaining skills and competencies that would help them progress within their respective careers.

Ioannis Costas and Jon Chouler (University of Bath), "Standing Up for Comedy in Science"

Humour is a powerful way of delivering meaningful insights and lessons. Using humour, stand-up comedians excel at making sure their audiences 'get' what they are saying. The techniques comedians use are fully applicable to academic hard and social science communication. By embracing stand-up comedy, academics can improve how they engage lay-audiences with their work. Unfortunately, there are many barriers researchers must overcome to engage the public using humour. Amongst them is the uncertainty of how to communicate with an audience whose expectations differ from an academic audiences', or where to find a platform to develop comedy techniques and put them into practice.

So how can we solve this problem? Join us on a perspective journey based on our experiences as hard and social science communicators. We will discuss how we created two platforms (Science Stand-Up and Ignite Your Mind) as well as coordinated a third (Pint of Science) with the aim of equipping researchers with the tools of humour and lay-audience engagement. In this panel-style Q&A format, we will outline our successes, what we learned, and what we may look

towards in the future. We would like this to be an interactive session which ultimately adds to the conversation of how academics and practitioners can use humour to share their research more effectively.

Gareth Davies (speaker), Richard Holliman, Emma Rothero (Open University), "The Importance 'Blended Professionals' Play Operating in the Notion of a 'Third Space' in Engaged Research"
We will report on the importance 'blended professionals' play operating in the notion of a 'third space' in engaged research. This reflects on participation in The Open University's Public Engagement with Research Catalyst, Engaging Research Seed Funding Award Scheme, based on the track record of engagement built up over a number of years through the Floodplain Meadow Partnership (FMP). FMP sit in a unique position functioning as 'boundary spanners' between practitioners (floodplain meadow managers), policy makers (Natural England - the organization that manages the agri-environment scheme), and academic researchers (at The Open University). FMP aims for participating in the seed-funded award-scheme were to better understand the impact their site-specific advice (translating Government-funded agriculture environment schemes), had on helping meadow managers create new species-rich floodplain meadows. Through 16 semi-structured telephone interviews (with site managers and an interview with a national representative of Natural England), FMP's advice was found to be invaluable for supporting site managers through the provision of excellent technical advice; ultimately supporting the Higher Level Stewardship scheme to benefit site managers determine suitable management plans. Moreover, given the 'third space' FMP occupied meant that this relatively light-weight evaluation was also able to inform other stakeholder conversations, having a positive impact on the sustainability of FPM and the collective understanding of the meadows; helping to galvanize management proposals into action.

Elena Denia (University of Valencia), "On the Public Attention to Science Achievements on Twitter"
The present work in progress aims a study on the social diffusion of science and public attitudes toward science. I propose a practical study on Twitter –by means of tools of computational sociology– on public attention to a science event (i.e. a discovery, an achievement, etc.) in order to firstly investigate the features of the network. 'Attention' is defined by the community (formed by agents; *media*, *institutions & associations*, *scientists* and *general public*) and identified by keywords and #hashtags (real-time nature). The study is restricted to a specific event but may be generalized to other events and areas.

On the one hand, this work offers a Twitter analysis of the social attention cycles and the dynamics of scientific information. On the other hand, the idea is to explore attitudes of communities and individuals toward science achievements –for instance the recent discovery of gravitational waves–, sometimes meaning an acquisition of new scientific information. That is to consider innovative tools for measuring the social perception of science, a social aspect studied extensively over the years by Eurobarometer surveys in Europe, by Fecyt reports in Spain and others. It represents an original contribution to the branches of knowledge of *Public Understanding of Science*, *Science Communication* and *Computational sociology*.

The study is opened to a deeper analysis concerning to the content of the *tweet*. The linked content may have different formats and sources (or channels) like papers, blogs, media news, videos, etc., and could be estimated whether a favourable perception of a concrete science achievement is linked to the flow of information of high scientific rigor and/or vice versa, by crossing perception (*positive*, *negative*, *neutral*) with scientific rigor.

Kanta Dihal (University of Oxford), "'If You Can't Explain It to a Six-Year-Old…': Communicating Quantum Physics to Children"

If communicating the concepts of quantum physics to adults proves a struggle, how could a children's book author approach the topic? Children's popularizations of science usually include practical and tangible elements, such as experiments which children can perform themselves. However, as there are no child-friendly quantum physics experiments, in books that cover this topic such experiments are to a large extent abandoned in favour of a science fiction-like or fantastical story that excludes the reader as an active agent. I will discuss Lucy and Stephen Hawking's *George* series (2009-2016) and Russell Stannard's *Uncle Albert and the Quantum Quest* (2005) as examples. The fictional and the fantastical are used extendedly in all of these works, to the point where science and fiction are no longer distinguishable, turning the work into a 'scientific fantasy'. Too often, studies of literature and science (Sleigh, Clarke and Rossini, Willis) or of science fiction (Latham, Bould et al, Garnett and Ellis, Roberts) omit works for children. This paper will address this gap, looking at the communication of quantum physics to children via two genres, science fiction and popularization, and the ways in which a crossover between the two can be made in order to communicate the concepts from modern physics. Where Melanie Keene in *Science in Wonderland* (2015) discusses the use of fantasy elements in science writing for children to show that science was stranger and more amazing than fiction, I will show to what extent this discourse continues to be used.

Roland Edwards (University of Manchester), "Scientific Education at the Workplace: The Role of Non- Formal Educational Material"

The role of formal academic textbooks, monographs and seminars as devices in discipline formation and growth is well established. Similarly the use of informal methods of science communication, such as museum exhibits, television and radio programmes in presenting science to the public is well understood. However, the role of non-formal educational material in communicating science to engineers and designers has received little attention.

During the mid-1950s institutions such as the government run British Productivity Council (BPC), employers' associations, the TUC and universities ran non-formal educational programmes on topics which included operational research, production engineering and ergonomics. These courses, which ran for 2 days to 3 weeks were written and delivered by experts in the field and were aimed at providing a basic understanding and application of the specific science. Aimed at engineers, designers, architects and middle and senior managers these courses were supported by material such as films, generally but not exclusively made by the BPC and books and pamphlets written by experts in the field.

In this presentation I will examine two pieces of non-formal teaching material used in ergonomics courses. These are the 1957 film "Fitting the Job to the Worker" produced by the BPC and some of the 12 pamphlet series, Ergonomics for Industry which were issued by the Department of Science and Industrial Research in the early 1960s. The presentation will show how these materials depicted ergonomics to non-ergonomists and were used as levers to bring ergonomics into an industrial setting.

Fernando García Naharro (University of Madrid), "Deconstructing Scientific Journals: Science and its Audience Under Franco"

In this paper I argue that scientific journals are constituted through the work and resources of many actors in many places, despite they are finally attached to only a few names (authors, publishers and Institutions). Deconstructing some Spanish scientific journals I intend to mapping out some of these actors and elements behind the big names. Journals that were published trough the official channels and intended to specific audiences, but what kind of audience? Where did these publications come from and how did they circulate? How were they put on use in the concrete time and social terrain of Spain during Franco´s dictatorship (1939-1975)?

These are the questions that I claim to answer from a cultural point view, focusing on the elements that contribute to the conformation of what they called scientific journals. Scientific publications analyzed as meaningful objects in connection with a distinct set of social practices and associated with certain kind of audience and places where they acquire a specific identity, separating in fact science from non-science in the light of the official image of science embodied in the centrally authorized scientific publications produced under the Regime.

Jean-Baptiste Gouyon (University College London), "To Provide Instruction Through Pleasure. An Intermedial Investigation of Interactivity on TV and at the Museum"

The BBC Science Unit recently engaged in developing digital contents for web-based platforms which rest on the notion of interactivity. A key aspect of this endeavour is the idea that, to paraphrase head of digital contents at BBC Science Kate Bartlett, if, when they touch a screen nothing happens, young people now tend to think that it is broken. Here, like in the museum several decades ago, interactivity rest on the introduction of a haptic dimension to the display.

My intention with this paper is to lay the ground for further investigation of interactive television, and to draw some parallels between television and the museum, to try and make sense of interactivity in the former.

The strategies and contents developed at the BBC Science unit are intended to reach audiences in the context of a platform-based, rather than channel-based, television environment. The idea here is that audiences increasingly tend to look at whatever comes their way on the internet-based platform which they happen to favour – Youtube, Facebook, Twitter, etc., and which they access through a variety of mobile devices, rather than using a TV set to tune in onto a specific channel in order to access a given type of content (switching on to BBC2 to watch "intelligent" TV). So rather than a competition for audiences' attention taking place between channels, the situation is rather one of competition between producers of contents for the attention of platform users.

With this paper I am particularly interested in looking at the difference between co-production and interactivity, drawing on the hypothesis that thinking of interactivity as a form of material practice is relevant here. Ultimately, this paper is intended to use the notion of interactivity to reflect on the broader theme of the public engagement with science and technology (PEST), in relation to instances of science in public.

Martina Gröschl (University of Klagenfurt), "Follow the Traces of Popular Mathematics Books"

Popular mathematics books cover a broad range of mathematical topics. They form a vital part of our popular culture. However, it has not been always so – they had played different roles in different

periods of history. From a different perspective, they reflect the specific *zeitgeist* and also the attitude towards mathematics in general. On the basis of some successful popular mathematics books I want to trace the development of this literary genre. I argue that the study of these books gives us valuable insight into the different attitudes towards mathematics in different societies.
At first I am going to introduce an approach to carve out the specific *zeitgeist*. More precisely, I explore the stories told, the author's intentions and their specific view on the role of mathematics. In the second part I examine the literary devices they appeal to.

I start my survey with a book written by Edwin Abbott Abbott arguing that already in the 19th century popular mathematics books have been more than just textbooks. Then I show how in the 20th century popular mathematics books turned from primarily educational tools with entertaining elements to bestsellers serving many other purposes. I am going to use examples from the following books:

- Edwin Abbott Abbott: *Flatland. A Romance of Many Dimensions* (1884)
- Malba Tahan: *The Man Who Counted* (1938).
- Douglas R. Hofstadter: *Gödel, Escher, Bach: an Eternal Golden Braid* (1979)
- Simon Singh: *Fermat's Last Theorem* (1997).
- Scott Patterson: *The Quants: How a New Breed of Math Whizzes Conquered Wall Street and Nearly Destroyed It* (2010).

Alexander Hall (Newman University), "Reporting on US Affairs or Creating Creationists? Creationism on the BBC"

The media play an integral and influential role in British society. The focus and framing of press, radio, and television coverage can popularise minority or extreme worldviews, which were previously not widely known within mainstream culture. By scrutinising the normative and largely dichotomous ways media producers frame coverage of controversial issues, we can explore the role popular media plays in transposing ideas and amplifying narratives.

Focussing on the British public service broadcaster, the BBC, this paper explores television and radio coverage of the US creationism and intelligent design movements. Beginning in the early 1980s, the British media responded to the purported rise in popularity in the US of creationism and intelligent design, with a raft of coverage focussing on the movements and their proponents. By analysing documentary and feature broadcasts on creationism, this paper demonstrates how in the 1980s BBC coverage transposed this predominantly US phenomenon and its often polarising narrative to the UK. While categorically condemning the pseudo-scientific elements of the creationist movement, the BBC, with its commitment to fair and balanced journalism, gave a platform to an extreme minority view and ultimately amplified a contemporary narrative of conflict between evolution and religion that was not representative of mainstream trends in the UK.

Sarah Hartley (speaker, University of Nottingham), Beverley Gibbs (University of Sheffield), Warren Pearce (speaker, University of Sheffield) and Carmen McLeod (University of Nottingham), "Progressing the Pedagogy of Interdisciplinarity: social and natural sciences in the TERRAIN Tool"
The lack of empirically-informed pedagogical guidelines for interdisciplinary learning is emerging as a significant lacuna in contemporary interdisciplinary higher education. The epistemological aims and consequences of interdisciplinary research have gained considerable attention in comparison to the educational challenges posed by interdisciplinarity. This situation is exacerbated by a scarcity of contemporary critical empirical accounts. We address this shortfall by illuminating one such empirical account: the introduction of Responsible Research and Innovation (RRI) to doctoral STEM students through the Teaching Responsible Research and Innovation (TERRAIN) Tool.

RRI is an interdisciplinary concept that aims to shape the direction and nature of science, technology and innovation for the benefit of society. RRI is being embedded in public and private sectors across Europe and internationally and calls for teaching RRI in postgraduate STEM training programmes. While RRI has particular leverage in the social sciences, it would not normally be part of mainstreamed STEM education.

We recount the policy and professional environment that brought TERRAIN into being and describe its development, implementation and evaluation in collaboration with several UK Centres for Doctoral Training. We anchor TERRAIN's critical analysis in emergent accounts of interdisciplinary pedagogies in higher education environments. We begin with a focused review of scholarly and practitioner literature, drawing out key values, skills and knowledge that we might look for in an interdisciplinary classroom. We then consider this in light of what we have learned through TERRAIN to propose a framework of interdisciplinary learning.

Oliver Hill-Andrews (University of Sussex), "Interpreting Science in Interwar Britain"
Studies of popularization in the twentieth century still tend to assume the existence of two stable cultures — elite and popular — with the latter being more passive than the former. It is supposed that professionalization had brought rigid divisions between science and the public, and 'popularization' was merely an adjunct to the creation of knowledge: less important and less interesting than what occurred in laboratories. An examination of the life of J.G. Crowther (1899–1983) — the first scientific journalist in the UK — reveals a different picture. This talk will focus on Crowther's emergence as an 'interpreter of science' (a term that overcomes many of the pitfalls of 'popularizer'). Crowther's writings are important because they appealed to a broad range of the nonspecialist public; a category that included research scientists (who, outside of their own subdiscipline, were nonspecialists). At a time of increasing specialization (and when fields were seen to encroach on each other), practising scientists spoke of the need for up-to-date syntheses of the various scientific specialisms. Eventually, the Nobel-prize-winning biochemist Frederick Gowland Hopkins (1861–1947) called for Crowther to be regarded as a scientist, as his work was as important for the creation of knowledge as laboratory research. These scientists largely overlooked Crowther's other aim: of inspiring revolutionary attitudes amongst the masses. Explaining how Crowther managed to carve out a place between scientific specialists and a broader readership not only modifies the historiography of public science and reveals the political origins of science journalism; it also potentially offers an example of how to interpret science for the many nonspecialist publics today.

John Holmes (University of Birmingham), "Setting Science in Stone: The Natural History Museum as an Act of Resistance"

The Oxford University Museum (OUM) opened to the public in 1860. It was a unique collaboration of working scientists and pioneering artists, the Pre-Raphaelite Brotherhood (PRB), who ten years earlier had declared their own mission to remodel art on the lines of science in their magazine *The Germ*. As well as collaborating on the design and decoration of the OUM, both scientists and artists wrote accounts of it as a work uniting science and art. Taking these accounts as a starting point, this paper will explore how they provide a model for reading and writing about a second, even more ambitious museum: the Natural History Museum (NHM) in South Kensington, opened in 1881. The NHM was a collaboration between the comparative anatomist Richard Owen and the architect Alfred Waterhouse. Owen was a mentor to both the Oxford scientists and the PRB. Waterhouse too was an admirer of the PRB, and he modelled his new building in part on the OUM. By comparing the plans, materials and decoration of the two buildings, however, it is possible to see how, under Owen's command, the inclusive, open-ended vision of nature as God's creation built at Oxford hardened into a rigid and insistent resistance to Darwinian evolution. Owen's science was out of date even before the museum opened, yet it remains fossilised in the fabric of Waterhouse's building.

Matthew Holmes (University of Leeds), "Twentieth-Century Biotechnology in the British Landscape: Historical Reflections"

Under a broad definition of biotechnology as the manipulation of biological organisms for industrial purposes, modified plants have occupied the British landscape for millennia. Yet during the 1990s and early 2000s, British consumers resoundingly rejected genetically-modified (GM) crops. Opponents of GM perceive such crops as profoundly unnatural; yet GM advocates point out that modern food production is already a fundamentally unnatural process. The latter situate GM within a long history of human intervention in plant breeding and argue that the technology is not so different from what has come before. I examine this claim through a history of three British crop plants - Proctor barley, Golden Promise and Devon maize - each produced by a different technique in twentieth-century biotechnology. This history results in two proposals, one affirming existing beliefs, the other pushing us in new directions. The first confirms that the successful uptake of crop plants produced by new biotechnologies is highly dependent upon social, economic and environmental factors. The second reveals that failed or secretive biotechnological techniques have led to substantial differences in perceptions of the longevity and scope of plant biotechnology. Revealing this hidden history has implications for the entrenched GM debate, as it demonstrates that GM crops are part of a historical continuum of plant breeding technologies. This revelation frees us from an intractable natural vs. artificial debate to focus on more tangible questions concerning GM crops, including their social, economic and environmental implications.

Hsiang-Fu Huang (University College London), "The Use of Sublimity in Popular Astronomy: Lent, Monty Python and Brian Cox"

Sublimity, the quality which 'produces feelings of awe, reverence, or other high emotion' (*OED*), has been a common element in the portrayal of the universe in popular works of astronomy throughout the past and present. This paper uses three cases for demonstrating the timeless significance of

sublimity: Lenten astronomy lectures in the early nineteenth century, the 'Galaxy Song' of Monty Python (1983), and the BBC television series of Brian Cox (2010-11). Astronomy lectures in theatres were prevalent during Lent in nineteenth-century Britain. With large visual apparatus, orchestra music and stage facilities, these astronomy shows combined informative instruction, amusing effects, and religious sentiments. Similar representation could be found in the mass media in twentieth and twenty-first centuries. Today's narrators – of whom many are professional scientists – might no longer speak of religious reverence, yet they still use the same language as of the popularisers two centuries ago. My research highlights the core concepts of emotion and aesthetic grandeur which have always been underlined consciously or unconsciously in popular astronomy. Popular science, I argue, sells not only knowledge but also a 'vibe'.

Tim Huisman (Museum Boerhaave), "Re-thinking Museum Boerhaave"

On January 1 2016 the Museum Boerhaave closed its doors to the public. The next year and a half the museum will be working on a new permanent display, replacing the current one which dates from 1991. This 'old' permanent display was characterized by its intellectual authors as 'an altar for the instrument,' visualizing the (Dutch) history of science and medicine by chronologically presenting scientific and medical instruments from 1550 to 1975. Historical and social contexts to the objects were kept to a minimum, restricted to a few paintings and photographs and museum texts. Although this approach left our visitors lots of freedom to interpret the exhibits, enjoy their aesthetic qualities and encounter individual icons from the history of science and medicine, it was seen as esoteric and intimidating by many people less knowledgeable about the sciences and their history. For a considerable part of our visitors the contexts, human interest and excitement encapsulated in our collection therefor remained hidden.

Clearly the somewhat elitist approach of the 'old' presentation will not do for a museum that wants to broaden its public appeal. The new permanent display will have to be much more accessible to a much larger and much more diverse public. In my presentation I want to introduce you to the working processes and strategies used by the staff of the Museum Boerhaave to reach these goals. How did they re-think the museum to make it more user-friendly? But also: what will the new Boerhaave look like?

Elizabeth Jones (University College London), "History of Ancient DNA as History of Celebrity Science: Communicating Science in the Media Spotlight"

In this talk, I argue that the history of ancient DNA research is a history of celebrity science. The search for DNA from fossils has a short but sensational history as it arose from the interface of paleontology, archeology, and molecular biology in the 1980s. From then to today, it has evolved from an emergent to an established technoscience. However, I argue it has evolved into a technoscience under the influence of intense public interest and extreme media exposure, particularly as it coincided with and was accelerated by the book and movie *Jurassic Park*. Through original interviews with over fi y scientists and students, I use oral history to reveal the intricate relationship between science and the popular press. From the start, ancient DNA research was a science in the spotlight. The media provided momentum behind the search for ancient DNA, contributing to the development of the discipline. Both researchers and reporters created a dynamic dialogue as a consequence. This interplay has important implications for science communication and

science in public. Overall, I argue that ancient DNA research is a case study of a celebrity science, and I suggest it as a framework for other scholars interested in the development of other sciences under persistent publicity pressures of the media.

Stefanie Jovanovic-Kruspel (Naturhistorisches Museum), "A Temple of Evolution: The Natural History Museum Vienna"

In contrast to the conservative and neo-absolutistic politics of the Austro-Hungarian Empire, the intellectual and scientific climate in late nineteenth-century Vienna was innovative and open. Obviously Emperor Franz Josef I wanted Vienna to become a leading centre of culture and science. When the decision to build a new Naturhistorisches Museum (NhM) was taken, the renowned scientist and declared Darwinist Ferdinand von Hochstetter was appointed as first director. Thanks to Hochstetter, the NhM was designed as a consequent manifestation of Darwin's theory of evolution. Compared to other museums of the time, including London, this was a unique and daring statement. Hochstetter incorporated humanity into natural sciences by setting up new exhibitions of Anthropology, Ethnography and Prehistory. This inclusion of the "human case" stood in clear opposition to the earlier anthropocentric view of the world and shows the increasing influence of science at that time. The inscription over the main entrance of the NhM, "For the Realm of Nature and its Exploration", emphasizes the idea that the museum had to be an expression of the state of the science. The message of the museum was not only communicated by the means of its exhibitions. The design and architecture of the building, and most importantly its decorations, make knowledge about human evolution readable for the visitor. The architects Gottfried Semper and Carl Hasenauer created a "speaking" architecture that summarizes the museum's purpose as a "Temple of Evolution".

Melanie Keene (University of Cambridge), "Histories of the Sciences for Children: Past, Present, and Future"

Whether falling apple, fossil monster, or philosopher's stone, the first stories one hears about the history of science set a powerful precedent for later expectations. In this talk I will introduce and analyse a selection of children's books on the history of science, investigating why it has been deemed a suitable subject for young audiences, and how its presentation has changed (or not) from the late nineteenth to the early twenty-first centuries. By comparing their chosen topics, tone, format, illustrations, and reception, I will explore how some works attempted to convey an entire disciplinary history, such as Arabella Buckley's 1876 *Short History of Natural Science*, F. Sherwood Taylor's 1955 *Illustrated History of Science*, or William F. Bynum's 2012 *Little History of Science*; and others, such as the picturebook biographies of Darwin and Galileo by Peter Sis, or the well-known Ladybird series, focused on specific moments of heroic discovery and memorable imagery. Since neither an emphasis on progressive narrative accounts of cumulative development nor exceptional lone geniuses reflect most current scholarship in the field, I will also suggest what we might want future histories of the sciences for children to look like.

Jared Keller (Imperial College London), "'Scientists Have a Natural Tendency to Take Themselves very Seriously': Science on BBC Radio in the Post-War Period"

As the Second World War drew to a close, many scientists in Britain came to believe that the spectacular wartime successes of technologies such as radar had created a widespread public demand for information about science – a demand that could and should be met through the medium of radio. This view was shared by many within the BBC, including a number of senior managers and influential producers. However, there were frequent and often bitter disagreements about how to best serve this new, eager public; some argued that the new demand should be met by scientists speaking directly to the public, whereas others argued it should be met by popularizers or science journalists who could better translate complex scientific information for listeners. These scientists, producers, and managers were therefore grappling with questions of authority, expertise, translation and popularization that are as relevant today as they were 70 years ago.

This talk will focus on a BBC producer named Archie Clow, a chemist and historian of science by training who would go on to guide science programming on BBC radio for the next quarter-century. Specifically, this talk will look at Clow's efforts to develop a series of science programmes delivered not by scientists but by what he termed 'competent publicists', and will examine the (mostly critical) reaction his efforts elicited from BBC management. Ultimately, I argue that these contentious exchanges came down to a fundamental disagreement over the ultimate purpose of science programmes, and that despite priding itself on being a public service broadcaster, the BBC's science programming was at times more about serving the interests and ambitions of the BBC than it was about serving the public.

Clare Kemp (Open University), "Engaging Children and Young People with Contemporary Science"

Levinson concludes educating about still-debated technologies will need "radical re- orientation of present science curriculum policy". Certainly current scientific teaching often revolves around fact-established curricula, and attracts only small numbers of gifted students to study science at university. Meanwhile, contemporary and debated issues are generally avoided, yet include exciting emerging technologies that potentially have relevance for students of all abilities. The current project explores these issues through study of one scientific research organisation involved in the development of genetically modified crops, alongside their government funding body. A mixed methods approach is combining semi-structured interviews and thematic analysis of the organisations' websites. The aim is to explore ways for students of all abilities to better engage with issues that are shaping the societies they will inherit.

David A. Kirby (University of Manchester), "Movie Censorship, Science Communication and the Deficit Model"

From 1930 to 1968 movie studios sent their screenplays for approval by censorship groups in the U.S. and U.K. including Hollywood's official censorship body the "Hays Office", the Catholic Church's Legion of Decency and the British Board of Film Censors. These censor boards dictated which aspects of science they considered appropriate for movies and which scientific subjects they considered indecent or immoral. In this paper I explore the parallels between movie censorship and the continuing role the deficit model plays in contemporary science communication. The deficit model and movie censorship both reveal a lack of trust in the public by trying to remove ambiguity from

audience interpretation. The deficit model's foundation is a conviction that if scientists can control messages about science then they can compel people to think the "right way" about scientific controversies. Movie censors mirrored this belief by acting as gatekeepers who only permitted what they saw as "acceptable" narratives about science to reach the screen. Censors wanted to "guide" audiences who they feared would not always remember that what they were seeing on movie screens were just stories. Specific examples for this paper will come from the archives of censorship organizations regarding specific movies including *Frankenstein* (1931), *Island of Lost Souls* (1933), *Dr. Ehrlich's Magic Bullet* (1940), *Freud* (1962) and *The Last Man on Earth* (1964).

Carola Leicht (University of Kent) and Carissa Sharp (Newman University), "Contemporary Views about Religious Scientists and Atheist Scientists: Findings from Experimental Social Psychology"
Throughout modern history, science and religion have often been seen as necessarily in conflict. However, many people are able to reconcile both belief systems, and our objective was to use person-perception methods in order to understand how these individuals are perceived. We built upon research showing that counter-stereotypical individuals are perceived with different impression formation processes than stereotypical individuals. When forming an impression of an individual who belongs to two typically unrelated groups, participants tend to use emergent attributes (attributes not associated with either of the constituent group memberships).

We hypothesized that impressions of religious scientists would differ from impressions of atheist scientists in that they would involve more emergent attributes and different demographics. We performed a series of online and lab-based studies with UK residents, in which participants described targets who were religious scientists or atheist scientists. We then assessed the extent to which those targets were described with emergent attributes, and differences between how the targets were perceived in regards to intelligence, warmth, and trustworthiness. Our results showed that religious scientists are perceived differently from atheist scientists and are described using significantly more emergent attributes. As exposure to counter-stereotypic individuals has been shown to reduce prejudice and bias, we discuss the potential of this research to inform interventions reducing prejudice against individuals belonging to and identifying with either or both belief systems.

Felicity Liggins (speaker, Met Office), Ellen Dowell (Einstein's Garden), Jamie Wardley and Claire Jamieson (Sand in Your Eye), "Overview of Sandscape, the MetOffice's Award-Winning Outreach Programme"
In 2015, the Met Office's award-winning outreach programme, designed to inspire the next generation of scientists and engineers, delivered one of its most ambitious and creative activities to date. It explored how scientists and artists can come together to create an engaging experience for young people and families. This activity was called Sandscape.

Sandscape was an interactive sand sculpture workshop exploring how weather and climate affect our health. Budding sand sculptors were shown how to fashion elaborate structures from sand and water – creating a landscape with bridges, skyscrapers, forests and factories. As they worked, participants were encouraged by the scientists delivering the activity to reflect on what makes a healthy city, considering how the natural and built environments influence air quality and circulation and how this impacts our health. Topics discussed included urban heat islands, air pollution and dispersion modelling, pollen forecasting and predicting the wind-borne spread of animal diseases.

Each hour long workshop culminated in a dramatic demonstration that used dry ice to represent clean air circulating from mountains, along rivers and into cities.

Here we present an overview of Sandscape, identify the strengths and challenges of such a collaborative and playful approach to public engagement and share the results of our evaluation. Sandscape was originally supported by the Met Office and the Wellcome Trust, and produced by Einstein's Garden in collaboration with the Met Office, scientists from the University of Exeter and sand sculptors from Sand in Your Eye. It was first presented in Einstein's Garden at Green Man festival 2015, an independent music and arts festival held annually in the Brecon Beacons, Wales, and then at Bournemouth Arts By the Sea Festival in October 2015. Further opportunities for redelivery in venues not-traditionally associated with science communication are currently being explored.

Harriet Lloyd (University College London), "How to Describe Historical Audiences for Science"
What methods can be used to describe historical audiences for science? In this paper I explore the different ways that historians can describe audiences, using the case study of the chemist Humphry Davy's audience at the Royal Institution of Great Britain in London, 1801-1812.

The lectures at the Royal Institution were described as public — prosopography can be used to reveal to whom the label 'public' was referring to. My prosopographical method is to collect data (names, titles and addresses) from Davy's audience that for an individual gives the historian little information to work with, but for the collective audience can be used to reveal hidden patterns and shared commonalities between actors. Compiling a list of addresses has allowed me to place actors from Davy's audience on a map, which in turn reveals social networks between the audience members that might otherwise remain hidden. For example, multiple actors often gave the same address but did not share the same surname. Without addresses, relationships between actors might only be revealed among actors sharing the same surname.

This project seeks a best description of the experiences of hundreds of historical actors, the majority of whom do not have archived papers. I am experimenting with visual explanations: a layered image of a crowded Royal Institution lecture theatre shows the level of nuance I can achieve with each actor in my description of Davy's audience.

Cristina Luis (Universidade de Lisboa, speaker), C. Conceição (Instituto Universitário de Lisboa), A.J. Monteiro (Universidade de Lisboa), A.F. Costa (Instituto Universitário de Lisboa), M.C. Lourenço (Universidade de Lisboa), "Humanities and Citizen Science in Portugal: An Overview"
Citizen science projects seem to follow a dominant global trend, i.e., mainly involving research data related to biodiversity, environment, astronomy and public health. Worldwide the number of citizen science projects using data arising from the humanities is still reduced, and Portugal is no exception. At the same time, although studies on citizen motivations abound, the motivation of researchers to promote citizen science projects has not received the attention it deserves. What motivates researchers to promote citizen science projects? What are the requirement and conditions? Are some disciplines more 'suitable' to knowledge co-production? If so, which disciplines and why? In particular, are the humanities intrinsically difficult to involve citizens in research? Why? We will discuss these questions and propose a research framework to study them in the Portuguese context.

Chris Manias (King's College London), "The Lost Worlds of Messmore & Damon: Science, Spectacle and Prehistoric Monsters in the Early-Twentieth Century United States"

The early-twentieth century was a key period in which dinosaurs, 'cave men' and other prehistoric creatures were promoted to the public, and used in debates on evolution and the natural world. This paper will focus on one of the most high-profile commercial promoters of prehistoric knowledge in the 1920s and 1930s, the model-making company Messmore & Damon of New York. Drawing off traditions in commercial showmanship and interacting with scientific institutions like the American Museum of Natural History, Messmore & Damon constructed a whole menagerie of life-sized moving and roaring prehistoric animals, including mammoths, Neanderthals, and (as their centrepiece) the 47 foot long 'Amphibious Dinosaurus Brontosaurus.' These animatronic models were displayed throughout the United States and beyond, making their way through newspaper stories, department store displays, vaudeville shows, parade floats, and – at the 1933 Chicago World's Fair – the extravaganza of 'The World A Million Years Ago,' depicting the entire history of life. Examining the promotional strategies used by Messmore & Damon and how these displays were debated in the wider media, this paper will discuss how palaeontological knowledge could be used and communicated in this period, and the relationships between science and commercial spectacle in the twentieth century.

Oliver Marsh (University College London), "Le Geek, C'est Clique? Emotional and Definitional Meanings of Science Online"

An important science communication phenomenon of this decade is the growth of online forums for discussing science. Examples include the Facebook page 'I Fucking Love Science' (IFLScience), which has over 20m 'likes' and regularly tops Facebook's user engagement statistics, or Reddit threads such as r/science or r/AskScience which offer thousands of users the chance to ask and answer one another's science questions. As with many contemporary 'Web 2.0' sites, these ostensibly provide significant opportunities for mass open dialogues; however features of both communal norms and technical infrastructure shape how and which participants can involve themselves in dialogues, even when traditional offline identity cues are reduced or absent.

My research investigates how meanings of 'science' and 'science person' are constructed and used within conversations on four case-study groups – IFLS, the reddit group r/EverythingScience, and the XKCD and Skeptics' Society forums. In this paper I will present key themes from across these with reference to both Science and Technology Studies (STS) and scholarship around online fan communities. For example, debates on these groups around 'properly scientific' discussions are familiar from STS scholarship, most recognisably of Thomas Gieryn and Brian Wynne. However, the science-based in-jokes, meme images, and identity labels are more adequately described by drawing on Henry Jenkins' 'meaning-making' and Nancy Baym's 'informational and performative capital,' developed from studying television and science-fiction fan communities. By combining these separate perspectives and using them to analyse online conversation data, I consider how 'making meanings' of science can be both a definitional and emotional act.

Joseph D. Martin (Michigan State University), "The Purloined Letter Effect: Prestige Asymmetry in the History of Science"

High-energy physics and cosmology attracted considerable public attention through the later-twentieth century. In contrast, condensed-matter physics— which occupied the greatest proportion of physicists—remained little known to the public, despite its relevance to technologies that most people use daily. Why do similar scientific endeavours often garner unequal public approbation?

Condensed-matter physicist Andre Geim points out that graphene, his best- known discovery (found in small quantities in pencil shavings), "has literally been before our eyes and under our noses for many centuries but was never recognised for what it really is." Condensed-matter physics investigates phenomena on the human scales, rendering it susceptible to the Purloined Letter Effect. In Edgar Allan Poe's "The Purloined Letter," an unscrupulous minister steals a compromising letter to blackmail a wealthy aristocrat. Anticipating a thorough police search of lodging, he hides the letter in plain sight, knowing they will overlook anything unconcealed. The protagonist of the story, C. Auguste Dupin, uncovers the ruse, making the police look foolish in the process.

Discoveries of phenomena that are "before our eyes and under our noses" fail to enact scientific values that comport with public expectations for scientific progress. Whereas the frontier-oriented rhetoric of high-energy physics and cosmology upholds ideals of human potential, discoveries that smack of the mundane are reminders of human limitations. I trace this effect through the public-facing rhetoric of discovery in condensed-matter physics, contrasted with analogous rhetoric surrounding high-energy physics and cosmology.

Will Mason-Wilkes (Cardiff University), "Science as Religion? Representations of Science in Contemporary British Science Television"

Television has been and remains one of the most ubiquitous, far-reaching and trusted mediums for the communication of science. The way in which science is represented on television has important implications for public understanding of, attitudes towards and engagement with science.
Within the medium of television, science can be represented in various ways. My focus will be on representations of science in non-fiction genres, which claim to represent reality in a true-to-life way. I will focus on what I will call 'religious' and 'secular' portrayals of science on British television. I will identify these in two specialist factual science programmes first aired on the BBC in 2013. The religious portrayal of science presents science as providing a creation narrative, as being immutable, as easy to accomplish and as a source of meaning. The secular portrayal represents science as provisional, changeable, requiring skill to accomplish and providing both positive and negative impacts on society. These contrasting portrayals are not dependant on the particular scientific topic that is being presented, but are a consequence of the kind of language and iconography used to describe science, in concert with visual and audio elements.

I will focus on the religious portrayal of science and its problematic consequences. The religious portrayal presents a fundamentally asocial view of science. I will argue that it could engender understandings within audiences which compromise their ability to engage with science in well-informed and constructive ways.

Candace Massey (Simon Fraser University), "Making a Rule of the Exception-al Respondent: Tracing the Patient Testimonial as a New Form of Evidence-Making in the Era of Personalized Medicine"
Personalized medicine is an emergent paradigm in the clinical diagnosis, management, and treatment of cancer in the US and the UK. Personalized medicine employs genome sequencing technologies and gene expression profiling techniques towards discovering individually-targeted treatments for patients, also know as pairing "the right drug, with the right person." A trend in current medical news reports and press releases is the growing use of individual patient narratives when discussing medical breakthroughs in personalized treatments for cancer. These reports are often structured around the cases of a very few number of individual patients who have been enrolled in experimental clinical trials with successful results. Sometimes termed as "exceptional respondents" by researchers, these patients are portrayed as possessing genomic anomalies that can be further investigated and capitalized on, such as in improving the design of clinical trials that will lead to the development of individualized treatments for a larger cohort of patients.

Drawing on STS and historical works that have focused on the shifting status of objectivity, this paper seeks to describe how scientific-medical "breakthroughs" in personalized medicine travel from the laboratory to the public, and acquire value and secure legitimacy vis-a-vis the patient testimonial. Engaging in close text analysis of popular newspaper articles from major urban centers in the US and Canada, this paper seeks to address the following questions: First, how are patient accounts or 'testimonials' employed as objective evidence for the successful use of personalized treatments in the clinical trial? Second, how does the patient testimonial reinforce the conviction amongst researchers and the general public that personalized treatments are the future of medicine, subsequently making a discursive rule of an "exception" (the patient is perhaps 1/270 in the clinical trial to reach a high survival outcome)? This paper will contribute to discussions in the history of science that seek to trouble established dichotomies between the subjective/objective and fact/value in scientific epistemology.

Ruselle Meade (Cardiff University), "Embracing the Transformative Potential of Science: Popular Science and the Artisanal Class in early Meiji Japan"
During the Japanese "science fever" of the late 1860s and early1870s, many science books were translated into vernacular Japanese from Chinese and European languages. These vernacular works rendered science accessible to new audiences, and opened up scientific material for appropriation in various ways. This paper focuses on one such rewriting from this period, *Accounts of Invention* (*Hatsumei kiji*) a work written by a tradesman for his fellow tradesmen. It was created by combining material from vernacular Japanese translations of Chinese and Dutch works, along with original additions to shape it into a genre accessible for his target audience. With this work, its creator sought to convince his fellow tradesmen that the modernity promised by science was an opportunity to transform the status of their artisan class, which hitherto had a relatively lowly status in the immutable social hierarchy of early modern Japan. By focusing on the pre-eminent technological icon of modernity, the steam engine, its creator could persuasively argue that it was from the artisanal rather than scholarly classes that Japan's future Stephensons and Watts would emerge. This paper will examine how new modes of communication and expression that emerged in the context of a rapidly modernizing Japan enabled new audiences to engage with science, and provides insight into how those outside the scholarly classes embraced science for its promise of elevating their social position.

Felicity Mellor (Imperial College London), "Not Communicating Science: a Typology of Silence"
Much discussion about science communication assumes that scientists should communicate as much as possible. Yet episodes in public science frequently provoke questions about when *not* to communicate – a recent example being the debate over whether climate scientist James Hansen was right to publicise his research on rising sea levels before it had been through peer review. In this paper I argue that to make sense of such debates, we need an analytical framework that recognises the communicative function of silence and distinguishes between its different forms. I propose one such typology that analyses silence along two dimensions: a producer-oriented dimension of choice and an audience-oriented dimension of communicative effect. I will illustrate the different types of silence with examples drawn from both the history of science and contemporary science, highlighting the communicative struggles that scientific silences can represent.

Paul Merchant (The British Library), "Oral Histories of Science and Religion in Public"
This paper considers – in the case of Britain in the later 20th Century – the relations between popular science writing, efforts to improve the 'public understanding of science' and a reinvigorated conversation, in print, about relations between science and religion. Drawing on extended life story interviews with Mary Midgley, Lewis Wolpert, Chandra Wickramasinghe and science writer and editor Bernard Dixon, it raises new questions about how particular pages of *New Scientist* in the 1970s, or books such as Midgley's *Science as Salvation* (1992), should be read. In particular, it argues that very personal thoughts and intuitions concerning the nature of reality, and very individual engagements with science and religion – revealed in life story oral history – are amplified across books and magazine articles that might easily be taken as straightforward markers of a 'public discourse'.

Daniel Navon (UC San Diego), "Making and Remaking Facts: The Social Mediation of Genetic Mutations, 1959-2015"
The idea that facts and even entire systems of knowledge production can undergo radical change or crumble away altogether lies at the very heart of the social studies of science. However, this paper addresses a different kind of historical transformation of scientific facts – one that is underwritten by a strong *continuity* in the objects of knowledge in question. How, I ask, do scientific facts change over time? In order to pursue this question, I examine how what it means to have a genetic mutation has been transformed over the last half-century. Specifically, I trace the shifting social and biomedical status of mutations like Fragile X and the 22q11.2 microdeletion. For decades, they attracted avid interest from researchers in human genetics but very little attention among other fields or broader publics. Today, by contrast, huge amounts of resources and attention are dedicated to these disorders with the goal of improving health outcomes and unlocking the genetic basis of more common conditions like autism. Furthermore, they have become the object of a host active social movements with support groups, online forums and registered foundations dedicated to the cause of a these genetic mutations and their bearers. Drawing on the work of Ludwik Fleck, I develop a framework of 'reiterated facticity' that aims to help us understand how scientific facts are made and

remade in interaction with the networks of social mobilization organized around them and the shifting publics with which they must engage.

Jessica Norberto (USP/ Fundação CECIERJ), "Travelling Science Museums: Challenges and Experiences in Science Communication"

Travelling science museums aim to make science more popular and reach the audience in its own space and time. When an exhibit moves, things, time and space are different. Travelling science is challenging, specific and unlimited: you have to be creative because of the reduced space, you need a sharp didactical approach because of the short time, you must go straight to the point because the institution can afford just a few exhibits. Furthermore, its maintenance is continuous and expensive. Everything that is interactive, hands-on, manipulative and moves around a lot, needs maintenance, paintings and adjustments frequently. In this session, which is part of a Phd study, we propose to discuss the past, present and future of travelling museums in the world and in Brazil, specifically. From the experience of four pioneers and well known Brazilian travelling science museums – Promusit, Mobile Science, Caravan of Science, and Ponto UFMG Itinerant Museum - we are also going to present and analyse challenges and strategies of communicating science to a broad range of publics in very different social contexts. Because they are built in trucks, they can visit towns, which usually do not have access to this kind of activity. They do not only transport artifacts and equipment to build external exhibitions, shows and workshops, but they also offer activities in their internal rooms.

Jesse Olszynko-Gryn (University of Cambridge), "Technology on Screen: Public Visibility, Product Placement and Pregnancy Testing in British Television and Cinema"

In this paper I use the case of Unilever's Clearblue, the popular home pregnancy test, to investigate how new technologies are made publically visible, mainstreamed and normalized on screen. A product of the British boom in entrepreneurial biotechnology that coincided with NHS cutbacks and the rise in health consumerism, Clearblue rapidly emerged in the late 1980s as market leader in the most lucrative sector of the little-studied diagnostics industry. Though also advertised in women's magazines, Clearblue was marketed more effectively to larger and more diverse audiences on television and in cinema with help from the then nascent and also little-studied product placement industry. As I will show in this paper, product placement ensured that when a female character was portrayed using a pregnancy test in a soap opera or romantic comedy, she almost always chose Clearblue.

Product placement was especially crucial in Britain, where the non-commercial BBC controlled a large market share and advertising regulation was highly restrictive. Constitutive of Britain's then increasingly public and politically fraught culture of reproduction, which in the 1990s focused especially on 'schoolgirl mums' and the biological clock, televisual and cinematic pregnancy testing propelled the commercial rise of Clearblue and fed into the construction of new femininities (pregnant teenagers and older career women trying to conceive). I argue that – in addition to print media – television and cinema are an integral part of the story and should be taken seriously by historians.

Clare O'Reilly (University of Leeds), "Contests between 'Citizen' Scientists and Taxonomists over the Wild Plant Hybrid in Britain 1850-1900"

In 1899 an orchid taxonomist at the Royal Botanic Gardens, Kew, Robert Allen Rolfe (1855-1921), claimed that the plant hybrid had been "treated unsympathetically, largely ignored or got rid of" by British botanists during the nineteenth century. Continental botanists had done far more in detecting wild hybrids, shown by Wilhelm Olbers Focke's (1834-1922) *Die Pflanzen-Mischlinge* (1881), the definitive listing of wild hybrids reported across Europe. Yet British herbaria include many specimens labelled as hybrids, collected on local natural history society field excursions and distributed by specimen exchange clubs. Why was British plant taxonomy so much at odds with the approach taken on the continent and with the evidence provided by British field naturalists?

This paper compares the hybrid in British herbaria from 1856-1900 using the Herbaria at Home project database with disagreements about hybrids played out in scientific periodicals. The underlying tensions motivating the debate over plant hybrids in nature included the lumper-splitter divide in the history of taxonomy, worries about a proliferation of plant names by "hybrid-mongers", and the practical difficulties in identifying hybrids. However, the paper concludes that the role of botanical education accounted for attitudes among British systematic botanists to the hybrid. One aim is to show how 'botany' consisted of diverse interconnected scientific communities and the 'citizens' involved in science were characterised by highly skilled scientific practices and a sense of a scientific self, which acted as an important link between them and museum and university taxonomists. Another is to demonstrate the historical value of museum collections of plant specimens and to contribute to historiography on the biological specimen as a source of scientific knowledge-making.

Andy Ridgway (University of the West of England), "Key Skills and Employability Factors for Science Journalists in the Digital Age"

Like many other fields of science communication, science journalism is facing a time of rapid change thanks to the opportunities and challenges presented online. For those who work as science writers, the potential to present stories in new, digital, formats is likely to lead to changes in the set of skills they require – skills that have stood the test of time for decades. At the same time, having spent the past 20 years as a journalist, most recently as a science journalist, I became increasingly aware of the importance of an individual's non-qualification 'capital', such as a track record in writing and strong interpersonal skills, in determining career success.

This paper reports on the findings of an online survey of 51 UK-based science journalists and interviews with senior editorial staff at publications in the UK that sought to gain an understanding of the skills required by today's science journalists. More specifically, the research sought to determine the role that non-qualification capital plays in career success and the extent to which the skills required by today's science writers are being transformed by digital media. The study raises interesting questions about how current and future writers will acquire the skills they need in this shifting landscape and whether those skills may be easier for some than others to acquire. Given the growth in the importance of digital online media in several forms of science communication, the results raise interesting questions about the skills required in the industry more broadly.

Tom Ritchie (University of Kent), "Mathematics, Meccano and Models: The Narratives of the Hartree Model Differential Analyser"

The focus of this paper is on Meccano as a scientific instrument and building block in the twentieth century. By analysing the Hartree Model Differential Analyser, constructed from Meccano, from its construction in 1934, to its place as a museum piece in the Science Museum today, this paper will build on the work of toys as scientific instruments, highlighted previously by Melanie Keene's excellent '*Construments'* article.

Before the Second World War, Meccano was used by scientists to construct devices, such as the Hartree Model Differential Analyser in Manchester. This model has been largely overlooked in contemporary histories of mathematics and computing, despite the principles of the machine being used to explore the wave function of the Hartree-Fock method and the atomic structure of chromium. Later, during the Second World War, the principles of the original Meccano Model were also used to determine the trajectory of flak shells, as well as having a role in Britain's nuclear ambitions in the Tube Alloys project.

After the Second World War, the digital EDSAC and ENIAC machines took precedence within computing. However, interest in this analogue machine was rekindled with the collection of the Meccano Model Analyser, that would go on to feature in the Science Museum's 'Information Age Gallery' until 2015. This enduring toy is intriguing in how little it has physically changed in 80 years, yet how much scientific machines and their narratives have changed in that same time.

To fully contextualise the narratives attached to the Meccano Model Analyser, I will situate the Meccano Model at the centre of my presentation, whilst also using a variety of other case studies, focusing on two questions:

- What scientific narratives have been attached to the Hartree Model Differential Analyser since its construction in 1934?
- In what ways did the use of Meccano as a scientific tool affect the science of the Hartree Model Differential Analyser?

Janine Rogers (Mount Allison University), "The Illuminated Museum: Book Culture and the Natural History Museum"

Many natural history museums of the late nineteenth-century were constructed as part of the Gothic Revival architectural movement; in this paper I will discuss how the Gothic natural history museum has roots in medieval book culture. In the middle ages, manuscripts were not just objects of artistic beauty or textual information, but also visual and spatial statements how we process knowledge, how meaning is developed and how that meaning connects to truth, including scientific truth. With the Gothic revival, Victorian architects, scientists and curators imported the philosophy of the medieval book as a model for scientific thought into their museums. For example, the use of light in the Gothic building is part of a medieval understanding of optics and space that is seen in manuscript illuminations and the medieval cathedrals that provided the models for modern natural history museums. With the development of evolutionary theory and other modern scientific theories, the medieval doctrine of light was employed by designers and architects of museums such as the Natural History Museum in London and the Oxford University Museum to articulate their vision of nature in response (negative and positive) to such theories. Thus the buildings of these museums act as "books of nature" that "write" nature through the architecture. This history gives us a sense of the deep

relationship between buildings and books, and in this case, the ways in which science, natural history and other forms of knowledge are inscribed in the architecture of the museum.

Anahita Rouyan (University of Bologna), "Staging Experimental Life Sciences: The American Press and Hugo de Vries's Theory of Mutation 1900-14"

When the Dutch botanist Hugo de Vries arrived on the American shore in the summer of 1904, he intended to conquer not only local scientific circles, but the entire nation with his popular theory of plant heredity. De Vries journeyed to the United States three times, delivering numerous public lectures, publishing two books intended for lay audiences and contributing articles to general-interest periodicals.

Local newspapers dutifully reported on de Vries's American itinerary, representing applied knowledge about plant heredity as a pathway to agricultural innovation and gradually exposing a novel variant of scientific agriculture that was beginning to emerge in the United States. Since the topic had already attracted a considerable public following through the celebration of the horticulturalist Luther Burbank, newspaper editors conceptualized de Vries's mutation research as a theoretical counterpart of Burbank's practical achievements, continuously suggesting that the mutation theory promised an economic value, even if no profitable mutations ever materialized.

My analysis of these media representations offers a glimpse into the discursive mechanisms which governed the installation of knowledge about experimental life sciences, especially plant heredity, in the public sphere during the first decade of the twentieth century. Foregrounding the methods employed by editors and journalists for staging de Vries's mutation theory, I trace their role as co-producers of scientific knowledge in developing a discourse of genetic modification which prefigured public representations of genetically modified organisms produced in the 1990s.

Susanne A. Schmidt (University of Cambridge), "The Politics of 'Popular Science': Midlife Crisis, Feminism and Psychology in Public in the 1970s"

This paper studies the distinction between good and bad "popular science" and its political implications in the 1970s. The demarcation of science from other knowledge is a well- established topic in history of science and neighbouring disciplines, yet with regards to science in public, the main focus has been on the demarcation *between* science and "popular science". I analyse the who, how and why of demarcation *inside* "popular science" by historicising the "midlife crisis", which spread in the United States and abroad with Gail Sheehy's *Passages* (1976).

Sheehy was a feminist journalist and the "midlife crisis" an instruction for how to end gender inequality. In spite of its popularity, this concept was soon replaced by an androcentric, masculinist definition put forward in a series of trade books penned by psychiatrists and psychologists. The switch was brought about without a debate on the politically charged disparities between both "midlife crises". The concepts were compared and contrasted, but primarily with regards to form, not function: as good vs. bad science "popularisations"—this was to the advantage of the psychological, chauvinist "midlife crisis".

The paper shows that scientific and journalistic actors alike drew the boundary between good and bad "popular science", and they did so in similar ways. Salient among the various demarcation criteria at play was a normative concept of priority ("be first or be bad"). I suggest that the boundary-work was a way of negotiating the place of psychology in public in the context of the

feminist criticism of psychology, a more assertive science journalism and the contemporary boom of popular psychology and self-help literature.

Charlotte Sleigh (University of Kent), "'Not One Voice Speaking to Many': Duplicators, Radios and Science-Fiction Fans in the Mid-Twentieth Century"

During the 1930s a new, self-aware group emerged in Britain: science fiction fandom. These very young men represented an eddy in the historical mainstream of twentieth-century scientific media. Whereas one-to-many was the order of the day (cinema, radio), their efforts reversed, or attempted to reverse, the trend. Their amateur magazines were produced domestically or on the sly at work; with their duplicators they made periodicals that – they hoped – spoke back to the hegemonic voices of publishing and other media.

After exploring the efforts of the fans, this paper goes on to examine the final novel of one of their favoured authors, E. C. Large. Large's Dawn in Andromeda (1956) wickedly satirised the mediatisation of science by having God challenge a pioneer population, working from nothing on a brand new planet, to create a 'seven-valve all-wave superhet wireless' in just one generation. This was to be both the peak of scientific achievement and the acme of social order. But would it, as the fans might have wished, have a 'button that we could press when we liked a programme, or refrain from pressing when we didn't'?

Recent work has begun to disassemble the historical wall between high modernism (Woolf, relativity) and the apparently plebeian modernism of scientific realists (Wells, radar). This study is framed squarely in such revisionist terms.

Melanie Smallman (University College London), "The Wrong Views, the Wrong Expertise and the Wrong Networks: Why Ten Years of Public Dialogue on Science and Technology has had little Impact on Policy in the UK"

The UK has seen a move to involve the public in discussions about the future of science and technology, since 2000. But what impact has formal citizen jury style dialogue activities had on policy and what does it tell us about how people come to terms with new technologies

In this paper, based upon an analysis of ten years' worth of public dialogue, expert and policy reports, as well as a series of interviews with government Ministers, civil servants and Chief Scientific Advisers, I will describe the discourses expressed in public dialogues. I will argue that these public discourses describe an imaginary of science and technology that is significantly different to the 'elite' imaginary shared by scientists and policymakers. I will also suggest a number of reasons why these different imaginaries make it difficult for public discussions to influence policymaking and discuss possible steps to address this in the future.

James Sumner (University of Manchester), "Of Punched Cards and Punch: Historical Humour as a Source for Tracing Popular Understandings of Science and Technology"

"Send someone a bill for a million pounds. They'll think we've got a computer." Appearing in the venerable comic weekly *Punch* in 1981, this joke was very much of its time – but only just. It relies on a particular set of assumptions which were current for British audiences between the mid-1950s, when stories of freak computer-generated bills began to take hold as standard newspaper fodder,

and the mid-80s, when falling costs made personal computers in office environments an accepted norm.

This paper explores how historians might use comic sources to gauge general audiences' developing understandings and expectations about scientific and technical topics. As many studies have emphasised, there is never any one readily identifiable "general public", nor any "typical" non-expert position. There are, however, powerful shared received understandings, and these serve as very useful building blocks for humourists, whose work often depends on brevity and immediate recognition for effect. Even without direct evidence on audience response, charting which scientific jokes were deemed "gettable" by successful authors and editors may provide valuable clues to the wider picture.

My case study considers representations of electronic computers in *Punch*, a periodical which has been extensively explored for the nineteenth century but which actually reached its peak of circulation (around 184 000) in 1947-8, just as computing was coming to public prominence. Some authors proved surprisingly committed to extending the reader's knowledge of computing concepts, but for others the lack of any such agenda was the point: one 1969 piece by Alan Coren, a future editor, strings together practically every widely established journalistic and fictional cliché of computing around the entirely irrelevant framework of Dickens' *A Christmas Carol*. Several patterns and trends emerge, however: the widespread (and often negative) association of computers with large-scale social planning, for instance, emerges with the Wilsonian "white heat" agenda in the 1960s, fizzling out as the vision of the computer as a personal device takes hold.

Lei Sun (Xiamen University), "Cross-cultural Interpretation of Protection Motivation Theory: Qualitative Data from China"

Tobacco control in developing countries continues to be a public health challenge. Protection motivation theory (PMT) was one of the mostly admitted theories in understanding health risk appraisal. PMT postulates that the motivation to protect oneself from danger is a positive linear function four beliefs of severity, vulnerability, response efficacy, and self-efficacy, and it is a negative linear function of one evaluation of costs of taking adaptive response and rewards gain from keeping maladaptive responses. The knowledge in PMT about health risk appraisal in smoking has been confirmed in numerous practical studies but mostly in Western epistemic regimes. In terms of risk perception of smoking, laypeople in China and in other Confucius culture cultivated countries interpret the threats and the rewards in different or even opposite ways, due to the construct of face, social distance, social relationship, and especially the unique role of cigarette in social networking in their daily life. This paper examines PMT's validity, and practical relevance from cross-cultural perspective. Qualitative data are collected in China, to understand laypeople in risk coping in smoking. Focus group interviews were conducted by 12 groups, in which non-smokers shared their experiences and opinions about secondhand smoking in public area. And 38 in-depth interviews were conducted with smokers to understand their cognitive process in fear appraisals under the framework of PMT. The results can contribute to the collectives of knowledge on public's health risk appraisal across the globe.

James Thompson (speaker) and Elisa Järnefelt (Newman University), "Constructed Conflict: Survey Design and the Public Perception of the Relationship between Science and Religion"

Dichotomous categorisation of public perceptions of the relationship between science and religion as a battle between positions of 'conflict' and 'harmony' seems like a media simplification designed to make an old phenomena exciting and to sell copy. However, researchers frequently construct survey measures purporting to investigate public perceptions of the relationship between science and religion using a simple binary polarization between 'conflict' and 'non-conflict', or a three-part model of 'conflict', 'compatibility', or 'independence'. This means that social scientists and pollsters alike have primed their participants with a polarized narrative of conflict through their research designs. As such, it is unclear how well this polarization corresponds to the lived experience of the public, or what the public actually thinks when choosing between nebulous response options of 'conflict' or 'compatibility'. In this paper we shall present a critique of the constructed conflict narrative in surveys and polls. We will also present some possible solutions to move beyond a binary conflict model to attempt to capture more of the nuance and variety of public opinions on the possible relationships between science and religion. We hope to encourage pollsters and social scientists from across disciplines to consider; if they are truly measuring perceived 'conflict' between science and religion or unwittingly constructing it.

Rajive Tiwari (Belmont Abbey College), "Through the Looking Glass of Print Media: Popular Reflections on Science, Nationalism and Religion in 19th-Century India"

Modern science, as developed in the West, arrived at the shores of India riding the waves of imperial endeavor. This was also accompanied by an increase in Christian missionary effort. The native encounter with modern science occurred within the framework of imperial and Christian expansion but also in the context of a pre-existing understanding of nature imprinted in the public imagination as a rich tradition of indigenous scholarship. In the network that mediated Western science, colonial education system and popular press functioned as crucial nodes.

By way of exploring popular perceptions of European science, science-related articles from nineteenth-century newspapers and popular magazines were investigated. The articles don't indicate a wholesale rejection or acceptance of Western science. They, in fact, display a nuanced response to science expressed with mutually reinforcing undercurrents of nationalism, a desire for modernity and a concern for religious reform. The dialectics of power playing out on the colonial substrate was mirrored by the dialectics of knowledge in its superstructure. In responding to this new body of knowledge, people were not simply responding to a particular epistemology and ontology but to an entire system of power. Thus, the meaning of this science was constructed not in a vacuum but in the framework of various political and social movements. The talk will present excerpts of these writings on science and discuss their contextual nature.

Yotam A Tsal (University of California, Berkeley), "Le Vaillant and the Imperial Stuffed Animal: Enlightenment, Empire and the Eighteenth-Century Public Sphere"

On his voyage to the Cape of Good Hope in the 1780s, the eccentric French traveler and ornithologist François Le Vaillant kept in his camp a table for the dissection of animals which he "used only for this purpose". After his entourage, composed of Khoekhoe men and women, had finished dining, Le Vaillant asked for his precious table to be brought to him from his private tent. He then immediately

began to flay the birds he had killed the same morning. The men and women in the camp were quite astonished by the sight of this strange European man "taking the lives of birds just to strip them and immediately after give them their [original] form".

To Le Vaillant this astonishment appeared amusing and "extremely simple and natural". He decided not to "waste" his time explaining his scientific mission by "praising the cabinets of collections of Europe". His mind was elsewhere, in Europe, where his potential readership resided. Very much like the stuffed birds, snakes and monkeys he sent to Paris and Amsterdam, his experiences in Africa were publicized in his travel accounts for all to admire, criticize and discuss in journals, cabinets, coffee-houses and salons. For his audience there was little difference between the stuffed animals themselves and the printed books that conveyed the stories of the former's production. They were parts of the same whole. In my paper I argue that taxidermy of 'exotic' animals in its imperial dimensions was preformed for its wider public appeal as much as for 'pure' scientific reasons. Building on the insights of Bruno Latour, Steven Shapin, Simon Schaffer and Robert Darnton, I show how Le Vaillant's work, from the procurement of specimens in Africa to the publication of his books, was shaped by his concern about his public persona. More broadly, this paper demonstrates how intimately related, and in many ways inseparable, science and the public sphere were in a moment when both were experiencing dramatic reconfigurations.

Amy Unsworth (University of Cambridge), "Evolving Attitudes: Changes in Acceptance of Evolutionary Theory amongst Non-Religious, Christian and Muslim Publics"

There has been an increased visibility of creationism in the British press since the 2000s, mainly linked to fears that creationism may enter British classrooms due to changes in government education policy, changes in the religious make-up of the population, and incidents of creationist activism. However, little attention has been paid to factors outside of formal education that may play a role in changing individuals' attitudes to evolutionary theory, particularly amongst religious publics. I present here results from a national survey investigating the different ways that people hear about evolution and which media personalities are best known and most trusted – including David Attenborough, Richard Dawkins and creationists Ken Ham and Harun Yahya. Analysis of the survey data reveals several social and media factors that contribute significantly to changed attitudes towards evolution amongst Christians, Muslims and non-religious people.

Matthew Wale (University of Leicester), "'Why Do Entomologists Want a Weekly Newspaper?': Scientific Communication in Nineteenth-Century Natural History Periodicals"

Henry Tibbats Stainton (1822-1892), an eminent nineteenth-century entomologist, believed that cultivating the study of insects across all classes was vital to the advancement of science. 'An Entomologist is none the less one because he wears fustian, [...] an observation, if new, is as important by whomsoever made; and a Spitalfields weaver may supply some important gap in our knowledge, which Oxford and Cambridge put together would fail to elucidate.' To this end, Stainton established and edited a number of periodicals, all affordably priced, aimed at a broad audience, and requiring a minimum of specialised understanding. Chief among these works was the *Entomologist's Weekly Intelligencer* (1856-1871), which kept its readers abreast of the latest entomological news, distributed far more widely and at greater speed than had hitherto been possible. Publications of this kind became increasingly common over the course of the nineteenth century, engendered by

advances in printing technology and repeal of the Stamp Tax and paper duties. This had significant implications for the creation and circulation of scientific knowledge amongst the growing literate public. Many periodicals did not only serve to disseminate science, but also encouraged their readers to take an active part in the creation of knowledge. Stainton's *Intelligencer*, for example, was composed almost entirely of reader contributions, thereby establishing a thriving entomological community with the potential to transcend barriers of distance and class. This paper will demonstrate how these periodicals were an important medium through which the nineteenth-century public engaged with natural history.

Emma Weitkamp (speaker), Natasha Constant, Sarah Ayling and Lindsey McEwen (University of the West of England), "Citizen and Community Engagement within the Drought Risk and You Project"
Drought is anticipated to become more frequent and severe in the UK. However, longer-term ecosystem responses to changing drought patterns and the inter-related impacts of climate, land management and human activities still need to be researched. The Drought Risk and You (DRY) Project aims to better understand these processes by exploring drought impacts on UK grasslands and trees through application of small scale ecological experiments working with citizen scientists. This paper reflects on the challenges of developing citizen science projects that involve primary school children and local community volunteers.

Citizen science mobilises the efforts of volunteers to monitor and analyse natural phenomenon, but can also be used as a platform to unite scientists, communities and stakeholders, exchange knowledge and dialogue, enhance learning about environmental change, and advance locally relevant strategies to mitigate climate associated risks. Our research responds to the call for more investigation into the social outcomes from volunteer engagement in citizen science, and place-based research into how participation shapes personal human-environmental relationships, including awareness of environmental risk. While still in the early stages, we reflect on the issues encountered in designing programmes with two specific groups in mind: primary school children and community volunteers.

Lisa Whittaker (Tenovus Cancer Care),"Knowledge Exchange and Public Engagement with Cancer Research"
Tenovus was first started by 10 men in 1943 who believed strongly in charity and helping others. One of the most important achievements since then was the opening of the Tenovus Institute for Cancer Research in Cardiff in 1967. The Institute undertook vital research into a number of forms of cancer and made significant advances on studies in breast and prostate cancer. A concern in the early days of the Institute was what we will do with the building when we cure cancer. Unfortunately this dream has not yet been realised, but Tenovus Cancer Care has continued to fund world class cancer research for over 50 years. Much has changed since the 1960s, the needs of cancer patients and their families are constantly evolving and therefore we are constantly evolving our research to meet those needs.

This presentation will reflect on the changes that have taken place in cancer research, the ways in which our research archive informs our current practice and service delivery and importantly the ways we have communicated this work over the last 50 years. As well as laboratory based

research to further our knowledge of how cancers form, drug treatments and genes, we now also fund community based research to help support an ever growing number of people throughout their cancer journey. In line with an increasing awareness of the importance and benefits of public engagement, knowledge exchange and impact we place a great emphasis on patient involvement in research. We set up a Research Advisory Group in 2011 of people who have been affected by cancer who help us decide which projects to fund. We also created a new research engagement post to enable us to develop our engagement activities across Wales. I will conclude by sharing our vision for engaging the public in cancer research in the future.

Poster Abstracts

Daniela R. de Figueiredo (University of Aveiro/ ASPEA [Portuguese Association for Environmental Education]), "Unravelling the Invisible Water World..."

Inside the oceans, rivers and lakes, there is a world of organisms that are invisible to our eyes but play a major role for the existence of life on Earth. Those microscopic communities form the so-called Plankton. The project "MIA – unravelling the Invisible Water World" aims to increase the Ocean Literacy by using artistic ways to explore the topics of plankton ecology and its vulnerability in the marine and coastal systems, particularly under a climate change scenario. The phytoplankton organisms, in particular, play an extremely important role as the basis of the aquatic trophic chain. Moreover, they have been increasingly used in biotechnology and even astrobiology research. However, sometimes phytoplankton organisms start to grow massively and form Harmful Algal Blooms that negatively impacts the ecosystems and may also pose serious health risks over other organisms, including humans.

The MIA project integrates science and arts (music, painting, animation, dance, theatre) in science communication / environmental education sessions in order to stimulate emotional intelligence as a way for a more effective awareness. The main target public includes children from all school levels, although several actions are also performed for the general public, encouraging lifelong learning. This required different strategies for different age groups. The project gathered a multidisciplinary team (including scientists, teachers, musicians, actors, animation/film directors) and several schools/institutions across de the national territory.

Filippo Guizzetti (University of Kent), "The Italian 'Stamina Case' Compared to Other Pseudoscience Controversies. The Value of the Scientific Community in Italian Society"

Between 2012 and 2014, Italian society was shaken by a serious case of scientific fraud. Since its creation in 2007, the Stamina Foundation claimed to be capable of transforming Mesenchymal stem cells collected from bone marrow into neurons and to have successfully cured tens of patients affected by various neurodegenerative conditions. Through a mix of massive media exposure, the use of moving fatally ill children and political connections, Stamina's founder Davide Vannoni almost succeeded in getting the Italian parliament to weaken the regulation on stem cell therapies. In this dissertation I will analyse this case and compare it to other famous cases of pseudoscience public controversies, especially the case of the link between the MMR vaccine and autism, which took place in the UK. Through this analysis, my aim is to understand what is the value of science and its

community in the Italian society and what are the challenges in communicating to and with the public(s) when controversial pseudoscience hits the news.

Sarah Kounaves (King's College London & Natural History Museum), "Science Engagement in the Digital Age: Understanding the Effect of Mobile Technology on Adult Engagement Experiences at a Natural History Museum"

Research suggests that personal mobile technologies may play a significant role in lifelong science learning. Few studies, however, have explored the potential of mobile devices from the perspective of adult engagement with science – here defined as the precursor to learning. Thus this research examines the ways in which adult visitors to a natural history museum setting use mobile technologies, and analyses how such technologies affect the visitors' science engagement experiences. The study uses a mixed methods approach. In the first phase a questionnaire was administered to 60 adult museum visitors to explore how adults naturalistically use mobile technologies in museums. Provisional analysis of responses has indicated the ubiquity of personal mobile devices (regardless of age and gender), highlighted the variety of ways in which visitors use their mobile devices, and shown how this usage changes inside versus outside the museum setting. The second phase was primarily qualitative and comprised an intervention study. Visitors to an exhibition were asked to either explicitly use their mobile devices, or to simply use them as they wished. The extent of science engagement experienced by each group was determined using an engagement framework. Preliminary analysis of the observation and interview data suggests that, contrary to findings in other studies, mobile devices may *not* be helping visitors to better engage with science. Given the current push in museum and informal science learning practice to embrace 'digital', this research highlights a need to re-visit and re-evaluate claims of "mobile learning", and to question the unproblematized adoption of 'digital' as a facilitator of engagement.

Ivvet Modinou (British Science Association), "Science Live – Connecting the Dots"

Live science events play an important role in bringing people together to discuss, discover and debate new ideas. At the British Science Association, we want more events taking place across the UK that are organised by members of the local community, who best understand their audiences. When we spoke to our community, we found that one of the key barriers was the stress and challenge of organising events; finding speakers, volunteers, along with arranging event practicalities can be daunting, especially those new to the process. We decided to try and solve this problem by building a digital support network - Science Live.

Our new event platform facilitates the connection of each part of the science event equation: the public, the scientists, the volunteers and the organisers. This will allow more people throughout the UK to put on and discover events – and lead to many more engaging with, understanding and enjoying science. Science Live will support event organisers by giving them access to scientists, connecting them with local volunteers and putting their events in front of the right audiences. We hope to create an online community of science event organisers, with the ambition that it will become a virtuous circle of engagement: volunteers can find an event, learn how to put it on through practice and become future event organisers; scientists throughout the UK will attend, be inspired, and perhaps return to speak or help organise a new event of their own.

Aline Mongellaz (CNRS – Centre national de la recherche scientifique), "Can we Blunt the Effects of Scientific Twittershock?"

Currently, I am building a communication project for a laboratory consortium in Lyon, France (ASLAN: Advanced Studies on LANguages). A fundamental aspect of this project affirms that the value of our research will be enhanced by increasing dialogue between our research community (i.e. the scientists) and a wide public audience. This insistence on dialog can be contrasted with the classical model for institutional scientific communication, which was unidirectional (a form most often referred to as the vulgarization or popularisation of science).

As a communication professional, my task is two-fold: put in place the mechanisms of that communication (for example, renewing our websites and initiating our presence in social media) and facilitating transmission of messages between these two publics (scientist and citizen). The transmission from scientist to citizen has been thoroughly considered, but it seems to me that ways in which a communications manager can help the scientist to interpret and assimilate public reactions to his message (for example, his/her Tweets) has been little explored. Are there ways to prepare the scientist for Twitter-shock? Can we mediate his/her relationship with these extra-academic communities, not only by helping the scientist to prepare the initial message (to blunt potential negative reaction), but also helping with the integration of the return message? Does the scientist really want to hear these messages? Indeed, does he have a responsibility to hear them?

Vivian Quirke (Oxford Brookes University), "From Pharmaceutical Innovation to Public Engagement: Steve Carter and the Micrarium in Buxton"

In 1981, a new kind of museum opened in Buxton's old Pump room. It was the 'Micrarium', created by Steve Carter, who had previously been involved in cancer research at ICI's Pharmaceutical Research Centre in Cheshire. The Micrarium's ambition was to make the microscopic world, which Carter had explored in his work for ICI, more readily accessible to the wider public. For this Carter developed a remote-controlled projection microscope and, with the help of his wife and three daughters, made 50 versions of it in their home workshop in time for the opening. After winning an award from the British Tourist Authority and receiving a Museum of the Year Award, the Micrarium became the first recipient of a grant from the Fund for the Development of Interactive Science Centres. It also received acclaim from professional microscopists, who praised both the clarity of the image and the depth of field obtained with the Micrarium's microscopes. However, Carter's premature death in 1987, and the eventual displacement of the apparatus used in the Micrarium by digital technology, led to the ultimate demise, not only of the Micrarium itself, but of its idea as a museum. My poster will illustrate this short-lived 'World First' use of microscopes in a dedicated museum setting, which through Carter bridged the gap between scientific innovation and public engagement.

Alice White (Wellcome Trust), "Wellcome to Wikimedia..."

From May 2016 to February 2017, I'm working at the Wellcome Library as a Wikimedian in Rsidence. A WiR is there to engage with librarians, members of the public, researchers and other organisations to encourage contributions to the development of Wikimedia and to make the Library's content more publicly accessible. This poster explores some of the methods, challenges, and opportunities

for this sort of project, and provides information for anyone interested in using Wikimedia themselves for engagement.

Organised Panel Abstracts

Intermedial Study of the Public Culture of Science (Sessions 9 and 12)
Organisers: Tim Boon (The Science Museum) & Jean-Baptiste Gouyon (University College London)
In their still much cited 1994 paper, Stephen Pumfrey and Roger Cooter argued that the main aim of the history of science was to understand and elucidate 'the place and placing of science in culture'. Since the early 1990s, the body of work investigating science in popular culture has grown. But so far, the vast majority of studies have concentrated on one medium, the written—and printed—word. The past decade has seen an increase, though, in the number of studies focusing on visual media, foremost amongst which has been film.

All of these studies enable us to get a better sense of how science and culture relate to one another. We argue, however, that to seek to grasp the public culture of science by focusing on one single medium, on one instance of science in popular culture, is not enough. It is our contention that a far more profound understanding of science in public will be obtained by working comparatively: Comparison between media, comparison between science and other elite aspects of culture; comparison between eras, and between countries.

Science and Religion in Public Spaces (Sessions 18 and 22)
Organisers: Fern Elsdon-Baker & Alexander Hall (Newman University)
These two panels respectively explore contemporary and historical aspects of the relationship between science and religion as represented and understood across various public spaces in the UK. The papers present ongoing research, co-ordinated by the Centre for Science, Knowledge and Belief in Society at Newman University, which is part of a growing, wider multidisciplinary network of scholars who are concerned with the societal context and social drivers of science and religion debates, rather than just their respective epistemological truth claims.

Writing the Natural History Museum (Session 1)
Organisers: John Holmes (University of Birmingham), Stefanie Jovanovic-Kruspel (Naturhistorisches Museum) & Janine Rogers (Mount Allison University)
Natural history museums are among the most ambitious buildings of the nineteenth century. Through their forms, plans and decoration, they seek to express complex conceptions of life and its significance within the cosmos. In so doing, they draw on distinct architectural models and traditions, artistic techniques and scientific theories. In this panel we will explore a number of complementary ways of writing about and reading nineteenth-century natural history museums as physical and textual spaces that combine architecture with art and science. The first paper will discuss how the natural history museums in Oxford (1855-60) and London (1873-81) embody two distinctive movements within Victorian art and science: the Pre-Raphaelite impetus to ground art in science, and the resistance to Darwinian scientific naturalism. The second paper will explore how the neo-

Gothic architecture of these same museums operates to order and make knowledge on principles analogous to and ultimately derived from those of medieval manuscript culture. The third paper will examine a third museum from the same historical moment but a different European culture – the Naturhistorisches Museum in Vienna (1872-89) – setting out how it embodies a comparable but very different interrelation of architecture, the arts and science.

Discussion Abstracts

Contemporary and Public Histories of Science, Technology and Medicine (Session 4)
Organiser: Angela Cassidy (King's College London)
This workshop will address the challenges of researching the recent pasts of science, technology and medicine. How do we make sense of the strange no-man's-land between contemporary society, collective memory and this thing we call 'history'? How do we figure out how the scientific debates of the past have shaped those of the present? When archives are thin on the ground, what sources and methodologies can we use to map this territory? Can we foster more productive dialogue between science communication, STS and the history of science, technology and medicine? Given that the social studies of science is now celebrating its own history, can we start asking if our research has had any 'impact' on science and society over the past fifty years?

Finally, the panelists will also discuss their experiences of doing contemporary history 'in public', whether this takes the form of social science with a time dimension, participatory research, oral history, media/document analysis, or studying 'science in public'. How do we engage with people who were and often continue to be key actors in the histories we write? Finally, how can we best engage as public experts ourselves? Panelists will each present a brief paper in which they outline their topic, main findings, research/engagement practise, and key questions raised; we will then move to open discussion for the rest of the session.

Comedy and SciComm (Session 11)
Organiser: Rebekah Higgitt (University of Kent)
Comedy and humour have become increasingly prominent within science communication, whether appearing informally online, as professional shows on TV and radio, or as amateur stand-up nights showcasing researchers. While humour and satire have been researched by communication or literary scholars, historians and sociologists, it has only recently begun to receive more sustained attention within Science and Technology Studies, particularly in terms of its role in public engagement. This panel brings together science communication professionals, STS scholars and historians of science to share their experience, evaluations and research. We will explore the current picture of comedy within science communication and questions such as: How can we assess the effectiveness of comedy as a form of science communication? Can comedy work to engage audiences who do not already identify as interested in science? Does comedy reinforce in-group/out-group dynamics? How can history and sociology of science help us in understanding science comedy/humour? What, if anything, is unique about science-related comedy?

Workshop Abstracts (NB sign-up required)

Creative Writing and Science (Session 15)
Leader: Charlotte Sleigh (University of Kent)
This workshop will be a very informal affair and will respond to the interests of those who attend. We may use it to workshop pieces already in progress (fiction, memoir, drama, poetry), to brainstorm ideas, or to sit down and write some poetry from scratch. Participants are welcome to bring plans, notes or drafts with them – but are not required to do so.

Doing Stand-Up Comedy (Session 14)
Leader: Steve Cross (Science Showoff)
Founder of Science Showoff and Bright Club, and currently a Wellcome Trust Engagement Fellow, Steve Cross is a comedian, presenter and producer who trains clever people to be funny. This is your chance to learn some tips and techniques, gain confidence for all sorts of public events and see if you can unleash your inner comedian.

Forest Genetic Resources Matter: Getting the Message Across Different Sectors (Session 16)
Leader: Ewa Hermanowicz (EUFORGEN/Bioversity International)
EUFORGEN (European Forest Genetic Resources Programme) is a networking programme of international cooperation promoting the conservation and appropriate use of forest genetic resources in Europe. The workshop will highlight the new EUFORGEN communication strategy, which was developed and rolled out in 2016. The main goals of the strategy are: a) to help achieve the first objective of the programme which is to 'Collate, maintain and disseminate reliable information on forest genetic resources in Europe' b) plan the communication activities more systematically and monitor them for effectiveness c) share the programme's achievements and knowledge beyond the traditional audience of experts in the field of forest genetic resources by making them accessible and understandable to policymakers, forest managers and scientists doing research in other thematic areas affected by sustainable conservation and use of FGR.

An interactive session will follow with a particular focus on digital communications: the website revamp and establishment of new communication channels (regular news, social media, newsletter) as well as linkages with communication partners. Participants will be asked to work in groups on the different stages of the revamp of the website: analysis of data on users' behavior (google analytics), preferences and needs (responses to surveys) and information architecture which influenced the decisions on the changes to the EUFORGEN online presence.

After the groups have shared the results of their discussions, I will conclude by giving a brief demonstration of the new website draft, walking the audience through the main changes as a result of the complete re-organization of resources.