

Introduction

*Brigitte Nerlich, Sujatha Raman, Sarah Hartley,
Alexander Thomas T. Smith*

In recent years the relation between science and society has become strained. In some parts of the world, mainly in the United States, science is said to be 'at war' with society (Otto, 2016). In others, particularly the United Kingdom, scientists have been dragged into debates over suspicion and contempt of experts, primarily economists (Mance, 2016). These developments play out against a series of crises in science, technology, politics and the economy, which are all interlinked.

In politics and economics, one can mention the 2008 financial crisis, threats posed by terrorism, rising tensions around the place of religion in science and society, the ascent of political populism, and, more recently, debates about the United Kingdom leaving the European Union – an exit (dubbed 'Brexit') that will have profound consequences for society, science and different forms of expertise. In the United States, a new presidency challenges established relations between science and politics, as well as between these domains, journalism and the public. In technology, controversies arise from increasing digitalisation, automation, cybercrime and much more, but also from the maturing of novel energy technologies and biotechnologies. These new technologies bring with them a range of ethical problems.

This volume uses recent developments in science–society relations as a focal point for exploring the tensions and contradictions raised by these large-scale issues. Over the last thirty years in the UK and beyond, science, policy and the public have come into conflict in a series of political crises. Examples include the BSE (bovine spongiform

encephalopathy) or ‘mad cow disease’ crisis, the almost intractable disputes about the commercialisation of genetically modified (GM) foods and crops, the effects of scientific dissent on public health (e.g. the measles, mumps and rubella (MMR) vaccine) and the impacts of the politicisation of climate science on climate policy (‘Climategate’). Since then, we have seen the emergence of new controversies involving the use of scientific evidence in policy (e.g. on the proposed role of dental evidence to assess the age of child refugees; the emergence of ash dieback disease) and on the conduct of research and innovation (e.g. on gene editing; management of the Zika virus), where issues related to security are ever-present. Last but not least, many of the topics listed above are global in nature. In this context we have seen the emergence of highly public conflicts around global institutions, such as the Intergovernmental Panel on Climate Change, where science and politics meet.

In order to deal with such emerging and enduring matters and their impacts on trust in science and politics, policymakers have proposed various solutions, such as promoting greater public engagement with science and policy, co-design of scientific research with stakeholders, open and participatory forms of innovation, increasing transparency in scientific advice for policymaking, and enhancing open access to scientific data and research outputs. Such solutions have begun to exploit a number of new digital technologies and algorithms which can be used for good or for ill – for sharing information quickly; for making information public and available for public scrutiny; or for increasing surveillance by the state, social groups or oneself.

We live in a society that increasingly aspires to open access, open data, open science and open policy. Underpinning this trend is an assumption that transparency and openness are in the ‘public interest’. They are, but there may well be dark sides to this trend that need to be examined. Indeed, these solutions to scientific and political crises might conceal or provoke a number of problems, challenges and questions – some new, some timeless. These are the ‘monsters’ hiding behind transparency, publicness and openness that we want to track down in this book. Keeping in mind that unknown troubles might lurk behind apparent solutions, we ask: what does making science more public, open or transparent mean, in theory and practice? Who are ‘the public’ and how are they constituted? What might ‘public science’

mean for the authority and independence of science and the capacity of publics to engage with science? What are the political implications of making science more public or transparent, and how does this relate to issues of legitimacy and transparency in politics and policymaking? What role do interested citizens play in the creation of science and the making of science policy? Who controls the new technologies and enterprises of openness and transparency? And what will happen in the future, given radical changes that are happening in science and technology, as well as politics and policy, globally and nationally?

Trying to find answers to these questions provides us with a much-needed opportunity to rethink the relationship between science and politics and, more importantly, the role of science in public, the role of publics in science, and the role of expertise in science and policymaking, as well the role of faith in science and society. Others have examined these issues, but we seek to put them in conversation with wider political developments around migration, religion and neo-liberalism.

The book

The chapters in this volume are based on work carried out within the Leverhulme-Trust-funded Making Science Public research programme (2012–2017), which explored the relationships between science, politics and publics through a number of topical case studies. The chapters challenge received wisdoms about openness and transparency and highlight and map the pitfalls and dangers – the ‘monsters’ in openness and transparency. The book is motivated by the sense that there might be metaphorical dragons or monsters hiding behind policy initiatives to ‘open up’ science in response to perceived legitimacy crises in research and innovation systems and in the relationship between science and policymaking.

The phrase ‘here be monsters’ or ‘here be dragons’ is commonly believed to have been used on ancient maps to indicate unexplored territories which might hide unknown beasts. Etymologically, the figure of the monster is double-edged and ambiguous in a way that invites reflection (Haraway, 1992). ‘Monster’ has twin meanings: the monster serves to both *warn* (Latin: *monere*) and to *show* (*monstrare*). Calls and efforts to open up science evoke multiple conflicting imperatives, hopes and anxieties, which we explore.

Where earlier works in science and technology studies employed the monster or golem figure to study the social aspects of science and its technological creations (Collins and Pinch, 1993; Haraway, 1992; Law, 1991), we argue that the time is ripe to examine the positive and negative effects of contemporary policy initiatives and institutions which purport to bring science, society and publics closer together through processes of openness, access and transparency. Developed as solutions to perceived crises in science/society relations, a variety of policy initiatives hide dilemmas that need to be made visible and need to be discussed out in the open. In sum, the chapters in this book explore the unfolding contradictions around efforts to ‘make science public.’

Science and the politics of openness: challenges and dilemmas

For many years now, some science and technology studies scholars have called for new forms of ‘post-normal’ science (Funtowicz and Ravetz, 1993), where scientific claims and their underlying assumptions are opened up to wider scrutiny, allowing a new ‘democratisation of science’ (Brown, 2009). Sheila Jasanoff (2002) has argued that we are witnessing a so-called ‘constitutional moment’ in which the claims of scientific knowledge and technology on behalf of the public good need to be openly justified rather than taken for granted. However, promises of openness, transparency and greater engagement generated by these developments must always be critically assessed. ‘People may not possess enough specialized knowledge and material resources’ to participate in apparently open forums (Jasanoff, 2003: 237). Likewise, privately sponsored industry research can all too easily be used through transparency laws to destabilise public science – for example, in cases of environmental and health-and-safety regulations introduced in the public interest (Jasanoff, 2006) – or to undermine political action on climate change, as journalist Delingpole (2010), for one, has attempted to do.

With the institutionalisation of scientific advice in government and an emphasis on evidence-based policy, scientific evidence has taken centre stage in many public and political conflicts. However, there are long-standing fears of a possible ‘scientisation’ or

‘technocratisation’ of politics (Habermas, 1970), which may shut out voices from areas other than science from the policymaking process. In this context, different stakeholders are using a range of experts and cherry-picking the claims or counterclaims that support their own political position. There are enduring debates about the status of expertise, and calls to acknowledge the status of lay experts (Wynne, 1992). These have in turn informed wider debates about opening up and democratising discussions involving scientific knowledge and public policy matters. Science cannot function, argues the political philosopher Stephen Turner (2003), without some monopolisation of expertise. He therefore suggests that it is intrinsically impossible to subject specialised knowledge to democratic discussion (see also Collins, 2014). Yet, wider discussions about the purpose of science and its role in matters of collective interest are political and value based. These cannot, *a priori*, be left to certified experts alone (Sarewitz, 2004), especially when laypeople or rival experts periodically mobilise in particular times and places to call attention to novel dimensions of public importance. In this context, how policymakers or science advisors engage with different forms of expertise becomes crucial.

Scientists have always interacted with a variety of publics, and science communication is as old as science itself. However, scientists are increasingly obliged to get involved in public engagement and, more recently, to practise responsible research and innovation, for reasons other than consulting, communicating with or involving publics. Opportunities for engagement with science and policy are being gradually replaced by mandated activities serving political functions, such as gaining ‘impact’ and contributing to economic growth. Fostering public engagement with science has become one of many political and economic performance indicators. This may lead to the instrumentalisation of public engagement (Watermeyer, 2012), and a loss of trust in science and scientists.

These developments happen in a context where higher education serves no longer to be primarily a public good but is increasingly marketised and privatised. Universities in the UK are now funded by students (or their parents) who pay tuition fees as consumers rather than as co-producers of knowledge. This means that universities now have a much-weakened relationship with the British public, on whom

they no longer depend for the bulk of their teaching budget. There are concerns amongst leading scientists, ethicists and lawyers about ‘who owns science’ – that is, about the privatisation of science – and calls are being heard for science to serve the public good more explicitly (see Holmwood, 2011; University of Manchester, Institute for Science, Ethics and Innovation, 2010).

Science, politics and publics are entangled in a complex relationship with normative ideas about openness, transparency and publicness, ideals that are being challenged not only by classic science/policy scandals such as those mentioned above (BSE, GM, MMR, Climategate). They are also being challenged by the emergence of new technologies, especially digital technologies envisaged to deliver some of those ideals, and by institutional and technological changes in the spaces where science takes place (universities and industries) and where politics takes place (government, the media, public forums, public consultations, etc.). The fact that political and policy debates, expertise, and the media have been entangled with such normative questions for some time has, in recent decades, become a growing source of instability in Western liberal democracies (see Smith and Holmwood, 2013). This has raised anxieties about the role of expertise and evidence in public debate in an age where countering ‘fake news’ and political disinformation – or what might have once been described as propaganda or even ‘psychological operations’ – has become a central concern for policymakers, electoral strategists, journalists, broadcasters and even intelligence agencies following the election of President Donald Trump in the 2016 US elections.

We are now living in a world where words like ‘facts’ and ‘truth’ have to be used with considerable care in science and politics, where facts and truths compete with alternative facts or someone else’s truth. In an article for the *Financial Times* entitled ‘The Problem with Facts’, the economist Tim Harford explores, as the subtitle says, ‘how today’s politicians deal with inconvenient truths’. He uses a phrase that has gained popularity in science and society circles since 2006, when Al Gore produced his notorious film *An Inconvenient Truth*, intended to make what he held to be truths about climate change public. In chapter 12, Warren Pearce and Brigitte Nerlich examine in detail the film and its reverberations through ensuing climate-change debates.

Such debates foreshadowed and even rehearsed arguments that are now raging through most of science and politics, particularly in the USA.

Meanwhile, novel energy technologies encounter issues of justice and fairness when deployed across the world. In chapter 7 Alison Mohr argues that such technologies and innovations might also hide monsters behind their veneer of novelty and service to the agendas of more openness and transparency. The open-access agenda is one major example in the context of research (Holmwood, 2013). The future of new frameworks of responsible research and innovation (RRI) within this wider context is therefore in question. On the one hand, the concept of RRI promises to open up opportunities to rethink the purposes of innovation (Owen et al., 2013) and diversify ways of innovating in response to a societal challenge (Hartley et al., 2016). On the other hand, RRI is becoming reduced to established ways of assessing a specific technology in terms of its risks and benefits. All these developments need to be monitored and scrutinised not only for the opportunities and chances for improvement they offer but also for the pitfalls and contradictions they might contain.

Themes

The chapters in this book map and illuminate issues ('monsters') in specific areas of science/policy practices where the complex problems identified above play out in particular ways and in specific cases.

The book is organised into four parts, around the themes of (1) **transparency** in the context of science in the public sphere; (2) **responsibility** in the context of contemporary research practice and governance, both globally and more locally; (3) **expertise** in the context of policymaking, risk assessment and the regulation of science; and (4) **faith** in the context of emerging tensions and misunderstandings between science, politics and publics regarding issues of religion. Each of the four parts contains an opening essay by an expert on the theme, and the book closes with an afterword and an epilogue reflecting on the contributions to the book.

Transparency

This part opens the book with an exploration of one its core topics; namely, transparency and openness and how they play out within various institutional and policy domains. Three chapters circle these concepts in different ways. **Stephen Curry** deals with an issue that has risen to prominence in science and university research in recent years – ‘open access’. He examines not only the potential of open access to break down barriers and open up academic research and knowledge to the wider public, but also the many barriers that exist or are emerging to impede the open-access movement. **Carmen McLeod** deals with issues of transparency and secrecy in the context of animal research through the lens of two transparency initiatives: the Swiss Basel Declaration announced in 2011, and the UK Concordat on Openness in Animal Research launched in 2012. In the final chapter of this part, **Roda Madziva** and **Vivien Lowndes** deal with transparency, evidence and publics in the context of a very topical issue – immigration. This chapter also contributes indirectly to the last part of the book, which deals with faith, as Madziva and Lowndes investigate faith-based claims being used when adjudicating asylum applications.

The part introduction by **Benjamin Worthy** dissects the concepts of transparency and openness and puts them into the context of recent research on these topics, as well as work on related issues around security, privacy, confidentiality and accountability. Worthy also highlights problems with radical openness in a context where ‘people’ might not be willing, able or interested to make use of the opportunities such openness affords them.

Responsibility

This part continues to explore the topic of openness, but with an additional focus on responsibility and justice. Three chapters move from the global to the more local, and from global environmental change and energy justice to concerns about responsible innovation in the context of Western concerns with genetically modified foods and crops.

Eleanor Hadley Kershaw presents us with an overview of the opportunities and challenges that emerge when trying to foster science/

society or science/public co-production of research and engagement within a global institution – namely, Future Earth. **Alison Mohr**, by contrast, deals with the tensions that emerge when Western energy technologies are distributed in the global South and how co-production between energy experts, social science experts and local community experts can help in this context. In both cases, openness is the *sine qua non* for such global enterprises to succeed. In the final chapter, **Stevienna de Saille** and **Paul Martin** tackle in an almost playful but deadly serious way some of the potentially problematic (or monstrous) consequences of the ‘opening up’ agenda written into responsible research and innovation frameworks. They do this by inspecting stories about monsters that have been told and are being told around GM foods and crops.

The part is introduced by **Barbara Prainsack** and **Sabina Leonelli**, who tease out the discursive promises and risks of using buzzwords such as ‘openness’ and ‘responsible innovation’. They also examine the tensions explored in some of the chapters between efforts at centralisation on the one hand and opening up research and institutions to epistemic diversity on the other, as well as between inclusiveness and social justice.

Expertise

This part continues to explore issues around expertise, experts and publics. The first chapter in this part, by **Sarah Hartley** and **Adam Kokotovich**, focuses on the always hot topic of risk and risk assessment. They make the claim that public involvement in risk assessment is not reaching its full potential and argue for a new role for experts and publics, supported by a detailed analysis of a particular case study; namely, the European Food Safety Authority’s public consultations. We then move from food safety to emerging diseases, in this case the emergence of a plant/tree disease: ash dieback. The chapter by **Judith Tsouvalis** finds a similar disconnect between experts and publics and a similar divorce between ‘risk’ assessment and public values. Both chapters make a plea for not dealing with risks from a purely expert and technoscientific perspective. **Warren Pearce** and **Brigitte Nerlich** in turn explore a particular case study, the release of the film *An Inconvenient Truth* in 2006, as an example where climate change

expertise is taken out of the pages of science journals and into the public sphere, and the opportunities and problems this generates. **Sujatha Raman, Pru Hobson-West, Mimi Lam and Kate Millar** use a famous political speech, 'Science Matters', as an opportunity to rethink the role of engagement by minority publics in constituting the public interest around science in alliance with expertise.

This part is introduced by **Mark Brown**, who sheds light on the tensions between experts and publics by providing a historical overview of the relationship between science and democracy. He examines the legitimacy of expertise in the current political climate and points out that 'avoiding technocracy without fostering populism is a key challenge of our time'.

Faith

This part continues to explore some of the topics addressed in the previous one, dealing with expertise, experts and publics, but with a particular focus on science and religion. The chapter by **Fern Elsdon-Baker** questions the expertise of social scientists when dealing with a particular type of 'public' – namely, people who in one way or another lean towards a creationist view of life on earth. She makes a plea for researchers to not posit as a 'fact' a presumed clash between scientific and religious world views, cautioning against assuming that the latter is always a monstrous public in conflict with science, and to explore public perceptions of evolutionary science and religion without either being overshadowed by this prejudice. The second chapter, by **David Kirby and Amy Chambers**, is a fascinating exploration of the struggle between film-makers and religious communities over shaping public views of science, including evolution, through a history of censorship. **Chris Toumey** introduces this part, weaving together reflections on science and religion with the themes of openness, expertise and responsibility in new and unexpected ways.

The book is rounded up with two closing statements, one an afterword by **John Holmwood** and **Jan Balon** reflecting on markets, neoliberalism, populism and the demise of the public university, which is one current issue that bedevils our (academic) lives. This is followed by an epilogue by **Stephen Turner**, who weaves together all the chapters presented in this book into a coherent story, by projecting them against

a much-needed historical background involving science, politics and publics.

Of course, a volume published in 2018 devoted to debates about the fractious relationship between science, policy and publics would be remiss if it were not to make more than a fleeting reference to the extraordinary year in politics that was 2016. In June, the UK voted in a referendum to withdraw from the European Union. At the time of writing, formal negotiations are under way between the British Government and their European counterparts following Prime Minister Theresa May's decision to trigger Article 50, which begins the two-year countdown to 'Brexit', on 29 March 2017. The UK referendum was followed six months later by the election of the billionaire Republican Donald Trump to the White House. The outcomes of both the British referendum and the US presidential election have profound consequences for science, which only serves to emphasise – sadly, from the point of view of many of our contributors – the importance of the questions explored in this volume in the current political climate.

We therefore end this introduction with a coda by **Alexander Thomas T. Smith**, which provides a brief snapshot (as of spring 2017) of the political landscape following these two electoral events, with a focus on some of the repercussions for science funding and policy in both countries.