

Oslo Summer School in
Comparative Social Science Studies 2017



Responsible Research and Innovation

Lecturers: Professor Richard Owen and Senior Lecturer Dr. Sarah Hartley,
University of Exeter, Business School, United Kingdom

Main disciplines: Science and Technology,
Innovation Studies

Dates: 31 July - 4 August 2017

Course Credits: 10 pts (ECTS)

Limitation: 25 participants

Objectives

Science, technology and innovation stand at a crossroads. Often advocated as the cornerstones of the knowledge economy and the drivers of economic growth and progress, they find themselves in a new political reality, a world in which globalisation, elitism and expertise are being challenged, and in which innovation, science and the institutions that harbour them, from multi-national companies to universities, run the risk of being seen as being increasingly out of touch with the challenges faced by many and the challenges our societies and planet face in the 21st century.

What sort of innovation and science leading to this do we want and for what purpose, how do we handle their uncertainties and political entanglements, what sort of political economy should they imagine? Fundamentally, what sort of future do we want these to create, and how do we take responsibility for those futures in a way that is inclusive, responsive and good? The concept of Responsible Research and Innovation (RRI) offers us an opportunity not only to ask and debate these questions, but to respond and transform our institutions and systems of science and innovation, but what does RRI mean in theory and practice, and can it ever realise its transformative potential?

This week long Summer School course provides an opportunity for social scientists, innovation scholars, scientists and engineers to come together to develop an in-depth understanding of the theory and practice of RRI for the responsible governance of science, emerging technologies and innovation. The course takes a critical, reflexive and deliberative approach, blending lectures with interactive exercises and group work, aiming to equip PhD students with a rich and developed understanding of RRI in both theory and practice that adds to and enriches their own PhD projects and programmes of study.

The course will:

- Explain the rationale for RRI and its historical foundations,
- Engage with meanings of responsibility in the context of science, technology and innovation
- Introduce a framework for RRI and its constituent dimensions, contrasting this with other framings of RRI that have emerged in recent years
- Critically explore experiments that have attempted to put RRI into practice across different areas of science, technology and innovation,
- Consider implementation of RRI, and its associated challenges, at project, programme and systemic levels
- Understand critiques of RRI, its politics and what we can learn from other discourses of innovation and responsibility from the global South.

The course prominently features diverse case studies e.g. on genetic modification, synthetic biology, financial innovation, quantum technologies and planetary climate engineering to help locate RRI in real world and potentially controversial areas of science, technology and innovation. As RRI sits at the interface of science, innovation and society, we welcome PhD students from social sciences (including innovation studies), sciences and engineering with the aim of creating a forum where mutual experiences and viewpoints can be shared across disciplines and PhD projects, enriching RRI for students from across these disciplines as part of an immersive learning approach.

Pre requisite reading / viewing for the Course

- Responsible Innovation: Managing the responsible emergence of science and innovation in society. John Wiley
- Stilgoe J, Owen R, Macnaghten P (2013). Developing a framework for responsible innovation. *Research Policy*, 42 (9), 1568-1580
- Owen R., Macnaghten P., Stilgoe J. (2012) Responsible research and innovation: from science in society to science for society, with society. *Science and Public Policy*, 6: 751–760.
- Richardson, H. S., (1999). Institutionally divided moral responsibility, in Paul, E. F., Miller, F. D., Paul, J., (eds.) *Responsibility*. Cambridge University Press, Cambridge, pp. 218–249
- Ribeiro, B., Smith R.D.J., Millar, K. (2017) A Mobilising Concept? Unpacking Academic Representations of Responsible Research and Innovation. *Science and Engineering Ethics*, 23 (1), 81-103
- The Forbidden Planet (1956) MGM
https://en.wikipedia.org/wiki/Forbidden_Planet

COURSE OUTLINE

Session 1 (Day 1 Morning): **The Rationale for Responsible Research and Innovation**

- What is RRI, why is it important and why now?
- What sorts of problems does RRI seek to address?

The first part of this session is interactive, introducing RRI as an interpretively discourse in the making and, taking a deliberative approach to explore what the term initially means to those attending the course and what sorts of problems they feel RRI might address. The second part of this session consists of a lecture that introduces the rationale for RRI.

First exploring the nature of technovisionary science and innovation, it makes three key observations about these: a) that they are activities that *create futures*, challenging us to ask how we can take responsibility for the kinds of futures they seek to create and, critically, how we engage with and decide what sort of future that should be b) that they create not only knowledge and value but *ignorances and uncertainties*, challenging us to ask how we proceed (e.g. innovate) under such conditions and c) that they are socially constructed and create political, ethical, environmental and social entanglements and dilemmas (unintentionally or by design), challenging us to ask how we can understand and address such entanglements in a timely and responsive manner.

These 3 observations allow us to frame the rationale and challenges for RRI and provide its departure point, focussing not only on the risks and uncertainties of science and innovation but their purposes and how we empower social agency in technology and innovation choices, including the formulation of grand challenges and grand options. The session introduces the first case study (planetary geoengineering) to illustrate the issues discussed in the lecture, serving as a site of contemporary, contested techno-visionary science to be explored as a location for RRI for the remainder of the course.

Recommended reading

- Sarewitz, D. (2015), CRISPR: Science can't solve it, *Nature*, 522, 413-414.
- von Schomberg, R. (2013). A vision of responsible research and innovation. In R. Owen, J. Bessant, & M. Heintz (Eds.), *Responsible innovation: Managing the responsible emergence of science and innovation in society* (pp. 51–74). Chichester: Wiley
- Stirling, A., (2008) “Opening up” and “closing down”: power, participation, and pluralism in the social appraisal of technology. *Science Technology and Human Values*, 33, 262–294
- Winner, L. 1980. Do artefacts have politics? *Daedalus*, 109: 121–136

Session 2 (Day 1 Afternoon): **Governing techno-visionary science and innovation**

- How is techno-visionary science and innovation governed?
- What are the strengths and deficits of the current approach?

This session sketches the contours of techno-visionary science and innovation governance in contemporary society. First, it explores the changing dynamics between science and society over history, particularly the changing role of science and universities in a market – driven, knowledge economy under stress. In this context, it examines the changing role responsibilities of researchers, moving from the objective search for truth underpinned by the so called CUDOS principles, codes of research integrity and research ethics to the rise of the entrepreneurial researcher under pressure to deliver economic (and social) impact from research.

Second, the session will consider the principle of governance by the market and its deficits (including the so called ‘dilemma of control’) and the reliance on evidence and risk - based regulation as a substantive form of governance in certain sectors such as pharmaceuticals, novel foods and industrial chemicals.

Third, the session concludes with an interactive group exercise to explore the concept of the ‘precautionary principle’ as a means of governing under uncertainty, in turn allowing members of the group to explore their own appetite for risk and their own moral and normative positions.

Recommended reading

- European Environment Agency (2013) *Late Lessons from Early Warnings: science, precaution, innovation* <http://www.eea.europa.eu/publications/late-lessons-2>
- Lee R.G. and Petts J. (2013) Adaptive Governance for Responsible Innovation. In: Owen, R., Bessant, J., Heintz, M. (Eds.), *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*. Wiley, London, pp 143-164.
- Nowotny, Helga, Peter Scott and Michael Gibbons (2001). *Rethinking science: knowledge in an age of uncertainty*. Cambridge: Polity.
- Polanyi, M. (1962). The Republic of Science: Its Political and Economic Theory. *Minerva* 1, 54–74.
- Marris, C. (2015). The construction of imaginaries of the public as a threat to synthetic biology. *Science as Culture*, 24(1), 83–98.

Session 3 (Day 2, Morning): **Beyond Risk: Multi level governance and the rise of the discourse of Responsible Research and Innovation**

- What complementary approaches to governing techno-visionary science and innovation exist?
- How do these approaches serve as foundations for RRI?
- How has RRI emerged over the last 5 years as an important ‘discourse in the making’?

The first part of this session builds on the themes initially explored in Session 2 to undertake a critique of evidence and risk -based regulation as an approach to governance, arguing that this is an approach focused on the products of science and innovation and their environment, health and safety risks, rather than their purposes and ethical, cultural and political entanglements. The majority of the first part of this session comprises a group work exercise to consider these broader issues in detail within two detailed contemporary case studies: one on GM insects and one concerning innovation using ‘big data’ in financial services, as sites for critical reflection.

The second part of this session considers a broader range of multi-level, ‘soft’ governance approaches that have emerged over the last few decades in response to the deficits of risk based regulation, including anticipatory governance (and the sociology of expectation); various forms of parliamentary, constructive and real time technology assessment, upstream engagement, ‘mid-stream modulation’, ELSI (Ethical legal and social issues) research and strategic innovation management (e.g. stage gating approaches). The session sets the context for the emergence of RRI, including the development of the term within the European Commission and Horizon 2020.

Recommended reading

- Hartley, S. (2016). Policy masquerading as science: an examination of non-state actor involvement in European risk assessment policy for genetically modified animals. *Journal of European Public Policy*, 23(2), 276–295.
- Fisher, E. and Rip, A., (2013). Responsible innovation: Multi-level dynamics and soft intervention practices. In: Owen, R., Bessant, J., Heintz, M. (Eds.), *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*. Wiley, London, pp. 165–183.
- Guston, D. H. and Sarewitz, D., (2002). Real-time technology assessment. *Technology in Society* 24 (1), 93–109.
- Karinen R., Guston D.H. (2010). Towards anticipatory governance. The experience with nanotechnology. In *Governing Future Technologies. Nanotechnology and the Rise of an Assessment Regime* (ed M. Kaiser), Springer: Dordrecht, Heidelberg, London, and New York
- Schot J. and Rip A. (1996), The past and future of constructive technology assessment, *Technology Forecasting and Social Change* 54: 251–268.
- Owen R., Macnaghten P., Stilgoe J. (2012) Responsible research and innovation: from science in society to science for society, with society. *Science and Public Policy*, 6: 751–760.
- Selin C. (2007) Expectations and the Emergence of Nanotechnology. *Science Technology and Human Values* 32: 196
- Felt, U., Wynne, B., et al., (2007). *Taking European Knowledge Seriously*. Report of the Expert Group on Science and Governance to the Science, Economy

Session 4 (Day 2, Afternoon): **Dimensions of responsibility: what is the responsible in RRI?**

- What is the responsible in RRI?
- What are the role responsibilities of academics (including PhD Students)?

This session explores what the polysemic term ‘responsible’ means in Responsible Research and Innovation. First a lecture considers the various dimensions of responsibility as foundations for a framework that will be presented on day 3, arguing the need to anchor RRI in a future-oriented mode of responsibility based on concepts of care and responsiveness. This also considers in detail the changing nature of the role responsibilities of researchers, moving from a demarcation model based on the independent ‘republic of science’ to an integrated model under RRI.

The second part of this session will be broken into two parts. First, groups return to the 3 case studies introduced earlier to a) recap the issues presented by these (highlighted in the morning session and in the readings, and b) propose an RRI approach for these cases and consider the responsibilities these would engender. The second part will be a plenary session to reflect on what has been learned so far and how this learning could contribute to the real world examples presented in the case studies. This discussion will set the scene for the introduction of the RRI Framework in Session 5.

Recommended reading

- Pelle S. (forthcoming) The normative content of responsibility in RRI approaches: two strategies. *Journal of Responsible Innovation*
- Glerup C. and Horst M. (2014) Mapping Social Responsibility in Science. *Journal of Responsible Innovation*, 1, 1: 31-50
- Mitcham, C., (2003). Co-responsibility for research integrity. *Science and Engineering Ethics* 9, 273–290
- Douglas, H., (2003). The moral responsibilities of scientists (tensions between autonomy and responsibility). *American Philosophical Quarterly* 40, 59–68
- Adam, B. and Groves, G., (2011) Futures tended: care and future-oriented responsibility. *Bulletin of Science Technology Society*, 31(1) 17–27.
- Grinbaum, A. and Groves, C. (2013). What is “responsible” about responsible innovation? Understanding the ethical issues. In: Owen, R., Bessant, J., Heintz, M. (Eds.) *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*. Wiley, London, pp. 119–142.
- Richardson, H. S., (1999). Institutionally divided moral responsibility, in Paul, E. F., Miller, F. D., Paul, J., (eds.) *Responsibility*. Cambridge University Press, Cambridge, pp. 218–249
- Pellizzoni, L. (2004). Responsibility and environmental governance. *Environmental Politics*, 13(3) 541–565.
- Wickson, F., & Forsberg, E.-M. (2014). Standardising responsibility? The significance of interstitial spaces. *Science and Engineering Ethics*, 21(5), 1159–1180.

Session 5 (Day 3, Morning): A framework for Responsible Research and Innovation

This session proposes will build on the modes of future-oriented responsibility introduced in session 4 to describe a framework for RRI based on dimensions of anticipation, reflexiveness, inclusive deliberation and responsiveness.

A lecture will chart the development of the framework and its evolution since its introduction in 2013, contrast it with other framings and definitions of RRI emerging in academic and policy circles, notably at the European Commission, providing a synthesis and comparison. This will include critical review of various studies undertaken that supported the development of the framework, including nanotechnology and geoengineering, and policies that have embedded RRI.

Recommended reading

- EPSRC Framework for Responsible Innovation
<https://www.epsrc.ac.uk/research/framework/>
- Jones, R. (2008). When It Pays to Ask the Public. *Nature Nanotechnology* 3: 578–579.
- Macnaghten PM, Owen R (2011). Good Governance for Geoengineering. *Nature*, 479
- Murphy, J., Parry, S., and Walls, J. (2016) The EPSRC's Policy of Responsible Innovation from a Trading Zones Perspective. *Minerva*, Vol. 54, No. 2, pp. 151-174.
- Owen, R. and Goldberg, N., (2010) Responsible innovation: a pilot study with the U.K. Engineering and physical sciences research council. *Risk Analysis*, 30: 1699–1707
- Owen R (2014). The UK Engineering and Physical Sciences Research Council's Commitment to a Framework for Responsible Innovation. *Journal of Responsible Innovation*, 1(1), 113-117
- Research Council of Norway Framework for Responsible Innovation under Biotek 2021, IKTPLUSS, NANO2021 and SAMANSVAR:
www.forskningsradet.no/prognett-biotek2021/Home_page/1253970728140
- Rome Declaration on RRI:
https://ec.europa.eu/research/swafs/pdf/rome_declaration_RRI_final_21_November.pdf
- Stilgoe J, Owen R, Macnaghten P (2013). Developing a framework for responsible innovation. *Research Policy*, 42 (9), 1568-1580

Session 6 (Day 3, Afternoon): **From Concept to Practice: Experiments in RRI**

This session starts to consider RRI's implementation in practice, an area of active research at this current time. A lecture reviews case studies that present as experiments in RRI implementation and examines the challenges of moving RRI from theory to practice and the factors shaping this. The session then examines a contemporary Norwegian project involving Assisted Living Technologies where RRI is being implemented and provides an opportunity to hear about and critically engage with the experiences of the project and what can be learned.

The session will also introduce the assignment to be undertaken by students attending the course, what is expected and timelines. The aims of this final part of the session will be to ensure that students understand the expectations of the assignment, how this will be assessed and have identified a specific RRI topic which matches their research interests and PhD studies and which can be discussed in detail over the remaining two days of the course.

Recommended reading

- Fisher, E., Mahajan, R. & Mitcham, C. (2006). Midstream modulation of technology: governance from within. *Bulletin of Science Technology Society* 26(6), 485–496
- Hartley S., Pearce W. and Taylor A (2016) Against the tide of depoliticisation: The politics of research governance. *Policy and Politics*
- The Assisted Living Project: <https://blogg.hioa.no/assistedliving/>

Session 7 (Day 4, Morning): **Implementing RRI: project level interventions**

This is an interactive session that provides the knowledge and practical skills to critically engage with and implement RRI in real world contexts at the level of research projects. We introduce an open access teaching tool (“TERRAIN”) for RRI which has been developed as a freely available tool to foster RRI in research organisations and consider tools described in the EU RRI Tools project, critically evaluating these. As a group we will further develop the TERRAIN tool through a collaborative learning approach aimed at pedagogic innovation, free for students to use when they return to their host institutions.

Exercises are designed to allow students to appreciate the broader dimensions and implications of research and innovation in practice, understand how RRI can address these complexities, the competencies and institutional arrangements that are needed and demonstrates the choices available to researchers. One of these takes the form of an exercise in which the group will serve as a jury to review shortlisted proposals for the European Foundation Awards for Responsible Innovation in 2016, and based on detailed examination, select its own winner for the award. At the end of this session we will reflect on the opportunities and challenges of project level RRI interventions based on these exercises and recommended readings.

Recommended reading

- Balmer, A.S., Calvert, J., Marris, C., Molyneux-Hodgson, S., Frow, E., Kearnes, M., Bulpin, K., Schyfter, P., Mackenzie, A. and Martin, P., 2015. Taking roles in interdisciplinary collaborations: Reflections on working in post-ELSI spaces in the UK synthetic biology community. *Science and Technology Studies*, 28(3), pp.3-25.
- European Foundations for Responsible Research and Innovation Award Nominees Case Studies www.efarri.eu/
- Nerlich, B. and McLeod, C., 2016. The dilemma of raising awareness “responsibly”. *EMBO reports*, 17(4), pp.481-485.
- Stilgoe, J. 2013. A year (and a bit) in responsible innovation <https://jackstilgoe.wordpress.com/2013/01/10/a-year-and-a-bit-in-responsible-innovation/>
- Blog: The Reluctant Geoengineer <http://thereluctantgeoengineer.blogspot.co.uk/>
- The TERRAIN tool for teaching responsible research and innovation: <http://eprints.whiterose.ac.uk/104570/>
- RRI Tools Case Studies and ‘inspiring practices’: www.rri-tools.eu

Session 8 (Day 4, Afternoon): **Implementing RRI: from projects to programmes to systemic change**

This session considers RRI implementation beyond the project level, within programmes of research and innovation, within research and innovation strategies and at a systemic level. Considering for example how research and innovation agendas are set, and by whom, it will ask how innovation systems and our structures and institutions of science should be configured to embed an RRI approach. What could systemic change look like, e.g. across Europe under Horizon 2020?

The session will include an exercise that considers RRI implementation within the field of synthetic and systems biology and quantum technologies, comparing and critiquing programme strategy documents which have attempted to embed an RRI approach in Norway and the UK. A member of the Research Council of Norway who has been involved in RRI development will attend for part of the session to hear the recommendations and respond to questions.

Recommended reading

- Research Council of Norway Biotek 2021 Strategy and RRI Framework: www.forskningsradet.no/prognett-biotek2021/Home_page/1253970728140
- UK Synthetic Biology Roadmap: <http://www.rcuk.ac.uk/documents/publications/syntheticbiologyroadmap-pdf/>
- A roadmap for quantum technologies in the UK: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470243/InnovateUK_QuantumTech_CO004_final.pdf
- Hartley, S., Gillund, F., van Hove, L. and Wickson, F., (2016). Essential Features of Responsible Governance of Agricultural Biotechnology. *PLoS Biol*, 14(5)

Session 9 (Day 5, Morning): Critiquing RRI: from process to politics

- Is RRI an unrealistic ideal that is destined to fail?
- To what extent does RRI challenge the status quo, or seek to transform it?
- What are the politics inherent in RRI?
- What can we learn from the Global South?

This session moves beyond considerations of RRI as process to its politics. It will critique RRI, asking whether it can ever work in the current political economy, and to what extent does it challenge this or seek to transform it: and if so to what ends? What is RRI's political imaginary? Where does RRI sit, and what does it have to say about an increasingly polarised world characterised by anti-globalisation, anti-elitism, anti-experts and nationalism, where an increasing majority feel failed or left behind by institutions that include science and innovation? If so what could RRI's contribution be, and what would it seek to change?

What can we learn from other discourses of innovation, inclusion and responsibility that advocate for 'responsible stagnation' or take normative stances such as degrowth, and those from the Global South, where concepts such as inclusive innovation have proliferated, and what are the politics of inclusion and other buzzwords that RRI leverages? This session, through a combination of lectures and discussion will explore these questions, with the aim of developing a group authored perspective to be published after the Summer School.

Recommended reading / viewing

- After Brexit: RRI should learn from the transition discourse. www.youtube.com/watch?v=FlBU-t4yfi4
- Blok V. and Leemans P. (2015) The Emerging Concept of Responsible Innovation: Three Reasons Why It Is Questionable and Calls for a Radical Transformation of the Concept of Innovation. In (eds B-J Koops, I. Oosterlaken, H. Romijn, T. Swiestra) *Responsible Innovation 2: Concepts, Approaches and Applications*, 19-36. Springer
- De Saille S. et al (2016) Innovation for a steady state: a case for responsible stagnation. *Economy and Society*, 45: 1–23
- Macnaghten PM, Owen R, Stilgoe J, Wynne B et al (2014). Responsible innovation across borders: tensions, paradoxes and possibilities. *Journal of Responsible Innovation*, 1(2), 191-199
- Pansera M, Owen R (2016). Innovation for de-growth: a case study of counter-hegemonic practices from Kerala, India. Forthcoming *Journal of Cleaner Production*
- Zwart, H., Landeweerd, L. and Van Rooij, A., (2014). Adapt or perish? Assessing the recent shift in the European research funding arena from 'ELSA' to 'RRI'. *Life sciences, society and policy*, 10(1), p.1.
- van Oudheusden, M. (2014). Where are the politics in responsible innovation? European governance, technology assessments, and beyond. *Journal of Responsible Innovation*, 1(1), 67–86.

Session 10 (Day 5, Afternoon): **Concluding Reflections: What next for RRI, what next for you?**

This concluding session begins with a final lecture that draws together the key concepts, themes and debates that have emerged over the 5 days, as a reflexive and responsive synthesis of our group encounter with RRI: what have we learned and what have the deliberations of the group brought to the concept of RRI. The lecture will embed video interview voxpops from experts and those working in policy who have been involved in RRI around the globe, with an emphasis on distilling key themes and original contributions that take the state of the art forward: these will be combined with the discussions had in Session 9 to sketch the outline contents of the group publication that will be developed after the School.

The session will then allow each student to reflect on what they have learned, and how they might embed this within their own PhD work, for example as a chapter within their thesis, or as further research to be undertaken when they return to their host institutions. The concluding part of the session will provide an opportunity to discuss the assignment to be finished after the course.

RECOMMENDED READING FOR CASE STUDIES

Planetary Geoengineering Case Study

- Macnaghten, P. and Szerszynski B. (2013) Living the global social experiment: An analysis of public discourse on solar radiation management and its implications for governance. *Global Environmental Change*, 23 (2): 465-474.
- Owen R (2014). Solar Radiation Management and the Governance of Hubris. In Hester R, Harrison R (Eds.) *Geoengineering of the climate system*, Royal Society of Chemistry, 211-247.
- Pidgeon, N., Parkhill, K., Corner A. and Vaughan N. (2013) Deliberating stratospheric aerosols for climate geoengineering and the SPICE. project *Nature Climate Change*, 2013, 3, 451–457
- Royal Society, EDF and TWAS: Solar Radiation Management Governance: the governance of research: www.srmgi.org/files/2016/02/SRMGI.pdf
- Corner A. et al (2013) Messing with nature? Exploring public perceptions of geoengineering in the UK. *Global Environmental Change* 23(5) 938-947.

GM Insects Case Study

- Boor, K. J. (2015, June 11). [Commitment to responsible science guides CALS plans for moth trials](#). CALS.
- Kamwi, RN, (2016), [Gene drive debate must include voices from Africa, elsewhere](#), *Stat News*
- National Academies of Sciences, Engineering and Medicine, (2016) [Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values](#), National Academies Press
- WHO (World Health Organization), TDR (Research and Training in Tropical Diseases) and FNIH (Foundation for the National Institutes of Health), (2014). [Guidance framework for testing of genetically modified mosquitoes](#). Geneva: WHO

Financial Innovation Case Study

- Armstrong, M., G. Cornut, S. Delacote, M. Lenglet, Y. Millo, F. Muniesa, A. Pointier and Y. Tadjeddine (2012). Towards a practical approach to responsible innovation in finance: new product committees revisited. *Journal of Financial Regulation and Compliance*, 20(2), 147–168.
- Asante K., Owen R. and Williamson G.(2014) Governance of new product development and perceptions of responsible innovation in the financial sector: insights from an ethnographic case study. *Journal of Responsible Innovation*, 1 (1) 9–30
- Muniesa, F., and M. Lenglet. 2013. “Responsible Innovation in Finance: Directions and Implications.” In *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, edited by R. Owen, J. Bessant, and M. Heintz, 185–198. Chichester: John Wiley

The lecturers

Professor [Richard Owen](#) holds the Chair in Responsible Innovation at the University of Exeter Business School, where he sits in the School of Management. Originally an environmental scientist, Richard's research involves understanding the responsible emergence of innovation and new technologies in democratic society. He works closely with the UK Research Councils in this regard with funding from NERC, ESRC and EPSRC, including a current grant to develop a Responsible Innovation Framework for them.

He has a background in risk assessment, governance and regulation, working at the interface between disciplines to support national and international policy development regarding emerging technologies. He teaches Strategic Innovation Management on the Exeter One Planet MBA.

Dr [Sarah Hartley](#) obtained a PhD in Politics and Environmental Studies with a specialisation in Public Policy from the University of Toronto in 2005. She has an MSc (distinction) in European Social Policy Analysis and a BSc (first class) in Environmental Management and Policy.

After her PhD, Sarah took up a professional position at Genome British Columbia, a Canadian funding agency where she established an interdisciplinary social science research programme in genomics and engaged policy-makers, industry and other stakeholders to explore the role of genomics in addressing societal challenges. She has held positions at the Institute for Science and Society, University of Nottingham, Department of Political Science, Simon Fraser University, W. Maurice Young Centre for Applied Ethics, University of British Columbia and Department of Political Science, University of Victoria. Sarah Hartley joined the Business school at the University of Exeter in 2016 as Senior Lecturer in Management.