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978-0-521-17678-1 - Successful Science Communication: Telling It Like It Is

Edited by David J. Bennett and Richard C. Jennings

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Successful Science Communication

In the 25 years since the Bodmer Report kick-started the public understanding of science movement, there has been something of a revolution in science communication. However, despite the ever-growing demands of the public, policy-makers and the media, many scientists still find it difficult to successfully explain and publicise their activities or to understand and respond to people's hopes and concerns about their work.

Bringing together experienced and successful science communicators from across the academic, commercial and media worlds, this practical guide fills this gap to provide a one-stop resource covering science communication in its many different forms. The chapters provide vital background knowledge and inspiring ideas for how to deal with different situations and interest groups. Entertaining personal accounts of projects ranging from podcasts to science festivals to student-run societies give working examples of how scientists can engage with their audiences and demonstrate the key ingredients in successful science communication.

DAVID J. BENNETT is a Guest at the Department of Biotechnology of the Delft University of Technology in The Netherlands and a Visitor to the Senior Combination Room of St Edmund's College, Cambridge, UK. He has long-term experience, activities and interests in the relations between science, industry, government, education, law, the public and the media, and he works with the European Commission, government departments, companies, universities, public interest organisations and the media in these areas.

RICHARD C. JENNINGS is an Affiliated Research Scholar in the Department of History and Philosophy of Science in the University of Cambridge. His research interests are focused on the responsible conduct of research, and the ethical uses of science and technology. He is a member of BCS, the Chartered Institute for IT, has worked with the BCS Ethics Forum defining and refining the BCS Code of Conduct, and with four other members has developed a *Framework for Assessing Ethical Issues in New Technologies*.

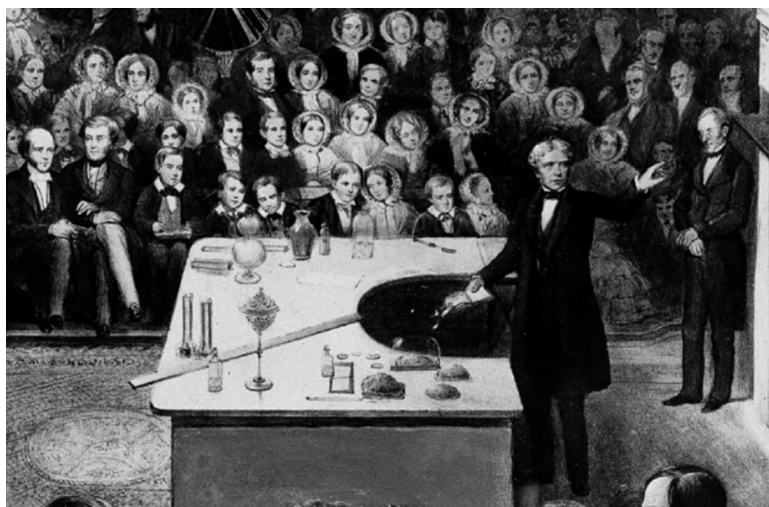
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Michael Faraday delivering a Christmas Lecture at the Royal Institution in 1856

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Telling It Like It Is

Edited by

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‘The time has come,’ the Walrus said,

‘To talk of many things:

Of shoes – and ships – and sealing-wax –

Of cabbages – and kings –

And why the sea is boiling hot –

And whether pigs have wings.’

from *Through the Looking-Glass and What Alice Found There*

Lewis Carroll (1872)

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This book is dedicated to the memories of Stephen White and Stephen Schneider and to James Astley. Steve White died suddenly on 23 August 2010 at the age of 61 after writing his chapter on 'Dealings with the media' and before it was published. As Director of Communications at the British Psychological Society for many years he did a very great deal to further science communication with both his writings and his own kind dealings with his many friends, colleagues and course participants. Steve Schneider died also suddenly at the age of 65 on 19 July 2010 before writing his chapter on 'Tackling the climate communication challenge' which Andrew Revkin kindly took on at short notice. Steve Schneider was Professor of Environmental Biology and Global Change at Stanford University, and for long a renowned climate change researcher and eloquent communicator about the scientific evidence in the public arena. James was born on 29 October 2010 when the book's writing had just been completed, both having been carefully nurtured by his mother, Katrina Halliday, as Senior Commissioning Editor, and he has his life before him to build and enjoy.

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Foreword

The need for scientists to be able to communicate, and so engage with the public, is as important now, if not even more so, as it was when I chaired the Royal Society's 'Public Understanding of Science' committee in the mid-1980s. The final sentence of the Royal Society report was: *'But our most direct and urgent message must be to the scientists themselves: Learn to communicate with the public, be willing to do so and consider it your duty to do so.'*

Fortunately, the need for scientists to communicate is now widely recognised and no longer considered controversial by the scientific community. Indeed, it is now an accepted part of any scientist's activities and there is no longer any stigma for a scientist to be involved in the public communication of science.

This timely book is addressed to all those involved in any way in the enterprise of science, and makes a major contribution to promoting and supporting the need for science communication. It is full of good practical advice, as well as giving a wide-ranging background to the issues involved.

Some commentators on the 1985 report suggested, quite wrongly in my view, that all that was being proposed was for scientists to feed the public with the scientific facts and that they would then quietly support science. This came to be known as the 'deficit model' and led to an emphasis on public engagement.

But how can there be the dialogue that is, quite appropriately, implied by public engagement, without some understanding by the public, whoever they might, be of the scientific issues involved? It is necessarily the scientist who has the relevant information, especially of the latest advances whether pure or applied, and so the onus to explain the scientific issues must fall on the scientist. Without the scientist having the ability to explain science in a way that the non-expert can

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understand and a willingness to get involved in the dialogue, there can be no public engagement.

In the last 25 years there have been several major developments that impact on the issues of science communication and public engagement. The first is the huge increase in post-16 education and, especially in university participation, which is now almost 45% in the UK. This has inevitably led to a much higher proportion of the population having some science education beyond the age of 16. A second major change is the extraordinary explosive increase in information available on the web and the more recent opportunities this is now providing for social networking. A third change is in the proportion of the population that is over 65 and supposedly retired. In future these changes must be taken into account in any overall consideration of approaches to science communication and public engagement.

This book effectively covers most of these and other relevant topics and is written by authors with suitably diverse and appropriate backgrounds. The topics range from history, going back to the Greeks, through social science and philosophical questions, to measurements of public attitudes to science and methods for evaluating the impact of different approaches to science communication. Most importantly, it includes practical recommendations from the viewpoints of journalists, both from the UK and the USA, and from the experience of those working in environmental consulting, and for patient support organisations, funding agencies, consumer organisations, the pharmaceutical industries, the British Science Association and many others.

It is a book that should be recommended reading for all those who are involved in any way with science. There is no better current comprehensive and succinct source that gives such an excellent background to the issues around science communication and explains how to engage with the public, with much valuable practical advice.

Sir Walter Bodmer FRS

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John Adams

John Adams is Emeritus Professor of Geography at University College London. He was a member of the original Board of Directors of Friends of the Earth in the early 1970s and has been involved in debates about environmental risks ever since. He is intrigued by the persistence of attitudes to risk: for the past 30 years, the same arguments, slogans and insults have been shouted past each other by the participants (or their descendants) in disputes about issues for which conclusive evidence is lacking. His current work on both risk and transport issues seeks to understand these attitudes and the reasons for their persistence, in the hope of transforming shouting matches into more constructive dialogues. He has a website: www.john-adams.co.uk.

David Bennett

David Bennett is now a Guest at the Department of Biotechnology of the Delft University of Technology in The Netherlands and a Visitor to the Senior Combination Room of St Edmund's College, Cambridge, UK. He has a PhD in biochemical genetics and an MA in science policy studies with long-term experience, activities and interests in the relations between science, industry, government, education, law, the public and the media. He works with the European Commission, government departments, companies, universities, public interest organisations and the media in these areas, having worked in universities and companies in the UK, USA, Australia and, most recently, the Netherlands. He was a founder member and secretary of the European Federation of Biotechnology Task Group on Public Perceptions of Biotechnology established in 1991 and one of the first organisations in this field. For the last 20

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years or so he has been running many international network-based, multidisciplinary projects, courses, conferences, workshops, etc. funded by the European Commission and other bodies in biotechnology and, of late, nanobiotechnology.

Hayley Birch

Hayley Birch is a freelance science communicator and director of the not-for-profit science communication company Sounds of Science, which specialises in creative communication about science. She uses new media tools including podcasts, blogs and social networks to engage with audiences for Sounds of Science projects and has been involved in research in collaboration with the University of the West of England studying the use of new media in science communication. Hayley is the creator of Geek Pop, a music project focusing on commissioning and publishing science-inspired music online. She has written for publications including *New Scientist*, *Nature* and *Chemistry World*; edited several popular science books; been involved in European Commission-funded science, society and policy initiatives; and worked with music festivals and science festivals to produce shows as well as written and audio content. She has a keen interest in embedding science in culture and blogs about science at the intersection with the arts at wordsofscience.blogspot.com. Hayley graduated in biological sciences from the University of Warwick and received her master's in science communication from the University of the West of England.

Sir Walter Bodmer

Walter Bodmer studied mathematics at Cambridge University where, having become fascinated with genetics through courses taught by Sir Ronald Fisher as part of the final-year mathematics programme, he did his PhD with Fisher in population genetics. He then went as a Post-Doctoral Fellow in 1961 to work with Nobel Prize winner Joshua Lederberg at Stanford University and to learn molecular biology. While there, eventually as a member of the Faculty for eight years, he contributed to the discovery of the major human tissue-typing system. In 1970 Walter Bodmer returned to the UK to take up the chair of genetics at Oxford and in 1979 he left Oxford to become Director of Research at the Imperial Cancer Research Fund Laboratories in London and was appointed the first Director-General of the Fund in 1991. On retirement from the ICRF in 1996, he returned to Oxford University as Principal of Hertford College

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until 2005, and as head of the ICRF (now CRUK) Cancer and Immunogenetics laboratory at the Weatherall Institute of Molecular Medicine where he continues his research into cancer and human population genetics. Walter Bodmer was one of the first to suggest the idea of the Human Genome Project. He was elected FRS in 1974, knighted in 1986 for his contributions to science, is a Foreign Associate of the US National Academy of Sciences and is the recipient of more than 30 honorary degrees and memberships and fellowships of scientific and medical societies.

Tracey Brown

Tracey Brown is director of the UK-based charitable trust Sense About Science which equips the public to make sense of science and evidence. She joined Sense About Science in its founding year 2002. Tracey has a background in social research, and previously spent four years working on a European Commission programme to establish social research and teaching in the former Soviet Union and a year setting up a commercially based risk analysis centre. She is a trustee of Centre of the Cell and a trustee of MATTER for All. In 2009 she became a commissioner for the UK Drugs Policy Commission. She sits on the Outreach Committee of the Royal College of Pathologists and in 2009 was made a Friend of the College. She is a regular writer and commentator on science and society, peer review and publication of research data.

Nicola Buckley

Nicola Buckley is acting Head of Community Affairs at the University of Cambridge. She helps to convene the UK science festivals network and is a member of the European Science Communication Events Association. As well as managing the annual Cambridge Science Festival, she founded the Cambridge Festival of Ideas in 2008, which engages the public with arts, humanities and social sciences research. Prior to her current role at the University of Cambridge, Nicola worked as a fundraising manager for several health and social care charities. She has a BA in history and an MPhil in social anthropology from the University of Cambridge and an MSc in science in society from the Open University.

Michel Claessens

Michel Claessens was born in 1958 in Brussels. He has a PhD in physical chemistry, and has worked successively at the Free University of Brussels

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(Department of Organic Physical Chemistry) and at the Erasme Hospital in Brussels (Department of Radiology), and then in the biotechnology and in the chemical industry. He has also been a freelance scientific journalist since 1980. Michel joined the European Commission in 1994. He was Deputy Head of the Communication Unit in the Research Directorate-General until March 2011. His main responsibilities concerned the organisation of major conferences and the Eurobarometer surveys on science and technology. He was also the editor-in-chief of the magazine *research*eu* of the European Commission. He is now Head of Communication at the ITER Organization (France, Cadarache) and teaches science communication at the Free University of Brussels. As a scientific journalist and writer, Michel Claessens has published 250 articles and eight books on science communication and several aspects of modern science and technology. He is also a member of the scientific committee of the international Publication Communication of Science and Technology network (PCST).

Sue Davies

Sue Davies is Chief Policy Adviser at *Which?*, working mainly on food issues. She is also a member of the Management Board of the European Food Safety Authority (EFSA). She has represented consumer interests on a range of government and industry committees and working groups at national and international level, including the Council of Food Policy Advisers, Science for All Expert Group, the Advisory Committee on the Microbiological Safety of Food (ACMSF) and Responsible Nano Code, and is the EU Chair of the Transatlantic Consumer Dialogue (TACD) Food Policy Committee. She was awarded an MBE in 2003 for services to food safety.

Peter Evans

Peter Evans is one of the UK's foremost science broadcasters, having spent over three decades presenting radio (and some television) programmes on all areas of research. After graduating from Oxford, he worked first in publishing as a commissioning editor, then became a freelance writer specialising in science, medicine and technology. He was the weekly 'voice' of radio science in the UK as presenter of the long-running magazine programme *Science Now*. He then started the prize-winning documentary strand *Frontiers*. Alongside this, he wrote and presented hundreds of programmes for the Open University from which he holds an honorary Master's degree for services to science communication. In addition, he has written or contributed to over 12 books and numerous articles; written and edited material for the

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UK government; and run his own training and consultancy company, again specialising in scientific matters. Currently, he is carrying out academic research analysing the impact of radio science messages on lay audiences.

George Gaskell

George Gaskell BSc PhD, Professor of Social Psychology, is Pro-Director of the London School of Economics and Political Science. His research focuses on science, technology and society; in particular the issues of risk and trust; how values influence people's views about technological innovation, and the governance of science and technology. His research competencies include survey methodology and both quantitative analysis and qualitative inquiry. Since 1996 he has coordinated the series of Eurobarometer surveys on 'Biotechnology and the Life Sciences' for the Research Directorate-General. He was principal investigator of 'Life sciences in European society', a European comparative study of biotechnology in the public sphere funded by the European Commission and is now leading a project on 'Sensitive technologies and European public ethics'. He is a member of the Expert Group on Risk Communication of the European Food Standard Authority and chairs the International Advisory Group of the Centre for Genomics and Society in The Netherlands. He was vice-chair of the European Commission's Science and Society Advisory Committee and was also a member of the Science in Society Committee of the Royal Society.

Laura Grant

Laura first got involved in public engagement as a physics undergraduate at the University of Liverpool, developing shows and workshops to tour secondary schools in Merseyside. Since her early outreach work, Laura has developed an interest in what works and why when engaging audiences with science. Her PhD, entitled 'Comparative evaluation of science communication activities', addressed these questions and she has since spent most of her career on evaluation research. Laura approaches evaluation as a practitioner herself, which ensures the integrity and relevance of her recommendations. She has completed many evaluation projects for a diverse range of clients including the British Council, the Royal Society, the Engineering and Physical Sciences Research Council, AstraZeneca, the Institute of Physics and the Royal Academy of Engineering. One of Laura's research interests is in developing ways to meaningfully measure impact. She uses a range

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of tools to help clients develop strategies and impact frameworks to capture learning and measure success. Laura enjoys sharing her interest and enthusiasm in evaluation with others and is frequently called on to deliver training and write guides on the subject.

James Hannam

James Hannam graduated in physics at St Anne's College, Oxford before embarking on a career in the City of London. While working, he took his MA in historical research at Birkbeck College, London before taking time off to complete his PhD in the history and philosophy of science at Pembroke College, Cambridge. He now works for Ernst & Young LLP. His reviews and articles have appeared in academic journals as well as *History Today*, the *Mail on Sunday*, the *Guardian* and the *Spectator*. His first book *God's Philosophers: How the Medieval World Laid the Foundations of Modern Science* (Icon Books, 2009) was shortlisted for the Royal Society Book Prize 2010. James lives in rural Kent with his wife and two young children. He can be contacted at bede@bede.org.uk.

Richard Hayhurst

Richard Hayhurst has worked in science communications for over 30 years, starting in Finland as marketing communications manager for Labsystems, one of the first biotech companies which pioneered HIV testing. Having developed a taste for communicating the controversies being thrown up by a golden era in scientific discovery, Richard returned to the UK to set up a PR agency specialising in the life sciences. Over the next 20 years HCC De Facto was involved in many of the leading issues of the day including cloning, GM, stem cell research, the Human Genome Project and industrial biotechnology. The agency also famously launched 'Dolly the Sheep'. Clients included GlaxoSmithKline, Genzyme, Roslin, the UK BioIndustry Association, Johnson & Johnson and Cambridge Antibody Technology. In 2005 Richard founded Hayhurst Media which focused on early-stage biotechnology companies. The company was acquired by the leading US agency Schwartz Communications in 2009 and Richard now runs their life sciences and technologies practices. He has also participated in several European Commission-funded projects looking at communications issues in genetics and nanotechnology. He is a founding member of both the London Biotechnology Network and London Cleantech Network. He holds an MA in modern history from the University of St Andrews.

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Wolfgang M. Heckl

Professor Dr. Wolfgang M. Heckl is the Director General of the Deutsches Museum and holder of the Oskar-von-Miller-Chair for science communication at the Technische Universität München. Previously he was professor of experimental physics and nanotechnology at the University of München (LMU) with a special interest in the field of organic self-assembly and the origin of life. His academic teachers include Nobel Prize winners Gerd Binnig and Theodor Hänsch. As a dynamic and charismatic science communicator he received the Communicator Prize in 2002 from the German Science Foundation and was awarded the first European Descartes Prize for Science Communication in 2004. He was the chairman of the pan-European Euroscience Open Forum in July 2006.

Paul Hix

Paul Hix is currently completing a transdisciplinary PhD in science communication and nanosciences in the Open Research Laboratory of the Deutsches Museum. The main element of his dissertation is the establishment of this novel laboratory concept in which he conducted nanoscale research in full public view for over two and a half years. From 1995 to 2003 he studied geophysics at the Ludwig Maximilian University of Munich and was awarded the Bavarian State Prize 2005 for his diploma thesis project: 'Scanning tunneling microscope for the International Space Station ISS'. In 1994 Paul Hix represented Great Britain in the luge competition of the XVII Winter Olympic Games in Lillehammer.

Sue Hordijkeno

Sue began her career in public engagement with science in 1994 when she joined the Wellcome Trust to work on the public and schools programme for its permanent in-house exhibition on the biomedical sciences 'Science for life'. She joined the British Science Association in 1999 initially to manage the Association's special millennial festival 'Creating SPARKS', a month-long science and arts festival involving all of the cultural institutions of South Kensington, and then went on to manage the Association's 'Science in society' programme. This involved developing the annual national science communication conference and co-creating the online mass participation psychology experiment 'Laughlab'. In 2001 she moved to the Natural History Museum and worked with the Museum's scientific curators and researchers to instigate a

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programme of daily onsite and online public events involving museum researchers in the newly opened Darwin Centre. She returned to the British Science Association in 2004 in her current role as Director of Programmes where she has overall responsibility for the British Science Festival, National Science and Engineering Week, the Association's 'Science in society' programmes and its press and PR operation.

Richard Jennings

Richard Jennings is an Affiliated Research Scholar in the Department of History and Philosophy of Science in the University of Cambridge. His research interests are focused on the Responsible Conduct of Research, and the ethical uses of science and technology. He is a member of BCS, the Chartered Institute for IT, has worked with the BCS Ethics Forum defining and refining the BCS Code of Conduct, and with four other members has developed a *Framework for Assessing Ethical Issues in New Technologies*. He teaches philosophy of science to undergraduate natural science students and philosophy to undergraduate philosophy students. He lectures on ethics in science and runs graduate workshops on ethical conduct and ethical practice in science. He has a long-standing interest in the history of science and the history of philosophy of science, lecturing on the history of science for the Pembroke College International Programme. He is a member of Pembroke College and of Queens' College Cambridge.

Richard Jones

Richard Jones is Pro-Vice-Chancellor for Research and Innovation at the University of Sheffield. He has a first degree and PhD in physics from the University of Cambridge, and did postdoctoral work at Cornell University in the USA, before being appointed a lecturer in physics at the University of Cambridge. In 1998 he moved to the University of Sheffield. He is an experimental polymer physicist who specialises in elucidating the nanoscale structure and properties of polymers and biological macromolecules at interfaces. Richard Jones has written and lectured extensively for general audiences and has participated in a number of citizens' panels and other deliberative forums about nanotechnology. He was the Senior Strategic Advisor for Nanotechnology for the Engineering and Physical Sciences Research Council from 2007 to 2009, and is a member of EPSRC's Societal Issues Panel. In 2006 he was elected a Fellow of the

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Royal Society, and in 2009 he won the Tabor Medal of the Institute of Physics for contributions to nanoscience.

Alastair Kent

Alastair Kent is the Director of the Genetic Alliance UK, formerly Genetic Interest Group (GIG) – the UK alliance of charities and support groups for people affected by genetic disorders. Its mission is to promote the development of the scientific understanding of genetics and the part that genetic factors play in health and disease, and to see the speedy transfer of this new knowledge into improved services and support for the treatment of currently incurable conditions. Prior to joining GIG Alastair worked for a number of voluntary organisations on issues concerning policy, service development and disabled people.

Lise Kingo

Lise Kingo is Executive Vice President and Chief of Staffs, Novo Nordisk. She joined Novo Nordisk in 1988 and worked over the years to build up the company's Triple Bottom Line approach. Ms Kingo was appointed Senior Vice President in 1999 and Executive Vice President, Corporate Relations, in 2002. Ms Kingo serves as chair of the board of the Steno Diabetes Center A/S, Denmark. She is also associate professor at the Medical Faculty, Vrije Universiteit, Amsterdam, The Netherlands. Ms Kingo has a BA in religions and a BA in ancient Greek art from the University of Aarhus, Denmark from 1986, a BComm in marketing economics from the Copenhagen Business School, Denmark from 1991, and an MSc in responsibility and business practice from the University of Bath, UK, from 2000.

Rikke Schmidt Kjærgaard

Rikke Schmidt Kjærgaard is a research fellow at the Faculty of Science, Aarhus University, Denmark, and an affiliated research fellow at Harvard Medical School. She graduated in 2008 with her thesis 'Framing science and technology: Media, narratives and policy'. Since 2008, she has worked as a postdoctoral researcher at Harvard Medical School and as a research associate at the MRC Mitochondrial Biology Unit, Cambridge, UK. Her research is focused on visual communication. Her current research covers art and science, graphic design for science, and artistic license in scientific images. Besides a PhD in science communication she has an MSc in mathematics and art history.

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Tanja Klop

After finishing her undergraduate study in biology, Tanja studied for her PhD at the Erasmus University of Rotterdam. She graduated in 2008 with her thesis 'Attitudes of secondary school students towards modern biotechnology'. Since 2008, Tanja Klop has worked as a postdoctoral researcher within the Biotechnology and Society Group at the Department of Biotechnology of the Delft University of Technology in The Netherlands. Her research is concerned with ethical and societal issues in emerging new technologies, with a main focus on innovative communication and education strategies.

Nicole Kronberger

Dr Nicole Kronberger is Assistant Professor at the Department of Social and Economic Psychology at Johannes Kepler University Linz (Austria) and Marie Curie Fellow at the London School of Economics and Political Science. Her research interests focus on social psychological phenomena – such as stereotypes, risk perceptions, moral reasoning and values – and how these relate to the processes of public understanding of technologies. She is currently working on the European Commission projects 'Sensitive technologies and European public ethics' and 'The landscape and isobars of European values in relation to science and new technology'.

Simon Lock

Simon J. Lock is a Teaching Fellow in the Department of Science and Technology Studies at University College London. His research focuses on historical, sociological and policy-related questions around the public dimensions of science with a particular focus on the public understanding of science, science communication, public engagement with science and technology, social and cultural representations of science and public attitudes to new technologies. Current projects include the history of the public understanding of science movement in the UK, and public attitudes and framings of carbon governance. He has also worked on projects concerned with public engagement with science and technology for the Royal Society, the Royal Society of Arts and the Government Office of Science.

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Chris Mooney

Chris Mooney is the author of three books, including *The Republican War on Science* and *Unscientific America: How Scientific Illiteracy Threatens our Future* (with Sheril Kirshenbaum). He is also a host of the popular podcast *Point of Inquiry* (www.pointofinquiry.org), blogs for *Discovery* magazine (blogs.discovermagazine.com/intersection), and works as a science communication trainer.

Alfred Nordmann

Alfred Nordmann is a philosopher of science and of technoscience at Technische Universität Darmstadt, Germany, and University of South Carolina, USA. Since 2000, he has been studying the culture of research in nanoscience and converging technologies. This provides a grounding for the analysis of ethical and societal dimensions of technoscientific research. With Martin Carrier, Nordmann edited the volume *Science in the Context of Application* (Springer, 2010). With Andreas Lösch and Stefan Gammel he developed an institutional model for social learning from collective experiments with emerging technologies. He has contributed to numerous reports and projects commissioned by the European Commission.

Patricia Osseweijer

Patricia Osseweijer is Full Professor of Science Communication and Leader of the Biotechnology and Society Section of the Department of Biotechnology in the Faculty of Applied Sciences of Delft University of Technology. She also holds the Special Chair in Science Communication of the Dutch Royal Institute of Engineering (KIVI-NIRIA). She is Managing Director of the public-private partnership Kluyver Centre for Genomics of Industrial Fermentation, Principal Investigator of the Centre for Society and Genomics, and Flagship Manager of the socio-economic programme of the BE-Basic university-industry partnership for innovation in sustainable chemistry. Her research focuses on analysis of future societal (ELSA) issues underpinning design and evaluation of novel forms of public communication.

Andrew Revkin

Andrew Revkin is one of the most experienced and influential journalists covering climate change, biological diversity and other global

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environmental issues. Building on a quarter-century of prize-winning print work, he writes the Dot Earth blog for the Op Ed pages of *The New York Times*, creating a forum where several hundred thousand readers a month evaluate and discuss climate, biodiversity, population and related subjects. Revkin, who was a staff reporter at the paper from 1995 through 2009, is the senior fellow for environmental understanding at Pace University's Academy for Applied Environmental Studies. He has reported on the science and politics of global warming since the late 1980s, from the North Pole to the White House and the tumultuous treaty talks in Copenhagen. He is the author of three books on environmental subjects: *The Burning Season*, his prize-winning account of the life and murder of the rainforest defender Chico Mendes (Houghton Mifflin, 1990), *Global Warming: Understanding the Forecast* (American Museum of Natural History, 1992) and *The North Pole Was Here: Puzzles and Perils at the Top of the World* (Houghton Mifflin, 2006). Revkin has received journalism awards from many organisations, including the National Academy of Sciences, the American Association for the Advancement of Science, and Columbia University and has been awarded an honorary doctorate by Pace and a John Simon Guggenheim Fellowship. He lives in the Hudson Valley where, in spare moments, he is a performing songwriter and member of the roots band Uncle Wade. Background at: <http://www.nytimes.com/revkin>

Maarten van der Sanden

Maarten van der Sanden is an assistant professor in science communication at the Delft University of Technology. He worked as a science communication professional and head of science communication section at the marketing and communication corporate staff at the same university. His PhD thesis was on biomedical science communication on predictive DNA diagnostics. He started his science communication career as a science journalist after finishing his biology study both in experimental zoology and in biotechnology and society.

Piet Schenkelaars

In 1984 Piet Schenkelaars finished his studies in molecular sciences and philosophy of science at The Agricultural University Wageningen in the Netherlands. Thereafter he worked for many years for civil society organisations in The Netherlands. From 1990 to 1993 he worked as coordinator of the Clearinghouse on Biotechnology at Friends of the

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Earth Europe in Brussels. Subsequently, he was employed by an environmental consultancy and a consultancy in societal communication, both located in The Netherlands. In 1998 he founded Schenkelaars Biotechnology Consultancy. Since then he has conducted many studies on regulatory and sustainability aspects of biotechnology. He has also coordinated EU research projects, organised conferences and moderated stakeholder dialogues.

James Shepherd

James Shepherd is currently reading for a PhD in theoretical chemistry at the Department of Chemistry, University of Cambridge, UK and is a graduate student at Gonville and Caius College. As an undergraduate studying natural sciences in 2006 he founded the Cambridge branch of an international organisation called The Triple Helix and in 2008, this work was recognised by the award of the Sir Harold Gilles Bursary. His passion for science communication stems from having been inspired towards science by the Royal Institution Christmas Lectures as a child. During his time at university so far, he has been lucky enough to be involved with several university initiatives, societies, newspapers and magazines. James is always on the look-out for new projects for the future, and is happy to receive correspondence to: js615@cam.ac.uk or jamesjshepherd@googlemail.com.

Chris Smith

Dr Chris Smith is a consultant medical virologist and a fellow of Queens' College at the University of Cambridge. He's also the founder and managing editor of *The Naked Scientists* radio show, podcast and website. Qualifying from the University of Cambridge combined MB/PhD programme in 2001, and having completed a thesis on the development of viruses as gene therapy vectors, Chris has forged his medical career in clinical virology. In parallel he has carved a niche as a science broadcaster and writer, publishing four popular science books internationally, including *The Naked Scientist* (Little Brown, 2010) and *Stripping Down Science* (Random House, 2010) and the hugely popular *Crisp Packet Fireworks* (New Holland, 2008), a book of kitchen science experiments co-authored with David Ansell. Outside of work, Chris enjoys gardening and travel and also has a young son and daughter who, together, ensure that his immune system remains on high alert by infecting him with everything circulating in Cambridge . . .

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Sally Stares

Dr Sally Stares is a Research Fellow in the Methodology Institute at the London School of Economics and Political Science. Her research is based around the methodological theme of social measurement, with a focus on the measurement of social psychological concepts in cross-national social surveys, and an emphasis on the use of latent variable models to address common challenges encountered in this field of work, such as capturing complex constructs, taking account of 'don't know' responses, and exploring the comparability of measures between groups – particularly between countries. She works on public perceptions of various aspects of science and technology, as well as on public opinion and social attitudes and values more broadly, particularly as they relate to aspects of civil society. She works on a European Commission project 'Sensitive technologies and European public ethics', and on an ESRC-funded project 'Latent variable models for categorical data: tools of analysis for cross-national surveys'.

Susanne Stormer

Susanne Stormer joined Novo Nordisk in 2000 to ingrain the Triple Bottom Line (TBL) principle in the business. In 2001 she was appointed manager of corporate stakeholder relations, responsible for driving the company's sustainability reporting. In 2004 she also became responsible for internal brand strategy and brand culture programmes. In 2006 she was promoted to Director, Accountability and TBL Leadership, and in April 2008 she was promoted to her current position as Vice President, Global TBL Management. Susanne has an MA in English studies and a BA in East Asian area studies from the University of Aarhus, Denmark. She is a graduate of Stanford Graduate School of Business Executive Education Program (2006). From 1993 to 2007 she was an Associate Professor at Copenhagen Business School.

Stephen White

Stephen White, who died suddenly on 23 August 2010 aged 61 and to whose memory this book is dedicated, was Head of Communications for the British Psychological Society since 1985. He founded STEMPRA – Science, Technology, Engineering, Medicine Public Relations Association – in the early 1990s to provide an organisation and place where science communication professionals could network and learn from each other.

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He organised and tutored numerous media and science communication skills courses for a wide variety of clients both in the UK and abroad, including the European Space Agency, Cancer Research UK, the Royal Society, the British Science Association, *Nature* and Unilever. His book *Hitting the Headlines* (White, Evans, Mihill, Tysoe, 1993) was the first to provide a practical guide to the media for scientists.

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