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Brigitte Nerlich,
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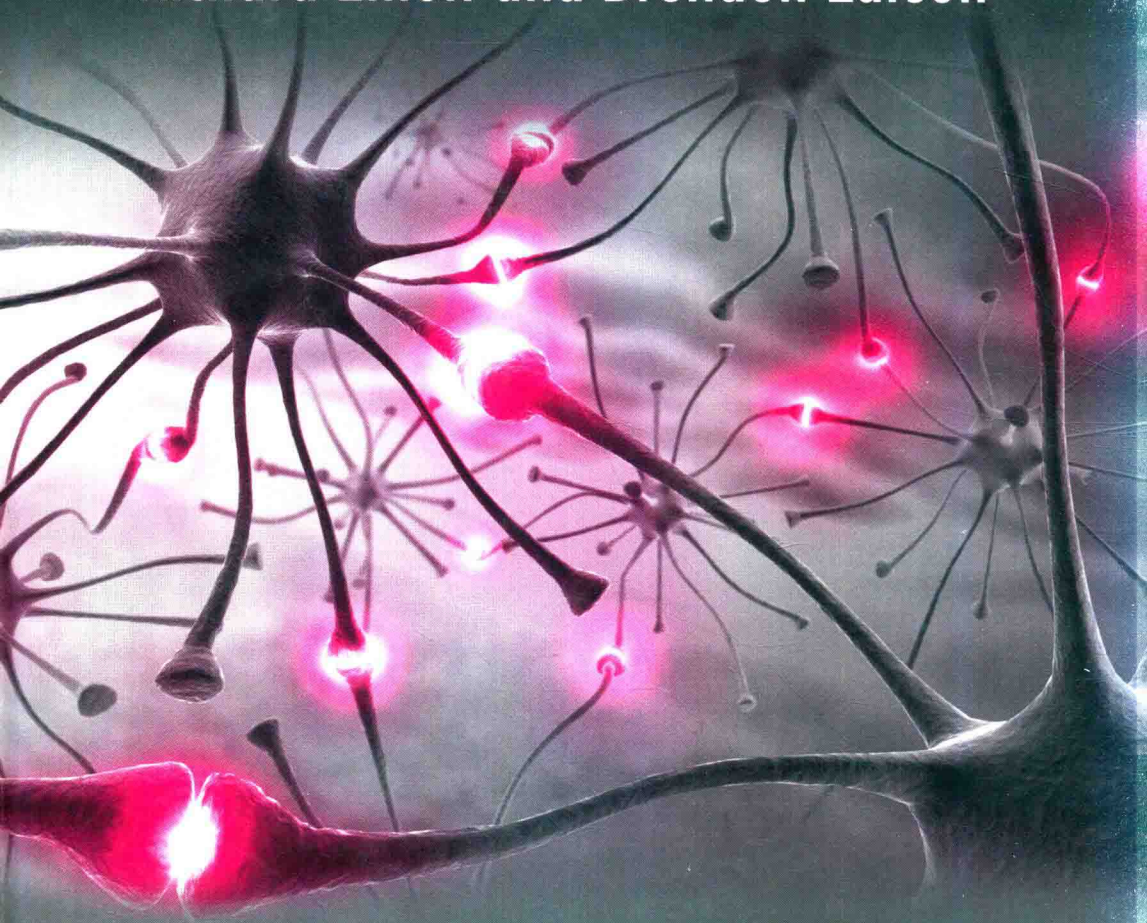

Communicating Biological Sciences

Ethical and Metaphorical Dimensions

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Published by
Ashgate Publishing Limited
Wey Court East
Union Road
Farnham
Surrey, GU9 7PT
England

Ashgate Publishing Company
Suite 420
101 Cherry Street
Burlington
VT 05401-4405
USA

www.ashgate.com

British Library Cataloguing in Publication Data
Communicating biological sciences : ethical and
metaphorical dimensions.
1. Journalism, Scientific. 2. Communication in science.
3. Life sciences literature--History and criticism.
4. Metaphor. 5. Discoveries in science--Social aspects.
6. Journalistic ethics.
I. Nerlich, Brigitte, 1956- II. Elliott, Richard.
III. Larson, Brendon.
570.1'4-dc22

Library of Congress Cataloging-in-Publication Data
Communicating biological sciences : ethical and metaphorical dimensions / [edited] by Brigitte Nerlich, Richard Elliott, and Brendon Larson.
p. cm.
Includes index.
ISBN 978-0-7546-7632-4 (hardback) -- ISBN 978-0-7546-7633-1 (ebook)
1. Science news--Moral and ethical aspects. 2. Communication in science. 3. Metaphor. I. Nerlich, Brigitte, 1956- II. Elliott, Richard, 1982- III. Larson, Brendon.

Q225.C656 2009
306.4'5--dc22

2009015458

ISBN 9780754676324 (hbk)
ISBN 9780754676331 (ebk)

Printed and bound in Great Britain by
MPG Books Group, UK

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Toby Murcott trained as a research biochemist before realising that he was better at talking about science than doing it, prompting a move into journalism. He spent seven years at the BBC Radio Science Unit, including time as BBC World Service Science Correspondent. He also managed to squeeze in being Science Editor for *Maxim* magazine. Toby followed this with a two year stint as Editor of digital satellite science channel *Einstein TV*. He currently writes regularly for *The Times*, produces *Home Planet* for BBC Radio 4, consults on science communication for a number of different organisations and teaches science journalism.

Brigitte Nerlich is Professor of Science, Language, and Society at the Institute for Science and Society, at the University of Nottingham. She studied French and philosophy in Germany, where she did her PhD in French linguistics. After three years as a Junior Research Fellow in general linguistics at the University of Oxford she moved to Nottingham, where she worked in the departments of linguistics and psychology before moving to the Institute. Her current research focuses on the cultural and political contexts in which metaphors and other linguistic devices are used in public and scientific debates about biotechnology, nanotechnology, health and illness and climate change. She has written books and articles on the history of linguistics, historical semantics, pragmatics and cognitive linguistics and, more recently, the social study of science and technology.

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Tim Radford was born in New Zealand in 1940, and became a newspaper reporter at 16. He worked for weekly, evening and daily journals, and spent 32 years on *The Guardian* in London, as letters editor, arts editor, literary editor and finally science editor. He has won five annual awards from the Association of British Science Writers, including a lifetime achievement award. He is an honorary fellow

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Stephen Strauss has written about science for close to 30 years, initially at *The Globe and Mail* newspaper in Toronto, and more recently for a series of places including the *Canadian Broadcasting Corporation*'s website, *The Times Higher Education Supplement*, *Readers' Digest* and *New Scientist*. He has written a number of books, including *The Sizesaurus* and *How Big Is Big*, as well as book chapters on a variety of topics. He has won numerous of awards, most recently a 2007 prize from the University of British Columbia for best science article in any medium in Canada in 2006.

Jon Turney is a freelance science writer and editor in Bristol UK. Past lives have included being features editor of *The Times Higher Education Supplement*, teaching at University College, Imperial College and Birkbeck College London, and commissioning popular science books for Penguin Press. He is a science journalism laureate of Purdue University and a senior visiting fellow in the Department of Science and Technology Studies at UCL. His books include *Frankenstein's Footsteps: Science, Genetics and Popular Culture* (Yale, 1998) and – with Jess Buxton – *The Rough Guide to Genes and Cloning* (2007). His next book is *The Rough Guide to the Future*, due in 2010. See www.jonturney.co.uk.

Elmien Wolvaardt (BSc) is a science communicator from South Africa with a background in print and broadcast journalism and a passion for making science accessible to a wider audience. She is currently the editor of the *Community Eye Health Journal* (www.cehjournal.org), which aims to inform and inspire health practitioners working on blindness in the developing world. As a freelance writer and editor she has worked with the Science Media Centre (www.sciencemediacentre.org) and the Science and Development Network (SciDev.Net) in London.

Preface

The idea for a book on the ethical and metaphorical aspects of communicating the biosciences emerged from a chance encounter between three people in June 2006 at the *Euroscience Open Forum* in Munich. Rick Borchelt (Communications Director, Genetics and Public Policy Center, Berman Bioethics Institute, USA) gave a paper entitled 'Narratives of humility', inspired in part by a 2003 paper by Sheila Jasanoff on technologies of humility (reprinted in this volume). He called for a new type of science communication that would highlight trial and error, explain the significance of failure and sketch out the episodic, incremental and non-linear progress of scientific endeavours. The focus would be on reporting scientific advances as a process and not just as products. In a paper on the politics and ethics of metaphor given at the same conference, Brigitte Nerlich engaged in a critical analysis of media coverage of the Woo-Suk Hwang cloning scandal and the routine use of metaphors such as 'science is a race' and 'scientific advances are breakthroughs'. Her findings confirmed previous research carried out by Nik Brown who found that '[s]cientific institutions and science correspondents routinely evoke the breakthrough motif when seeking to attract the interest of wider audiences.' In doing so, he pointed out, they 'lend credence to a culture which they may subsequently criticise when claims are revoked or judged to be hype' (N. Brown, 2000).

Elmien Wolvaardt, a science writer, listened to the talks given by Rick and Brigitte and suggested that it would be worth reflecting on the types of discourse favoured in science communication, the metaphors used to report on science, and the ethical implications they might have. She and other science writer colleagues agreed that finding good metaphors for new research is something of a creative art. However, once metaphors become established or popularised, using them can very quickly become an unconscious habit. Brigitte and Elmien began to ask questions such as: Could research by metaphor analysts be useful to jobbing journalists – if not to help them find new metaphors, then at least to warn them of potential pitfalls? Could research by science communication experts help metaphor analysts obtain a better insight into the creation and choice of novel metaphors and the more or less routine use of old metaphors in the process of communicating science? What are the challenges faced by science communicators in this process? What are the ethical implications of metaphorical and other framing activities? These are the some of the questions explored in this book.

The following chapters will review linguistic and practical challenges faced by communicators of science, while focusing on one central issue: the ethical status of metaphor and framing in science communication and science journalism, especially

in the biosciences. Some of the practical and ethical science communication issues discussed here may not be familiar to metaphor analysts, just as some more theoretical issues related to metaphor research may not be familiar to science communicators. We hope, therefore, that this book will stimulate dialogue between these communities and facilitate further collaborative research and investigation.

Since 2006, and our encounter in Munich, numerous studies have been published on the Hwang scandal which focus on both the interaction between science and the media and the ethical issues relating to the research and peer review process. However, the role of metaphor in this context has been somewhat neglected. As every metaphor opens a space for thinking and acting in particular ways, every metaphor also has ethical implications for science and society, which need to be explored in more detail.

Reference

Brown, N. 2000. Organising/Disorganising the Breakthrough Motif: Dolly the Cloned Ewe Meets Astrid the Hybrid Pig, in *Contested Futures: A Sociology of Prospective Science and Technology*, edited by N. Brown, B. Rappert and A. Webster. Aldershot: Ashgate, 87–110.

Acknowledgements

This book is the result of a collaboration between three scholars interested in various ways in science communication and metaphor. Brendon Larson came to the Institute for Science and Society in Nottingham as a Visiting Fellow in 2003 to work with Brigitte Nerlich on metaphors relating to invasive species, and they have been corresponding about metaphor related issues ever since. Richard Elliott joined the Institute for Science and Society as a PhD student in 2007, having previously worked as a science communicator in various arenas, including the American Association for the Advancement of Science and the British Association for the Advancement of Science. Sincere thanks go to Neil Jordan, our commissioning editor at Ashgate who was always there to provide quick and helpful advice on all matters editorial. We are also grateful to the Institute for Science and Society which provided some financial assistance.

Most importantly though, we want to express our gratitude to Rick Borchelt for his inspiration and support throughout the writing of this book. Rick would have loved to contribute a chapter on humility in science communication, but unfortunately fate intervened and prevented him from writing it. We also wish to thank warmly the contributors to this volume for delivering their chapters in a timely manner.

Last, but not least, we would like to thank each other for mutual inspiration and smooth cooperation in the process of editing, something that cannot be taken for granted, as anybody knows who has ever edited a book!

Brigitte Nerlich, Richard Elliott and Brendon Larson

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Chapter 1
Communicating Biological Sciences: An Introduction

Brigitte Nerlich, Richard Elliott and Brendon Larson

Science communication, ethics and metaphors

This book deals with science communication, especially the communication of biological sciences. But it approaches science communication from two perspectives that have never before been used together to discuss the aims, process and effects of science communication, namely: ethics and metaphor. There are, of course, many books and articles on science communication and ethics, and even more on journalism and ethics and the ethical dimensions of public communication of science and technology, some of which will be mentioned in due course. Many books and articles have also been devoted to science, science communication and metaphor; and again references to some of these will be made throughout. In this book we attempt to knit these efforts together and to shed some new light on the ethical *and* metaphorical dimensions of science communication.

By science communication we mean the reporting of technoscientific, especially biotechnological, knowledge and developments to non-scientists through popular science books and journals, newspapers and magazines, the broadcast media and 'public engagement' activities such as science fairs, museums and café scientifiques (see Stocklmayer et al. 2001). Some of these engagement activities have a long history (Gregory and Miller 1998), while others have emerged after older models of 'communicating science' had become problematised by theoretical developments in the social sciences but also by developments in science itself.

In the 1980s, a then new model of science communication, the so-called 'public understanding of science model' (Bodmer 1985; Miller 2001), had become the subject of growing critique. Social scientists increasingly challenged as ethically dubious its key underlying assumption: that giving laypeople more information about science will necessarily promote the acceptance of scientific and technological advances and lead to greater uptake of science subjects in school and as a career. They pointed out that this assumption is based on a 'conduit' metaphor of communication (Reddy 1979) on the one hand, and a 'deficit' model of knowledge and understanding on the other (for a good overview from the perspective of a science writer, see Dickson 2005). Messages, or 'facts' about science, are portrayed as being transmitted in a linear fashion from experts, those who know, to laypersons, those who have a deficit in knowledge. This

model overlooks the fact that communication is grounded in dialogue, contextual understanding and the co-construction of meaning. While laypeople may perhaps know fewer 'facts' about science *per se*, they still have a good understanding of the social and political function of science in society. That is, they have what one might call good ethical antennae. In this context, trying to improve our understanding of science communication becomes an important task for both social scientists and scientists themselves. This book contributes to these continued efforts.

Developments in science itself, including shifts in the politics of science and science funding, have also served to complicate existing conceptions of science communication. A recent issue of *research eu: the magazine of the European research area* (2008) included a special report on science journalism entitled 'The science storytellers':

> Science is progressively acquiring a new role as the progress it makes is seen as vital for the future. The media are also assuming growing importance with ever more codified means of communication. At the interface between the two, science journalism is undergoing a fundamental change that is affecting scientists as much as journalists, as their specific constraints often cause expectations to diverge. (d'Hoop 2008: 6)

Storytelling by science journalists is constrained by a variety of evolving issues, especially the diversification and acceleration of scientific research and the diversification and acceleration of science journalism. Two other developments in science and science communication herald increased tensions in the future. Demands are increasingly placed on science to generate innovative and commercial products with applications that benefit society and boost national markets. The second is the progressive and accelerating diversification of the media, aided by new outlets, new technologies (satellite television, the internet) and new genres (such as blogs, see Holliman et al. 2008); all this is accompanied by increasing demands for 'fast news' (see Gross 2008; Rosenberg and Feldman 2009). We do not directly address the increasing commercialisation of both science and science journalism here. Instead, we focus on an issue intimately connected with these developments and one of the major material and ethical challenges facing scientists and science communicators today: hype. As Bubela, Nisbet et al. (2009) have pointed out: 'The orientation towards hype is viewed internationally by many scientists, ethicists, policymakers, and government officials as the primary shortcoming of the media.' (p. 516)

Here, we briefly summarise some of the potential ethical difficulties related to the use of hype in science communication and explore some conceptual issues inherent in science communication itself, including framing, storytelling and the use of metaphor. We conclude by considering some major practical and ethical components of modern science writing.

Some (ethical) perils of science communication

Recent scandals in the biosciences, especially the South Korean stem cell scandal, have highlighted some ethically problematic aspects of science publishing and science communication in an age of increasing competition for research funding, academic status and public recognition (Bogner and Menz 2006; Weingart 2006; Gottweis and Triendl 2006; Franzen et al. 2007; Chekar and Kitzinger 2007; Hong 2008; Kruvand and Hwang 2008; Kim 2008; Kitzinger 2008; Jonyoung in press; Park et al. in press; Augoustinos et al. in press; and Nerlich, this volume). In particular, as we discuss in subsequent chapters, such scandals reveal fundamental weaknesses in the traditional use of framing and metaphor in science storytelling.

In 2004, the discoveries of Woo-Suk Hwang seemed to herald the dawn of regenerative medicine and a future in which the tissues and organs of every individual could be repaired and revitalised using their own genetically-matched stem cells. His work was published in a reputable science journal and greeted with enthusiasm by the media as a breakthrough achievement. But after Hwang's 'fall from grace' questions arose, not only about the scientific peer review system and the pressures placed on scientists to succeed, but about the nature of science writing and the media's seeming complicity in hyping up scientific breakthrough claims. Some analysts have called for greater humility in science writing (see Wolvaardt on Borchelt, this volume) and a greater awareness of the power of framing in general and metaphors in particular in science communication (Nisbet, this volume). Some, such as the Science Media Centre in the UK, have begun to take practical steps to address such problems (Fox, this volume).

While it should be stressed that the Hwang scandal does not stand alone (there have been other science/communication scandals in the past and there will surely be others in the future), it does appear to have had a particularly strong impact in bringing to light ongoing changes, in both science and the politics of science, which increase the likelihood of hype and fraud in these fields. These changes have been increasingly discussed not only by social scientists and media analysts but also by science communicators themselves (see Wolvaardt, this volume).

In 2007, delegates to the 5th World Conference of Science Journalists heard that science journalists need a new, or at least better, code of ethics if they are to communicate increasingly complicated science accurately. Bob Williamson, a professor of medical genetics at the University of Melbourne and an active science communicator, told a conference session that such a code would help both scientists and science journalists define what constitutes legitimate science reporting. As reported by Jia (2007), Williamson implied that both scientists and science journalists are implicated in the hyping of research findings. Another delegate, Rob Morrison, vice-president of Australian Science Communicators, presented research showing that almost half of the 2006 news releases posted on the science press website EurekAlert were labelled as 'breakthroughs'. He pointed out that overuse of the term fuelled the hype surrounding science, but noted that such sensational language was all too often necessary to grab the attention of