



## INTRODUCTION

# Science communication in a changing world

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**ABSTRACT:** With science being part of millions of people's everyday lives and topics penetrating politics and grabbing headlines, effective and accurate communication of science may be more important today than ever. Decisions have to be made in response to big issues such as climate change, declining biodiversity, ocean health and securing adequate food supplies for the growing world population, to name a few. However, most news readers, listeners and viewers have limited or no scientific education on which to base their opinions, and limited knowledge of where and how to find objective information. Aggravating this is the recent cut-back of entire departments specializing in science journalism at major news outlets. The contributions to this Theme Section present some of the many challenges facing science journalism and science communication in a changing world.

**KEY WORDS:** Science communication · Science journalism · Journalism ethics

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## CONCERNS

Science journalism is facing tough challenges today. The general public has a desire, and a right, to learn what new discoveries are being made and how these may affect everyday life, and they rely on science journalism to bring them this information. However, the topics are often very complex and difficult to relay in terms that are understandable for the non-expert, and they can be politicized or pushed by different lobbies. Topics such as climate change or stem cell research affect humanity on an existential level, and the ethics involved in portraying these topics—how, or indeed whether to portray them—are complex. Recent cut-backs of entire sections devoted to science reporting at major English-language news outlets are set to contribute to the major changes taking place in science journalism (e.g. Brumfiel 2009, Bubela et al. 2009, McElroy 2009); however, developments in non-English-speaking countries seem to be positive (Cornell 2009, this Theme Section (TS); El-Awady 2009, Elmer et al. 2009, Irwin 2009). The contributions to this TS

address various aspects of the challenges science journalism faces today.

### • Do journalism ethics apply to science journalism?

Describing the challenges presented to science journalists with respect to reporting on climate change, Ward (2009, this TS) emphasizes that this may have its own set of ethics entirely and may warrant moving away from the principle of 'balanced reporting', in which both sides of an argument are given an equal amount of space. Wolff (2007) points out that, in the case of climate change, the evidence is so overwhelming that presenting both sides equally may be misleading.

Journalism's ethics, and the goals of science communication, also vary depending on country, cultural and political background, and circumstances. In developing countries, governments may want to highlight positive developments in scientific research, possibly to gloss over other problems (Cornell 2009). In this situa-

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tion, science journalists may become adjuncts of the government or establishment if they report enthusiastically, and possibly uncritically, on science without looking at the bigger picture (Cornell 2009).

• **Who is responsible for making sure that results of scientific research are accurately portrayed in the media? What part do the journalists, the publishers, the researchers play?**

The responsibility for accurate science reporting lies, according to Halliday (2009, this TS), with journalists and researchers alike. She suggests that, 'science graduate students should be required to take a course on writing for the public—not with the intention of turning scientists into journalists, but to help them take a step back from the language they are immersed in.' Halliday (2009, p. 27). The specialized language used in communications between scientists and a fear of being misrepresented may be the main reasons why scientists are reluctant to communicate what they do to the public. To change this, Halliday (2009) suggests courses in science communication to be taught during graduate school.

Trust in reported research may also, to a large extent, depend on the readers' perception of possible conflicts of interest of the researchers. Building on an earlier study (Cook et al. 2007) highlighting a lack of disclosure of funding sources in many health and science news stories, Cook et al. (2009, this TS) asked science journalists about their practices with respect to uncovering and reporting on possible conflicts of interest. They found that most journalists had 'considerable awareness' of the implications of potential conflicts of interest, but that journalistic research and reporting practices varied widely and were largely influenced by considerations of time, space and editorial practices.

With the still relatively new freedom of press in Russia, journalists as well as publishers face choices as to what is reported—science or hyped-up pseudo-science—according to Egikova (2009, this TS). 'Nowadays, there is nothing standing between us and good science journalism', but 'freedom itself is important, but it is not enough for science journalism' says Egikova (2009, p. 31 and 32).

• **How is public opinion on science topics formed, and what role does journalism play in this?**

The Internet adds a new dimension to communication in general, and the communication of science in particular. It has become almost omnipresent, and there are no set rules on what goes: anyone can post

anything about any subject they choose, without quality control for most of it. The potential for readers to be misled is enormous, and readers are not able to distinguish between 'good' and 'bad' information (Clarke 2009, this TS). While 'interpreters' of scientific information—the journalists—have a responsibility to report accurately, Clarke (2009) also recommends sticking with the time-proven peer review system as the primary quality control mechanism of scientific literature.

• **Are certain topics pushed, are others neglected?**

As news online comes faster and faster, there is an enormous temptation for media outlets and journalists to quickly publish topics that will grab the readers' attention, sometimes at the cost of accuracy. Arguably, there may also be an increasing temptation for scientists to hype their research and 'hit the headlines'. A recent example is the media blitz around *Darwinius masillae* (aka 'Ida'). The release of information—and even scientific publication—about this fossil, presented as the 'missing link' in human evolution, seems to have been concerted with simultaneous documentaries and press releases (e.g. Zimmer 2009). However, in this instance, the strategy seems to have backfired somewhat (Arango 2009, Switek 2009, Zimmer 2009), and may even have helped to highlight the dangers in overly hyping science. Nevertheless, such hype can contribute significantly to the quick spread of misinformation and thus damage public understanding of scientific topics, as well as lead to mistrust of scientific discoveries and even scientists themselves.

• **A significant amount of science news is produced by freelance science writers. How much time can they, literally, afford to spend on researching a topic thoroughly?**

Looking back over 15 yr as a science writer in both the UK and Germany, Gross (2009, this TS) observes that the time available for proper research on a subject and the space given to science topics in publications has decreased drastically. According to Gross (2009, p. 5), 'the competition for readers' attention and the general acceleration of communications has restricted the range of scientific subjects that can be reported'.

## CONTRIBUTING AUTHORS

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**Maxine Clarke** is the Publishing Executive Editor for the journal *Nature* in London. Her areas of responsibility include author and referee services, editorial project management, editing various sections of the journal and subediting (copy editing) management. She runs Nature Publishing Group's authors' and reviewers' website, Nautilus (a blog for authors; <http://blogs.nature.com/nautilus/>) and Peer-to-Peer (a blog about peer review; <http://blogs.nature.com/peer-to-peer/>), and is one of the editors answering users' questions on the Ask The Editor forum on Nature Network (<http://network.nature.com/groups/askthenatureeditor/forum/topics>).

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**James Cornell**, formerly Publications Director for the Harvard-Smithsonian Center for Astrophysics, responsible for all technical and popular information, is the author or editor of more than a dozen popular science books. He has also written and produced video and film documentaries. As President of the International Science Writers Association (ISWA; <http://international-sciencewriters.org/>), he continues to promote science journalism worldwide through the publication of an online newsletter and as a consultant to various foundations.

**Viola Egikova** is a science journalist in Russia. She is the President of the Russian Association of Science Writers and Journalists INTELLECT and the Honorary Secretary of the European Union of Science Journalists' Associations (EUSJA; [www.eusja.org](http://www.eusja.org)).

**Michael Gross** is a chemist turned biochemist turned science writer. He started writing about science as

a hobby in 1993, just before taking up a post-doc fellowship at Oxford. In 2000, he switched to writing full time. As a regular contributor to *Chemistry World*, *Chemistry and Industry*, *Current Biology*, *Oxford Today*, and the German publications *Chemie in unserer Zeit*, *Nachrichten aus der Chemie*, and *Spektrum der Wissenschaft*, he covers a wide range of topics from the life sciences and physical sciences ([www.michaelgross.co.uk](http://www.michaelgross.co.uk)).

**Claudia Grossmann** was in the biomedical science doctoral program of the University of California, San Francisco, at the time of the study by Cook et al. (2009).

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**Bud Ward** has been an environmental journalist and journalism educator since 1974. He is Editor of The Yale Forum on Climate Change & The Media ([www.yaleclimatemediaforum.org](http://www.yaleclimatemediaforum.org)). Ward founded and edited several environmental and science journalism magazines and established the Environmental Health Center. He is a co-founder of the Society of Environmental Journalists (SEJ) and founded and managed the Central European Environmental Journalism Program. Ward has written 3 books and authored hundreds of articles on environmental issues. He is a regular participant on advisory committees and has lead several National Science Foundation-funded workshops involving science and environmental journalists and leading climate scientists.

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