Research Trends

Volume 1 | Issue 18 Article 2

7-1-2010

Speech is silver, silence is golden: The challenges of scientific communication

Tom Jones
Elsevier

Behind the data

Speech is silver, silence is golden: The challenges of scientific communication

TOM JONES

Scientists face some difficult choices. They can offer complete transparency by opening their debates to the general public via the Internet, but run the risk that normal academic criticisms could lead to libel cases. Alternatively, they could refuse to discuss anything openly, with the risk of alienating the general public. Finally, they could try working closely with journalists and other communicators, allowing them to disseminate their ideas, even though this can lead to misrepresentation of ideas and results. Three recent cases have highlighted the difficulties associated with each of these approaches.

I'll see you in court

When Simon Singh, the physicist turned science writer, published an opinion in the Guardian newspaper criticizing chiropractic therapy *(1)*, the British Chiropractic Association (BCA) attempted to sue him for libel. Eventually, the court decided in Singh's favor. *(2)*

This case highlighted risks that scientists face when the robust criticism typical of academic debate is published in the mainstream media. Within the world of academic journals, opponents have no recourse but to reasoned debate; in the public eye, however, when you run out of arguments, you can fall back on libel law. The BCA could have published their own response, providing the evidence Singh claimed was non-existent; instead, they chose to sue. For many academics, this is an unexpected response.

Storm in a teacup

In November 2009, hackers leaked internal emails belonging to members of the University of East Anglia's Climate Research Unit. According to climate-change skeptics, these emails contained evidence of data manipulation, and attempts to suppress the work of climate-change skeptics. They and the media also claimed that the content of these mails was in the public interest.

While a subsequent Parliamentary Enquiry cleared the researchers of manipulating data to show certain results *(3)*, public trust in climate-change science specifically, and the wider scientific community in general, has suffered.

The enquiry was, however, critical of the culture of withholding information *(3)*, which raises an important question for scientists: to what degree should they expect their communications and information sources, which might be private, informal and/or works in progress, to be subject to public scrutiny?

Darwin award

Few theories are as widely debated in the mainstream media as Darwinism. *(4)* In the pursuit of "balanced" reporting, many alternative theories have been given wide coverage, including intelligent design and Lamarckism. A predecessor of Darwin, Jean-Baptiste Lamarck proposed a theory of evolution by inheritance of advantageous survival traits acquired during the parent's lifetime. Darwinism superceded Lamarckism, specifically with respect to the acquisition of inherited traits.

Building on Darwinism, modern evolutionary theory suggests that evolution is a result of changes to the DNA sequence. When these changes help an organism to survive and reproduce, they pass into the next generation.

However, a recent study showing that chickens could pass on behavioral changes caused by stressful environmental conditions to their offspring, even though there were no changes to their DNA sequence, has been cited as confirmation of Lamarckism. *(5)* To anybody with a reasonable understanding of evolutionary theory, this result is completely compatible with Darwinism.

In fact, while the argument in the body of the article does not question current evolutionary theory, the headline and the introduction are rather sensationalist. Such treatment may lead many scientists to question whether they can trust journalists to treat their work responsibly, or whether they need to actively engage with the media to promote their findings in a balanced, rational and accurate manner.

Commenting on the article, Alice Tuff, from Sense About Science, a charity concerned with promoting good science and evidence for the public, said: "Science is a slow, continuous process based on uncertainty, while in contrast, the media demands quick, entertaining stories with clear answers and certainty. These different demands can seem difficult to reconcile, but if scientists' voices are missing from the debate, they risk being replaced by others who do not have the same regard for evidence."

Continued on page 5

Continued from page 4

Balanced voice

Scientists need to work towards resolving this uncomfortable relationship with the media; openness is required to maintain trust, and the public appreciates lively debate. For this to be effective, however, scientists need to be able to express themselves freely and without risk of libel – a threat that could cause scientists to self-censor some of their most progressive ideas. At the same time, scientists must balance reported articles with their own communications, through interviews and opinion pieces. After all, those who actually develop and test new ideas are best placed to understand the logic and subtleties of a scientific argument and thus communicate their work accurately.

Useful link:

Sense About Science

References:
(1) Singh, S. (2008) "Beware the spinal trap", *Guardian.*
(2) Editorial (2010) "Time for libel-law reform", *Nature*, vol. 464, issue 1104.
(3) Pearce, F. (2010) "Climategate inquiry points finger at university", *New Scientist.*
(4) Darwin, C. (1859) *The Origin of Species.*
(5) Burkeman, O. (2010) "Why everything you've been told about evolution is wrong", *Guardian.*

Research trends

Buckyballs, nanotubes and graphene: On the hunt for the next big thing

ANDREW PLUME

The current focus on graphene owes its legacy to the foundations of nanoscience laid down with the discovery of buckminsterfullerene (named in homage to the geodesic domes of architect Richard Buckminster Fuller) in 1985. *(1)* This sparked the search for other fullerenes, complex carbon nanostructures typically occurring as spheres (similar in appearance to a soccer ball, and colloquially known as "buckyballs") or cylinders. The first cylindrical structures, quickly dubbed nanotubes, were isolated in 1991. *(2)* Graphene can be considered as an unzipped and flattened-out nanotube, and has been shown to have unique electronic properties under certain conditions. *(3)*

Explosive growth

The growth of the peer-reviewed journal literature on nanotubes and graphene is nothing short of remarkable. While articles on fullerenes have appeared in steadily increasing numbers annually since 1985 (see Figure 1), massive (and so far sustained) growth has been observed for both nanotubes and graphene. Early response to the "discovery" of each of these materials shows very different trends (see Figure 2). While fullerene and nanotube research expanded rapidly, graphene research has grown exponentially (at a rate of 58% per year) since the publication of Novoselov *et al. (4)*, a landmark paper describing a new method for isolating stable graphene sheets. The citation impact of this paper is visualized in Figure 3, giving a clear sense of the citation ripples emanating from this paper out into the literature, like those from a brick dropped in a pond.

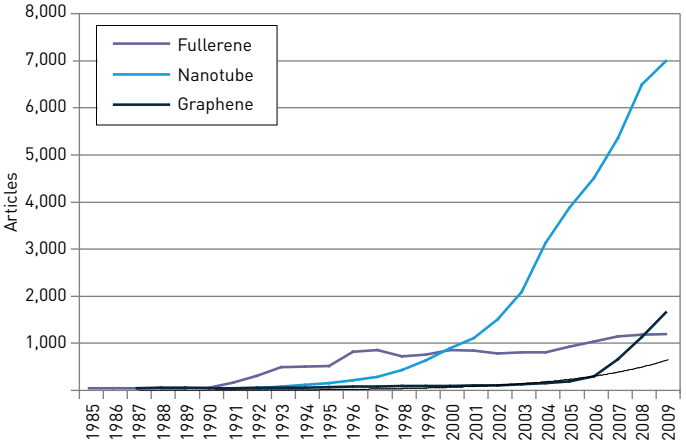

Figure 1. English-language research articles published in journals in the period 1985–2009. Keyword searches were conducted for fullerenes (*fullerene), nanotubes (nanotube*) and graphene (graphene*).
Source: Scopus.

Continued on page 6