



## Take the time and effort to correct misinformation

Scientists should challenge online falsehoods and inaccuracies — and harness the collective power of the Internet to fight back, argues **Phil Williamson**.

With the election of Donald Trump, his appointment of advisers who are on record as dismissing scientific evidence, and the emboldening of deniers on everything from climate change to vaccinations, the amount of nonsense written about science on the Internet (and elsewhere) seems set to rise. So what are we, as scientists, to do?

Most researchers who have tried to engage online with ill-informed journalists or pseudoscientists will be familiar with Brandolini's law (also known as the Bullshit Asymmetry Principle): the amount of energy needed to refute bullshit is an order of magnitude bigger than that needed to produce it. Is it really worth taking the time and effort to challenge, correct and clarify articles that claim to be about science but in most cases seem to represent a political ideology?

I think it is. Challenging falsehoods and misrepresentation may not seem to have any immediate effect, but someone, somewhere, will hear or read our response. The target is not the peddler of nonsense, but those readers who have an open mind on scientific problems. A lie may be able to travel around the world before the truth has its shoes on, but an unchallenged untruth will never stop.

Earlier this year, I had a run-in with Breitbart News — the libertarian website made infamous by the appointment of its former senior executive Stephen Bannon as Trump's chief strategist. It followed an article in *The Spectator* that criticized research on ocean acidification and contained several inaccuracies, written by James Delingpole, who also edits Breitbart London. To give an idea of the standard of discussion, Delingpole argued that there has been no long-term reduction in ocean pH levels and that future climate change would cause the release of carbon dioxide from the ocean. Acidification is therefore a non-problem invented by 'climate alarmists' because there is insufficient evidence for global warming.

I coordinated the UK research programme on ocean acidification and have been involved in national and international evidence assessments. There are genuine scientific uncertainties, but those were not the issues raised by *The Spectator*. When I complained to the magazine, no acknowledgement was received. I then published a rebuttal in *The Marine Biologist*, which prompted Delingpole to write on the Breitbart site that my work should be squashed like a slug.

I referred my complaint about the *Spectator* article to the UK Independent Press Standards Organisation (IPSO) and I expect its verdict soon. Issues of dispute include whether, as the article states, "marine life has nothing whatsoever to fear from ocean acidification" and whether "as looks increasingly to be the case, that the man-made global warming theory is a busted flush".

There is overwhelming scientific evidence to contradict those statements — strongly based on experiments, field observations and theory.

So it would be a defeat of rationality and science if my complaint to IPSO is dismissed as a matter of opinion, rather than fact. Nevertheless, results from around 100 researchers involved in the UK national programme on ocean acidification (comprising about 250 peer-reviewed papers) were disregarded in the *Spectator* article as providing no more new knowledge than could be obtained from "a few hours' basic research".

Brandolini's law certainly applies in this case. Demonstration of (incontrovertible) factual inaccuracy through the IPSO complaints procedure takes time and effort. But I think it is worth it — the scientific process doesn't stop when results are published in a peer-reviewed journal. Wider communication is also involved, and that includes ensuring not only that information (including uncertainties) is understood, but also that misinformation and errors are corrected where necessary.

Most scientists who see their work misrepresented don't have access to a formal complaints procedure. Online journalism seems to be subject to few, if any, rules. Only UK websites directly linked to IPSO-regulated media are subject to its standards. And even for those that are regulated, IPSO's previous incarnation, the Press Complaints Commission, was reluctant to become involved: "In the realm of blogging... there is likely to be strong and fervent disagreement, with writers making use of emotive terms and strident rhetoric. This is a necessary consequence of free speech."

Yet the rising tide of populism threatens the future of evidence-based governance. Social media and websites, lacking quality control, are replacing newspapers as the main information

sources for the public and many politicians, even at the highest level. Not much can be done about this nonsense online, but 'not much' is still something. Discussion threads provide some opportunity for challenge and informed comment, but are not for the faint-hearted. Another approach is fact-checking websites such as Climate Feedback. Scientists should support such efforts, even though they don't have the resources to scrutinize every dubious claim.

For greatest effect, I suggest that we harness the collective power and reach of the Internet to improve its quality. The global scientific community could learn from websites such as travel-review site TripAdvisor, Rotten Tomatoes (which summarizes film and play reviews) and alexa.com (which quantifies website popularity), and set up its own, moderated, rating system for websites that claim to report on science. We could call it the Scientific Honesty and Integrity Tracker, and give online nonsense the SHAIT rating it deserves. ■

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