

# Scientists Enter the Blogosphere

Blogs are one of the latest tools that scientists use to communicate their ideas to other scientists or to the general public. But who are the science bloggers and why do they blog?

There are close to 50 million weblogs or blogs for short. Blogs provide an online discussion forum for issues of current interest and are updated regularly with new short articles on which readers can comment.

The Pew Internet and American Life Project (<http://www.pewinternet.org/pdfs/PIP%20Bloggers%20Report%20July%2019%202006.pdf>), an initiative of the Pew Research Center, reports that 8% of Internet users in the United States, or 12 million American adults, keep a blog and 39% read one. Most bloggers (37%) write about their life and experiences; politics is a distant second with 11% of bloggers; and technology, including science, comes in at 4%.

According to the Technorati blog search engine (<http://www.technorati.com>), there are about 19,881 blogs with a "science" tag. Most of these are "pseudoscience blogs, new age blogs, creationist blogs, or computer technology blogs," says Bora Zivkovic, a Ph.D. student who writes *A Blog Around the Clock* (<http://scienceblogs.com/clock>). Zivkovic estimates that the actual number of science blogs is 1,000 to 1,200 and notes that such blogs are "written by graduate students, postdocs and young faculty, a few by undergraduates and tenured faculty, several by science teachers, and just a few by professional journalists."

These 1,000 or so science blogs provide authoritative opinions about pressing issues in science, such as evolution or climate change, or aim to engage other scientists in open and frank discussions about the scientific literature or science policy. Because of their freewheeling nature, these blogs take scientific communication to a different level.

## Meet the Bloggers

The rock star of scientist bloggers is Paul Myers, an associate professor

of biology at the University of Minnesota, who writes *Pharyngula* (<http://scienceblogs.com/pharyngula>). With about 20,000 visitors per day, *Pharyngula* is currently the most popular science blog according to Technorati. Myers started writing about 4 years ago. "It was a casual decision. One summer I had some free time and started typing away. And people started coming to the site," he recalls. "I thought that I would stop in a month or so but I didn't. I find it useful for communicating with other scientists and the community." Myers not only writes about his brand of science, developmental biology, but often discusses politics and religion. "The blog would not be as popular if it was only about science," he says. "I am popularizing science using political issues as a hook."

An expert opinion, a wide range of topics, and a distinct personality are qualities that readers seem to value in a blog. Derek Lowe was an insider of the pharmaceutical industry when he started blogging in 2002. He jotted down notes of his daily thoughts without disclosing any information about his own work or those of colleagues. "When I started I was definitely the only one blogging from inside the drug industry. I thought others would soon join but it has not happened," he says.

Lowe is mindful of the fact that his blog *In the Pipeline* (<http://www.corante.com/pipeline/>) enjoys a broad readership, from chemists, to investors, to the lay public. "I cannot just geek out and have heavy chemistry posts one after the other, or just heavy pharmaceutical industry information. I don't want to baffle or frustrate those who are not experts," he explains. Instead, *In the Pipeline* provides a variety of topics for people to discuss online, such as how to get a certain chemical reaction to work, or

how the market might react to a new cancer therapy, or even, how to land a new job.

## Blogging to E-ducate

Some scientists first entered the blogosphere by blogging about evolution—a topic that, like climate change, has galvanized public opinion. Tara Smith, an assistant professor of epidemiology at the University of Iowa, got into blogging by writing for *Panda's Thumb* ([www.pandasthumb.com](http://www.pandasthumb.com)), one of the first science blogs by observers and critics of the creationist movement. "I got some good comments and I started thinking I had more stories to tell than I could really share so I decided to start my own blog." She now writes *Aetiology* (<http://scienceblogs.com/aetiology>), a popular blog that focuses on topics within Smith's research field, infectious diseases, but also discusses evolution, science education, and, on occasion, parenting.

Meanwhile, John Timmer, a research associate at the University of California, contributes to the blog *Nobel Intent* (<http://arstechnica.com/journals/science.ars>) published by *Ars Technica*, an online magazine of human arts and sciences. "When I was following the Dover trial, it was very clear to me that intelligent design is not science, but other people were seeing the same testimony and coming to a different conclusion," says Timmer. "I realized there are large portions of the public who don't get science." Motivated by a desire to help change the situation, Timmer offered to contribute to *Nobel Intent*. Since 2005, he has been spending about an hour a day, usually at lunchtime, to scan the scientific literature and come up with topics to write about.

The concept of scientists reaching out to a lay audience is not new. "Scientists are an opinionated bunch

and they have given their thoughts on discoveries or events by speaking with journalists, writing letters to journals, authoring commentaries,” says Matthew C. Nisbet, a professor in the School of Communication at American University in Washington DC. “Blogs provide a lot more of that commentary, but delivered almost instantaneously.” According to Nisbet, blogs written by scientists provide an authoritative opinion on a topic, often within a richer context than, for example, a news article. “Science blogs are important because they continue to engage the attentive public in scientific topics,” he says.

Nisbet—whose blog *Framing Science* (<http://scienceblogs.com/framing-science>) focuses on the intersections between science, media, and politics—believes blogs are an important communication tool for the scientific community. “In the digital age, information is found based on availability rather than accuracy. If different interest groups start blogs that attack peer-reviewed science, and the scientific community does not engage in similar communication mode, they will miss an important opportunity to educate the public,” he says.

In a recent article (*Science* 316, 56, 2007), Nisbet and colleague Chris Mooney, a correspondent for the popular science magazine *Seed*, wrote that “Without misrepresenting scientific information on highly contested issues, scientists must learn to actively ‘frame’ information to make it relevant to different audiences.” In other words, instead of focusing on explaining the technical details of scientific issues, scientists should define arguments in a way that resonates with the public’s “core values and assumptions.” Scientist bloggers are debating the implications of this approach. Myers wrote in his blog that if he took Nisbet and Mooney’s advice “I’d end up giving fluff talks that play up economic advantages and how evolution contributes to medicine... and I’d never talk about mechanisms and evidence again. That sounds like a formula for disaster to me.”

### What Is the Impact?

As the debate about the Nisbet-Mooney article exemplifies, blogs

allow discussions of scientific issues that do not typically take place in the scientific literature. “A scientific journal is not the right vehicle for debate and discussion,” says Larry Moran, a professor of biochemistry at the University of Toronto and author of the popular biochemistry textbook *Principles of Biochemistry*. As a case in point, Moran used his blog *Sandwalk* (<http://sandwalk.blogspot.com>) to start a debate about evolutionary developmental biology. “There’s much to criticize in the field of evolutionary developmental biology or evo-devo,” leads off his March 30, 2007 entry. It continues “The thing that bugs me more than anything else is the attempt to create a general theory of evolution based entirely on a subset of living species: namely multicellular animals.”

But how significant are these discussions if only a minority of scientists read blogs, or write them? “Blogs are important sources for opinion leaders, activists, and journalists. They help create a lot of the discourse out in the world,” explains Nisbet. Indeed, many discussions that grab the attention of bloggers have ended up in the pages of *The New York Times* or in the news sections of science journals. “Blogs are having an impact because newsmakers read them,” says Moran. “To some extent we are writing for science journalists. We are saying ‘Here is something getting the wrong kind of coverage’ or ‘Here is something you should be paying attention to.’”

### Why Aren’t You Blogging?

Moran, at age 60, is somewhat unique among bloggers. Most bloggers, regardless of what they write about, tend to be younger. According to the Pew Internet and American Life Project more than half of all bloggers in the United States are under the age of 30. “Most of my colleagues think what I do is strange. Partly, that’s because they are not into the technology. I happen to have grown up with the Internet and understand its culture,” says Moran. “I think the younger people who are blogging now are likely to be doing it when they are 60.”

The age barrier is not the only thing keeping more scientists from blogging. The biggest impediment is probably lack of time. According to most bloggers, posts can take 30 minutes to a couple of hours to research and compose. That may not seem like much, except that a critical factor for a blog’s success is that posts are updated frequently, ideally at least once a day. “If I ever stop doing this, it is because of time commitment,” says Moran.

In general, scientists who blog say the benefits outweigh the problems. Most believe they have become better communicators and have gained a broader appreciation of different scientific issues. So why aren’t more scientists blogging? Even among scientists who are interested in communicating about science, many are uncomfortable with the nature of blogging itself. Speaking at the North Carolina Science Blogging Conference (<http://wiki.blogtogether.org/blogtogether>) held in January 2007 in Chapel Hill, Huntington Willard, director of Duke University’s Institute for Genome Sciences & Policy, said that blogging is “antithetical” to how scientists—at least those of his generation—have been trained. “I am a scientist and my opinion actually does not matter a bit. It is the data that matters and my interpretation of the data,” he said to his audience. “To scientists [blogging] is a tough jump to make and yet one that hopefully an increasing number of scientists will make in order to share our educated viewpoint on some science issue and have that be one of several mechanisms we use to try to engage the public.”

“Most scientists are not comfortable with blogging,” says Myers. “The training we get is to separate opinion from evidence, but blogs blur the difference.” Myers says on occasion colleagues have criticized him for “taking something objective and turning it into something personal.”

### Bloggling to Talk Shop

Alex Palazzo’s blog *The Daily Transcript* (<http://scienceblogs.com/transcript>) is a mix of musings about research and the ups and downs of postdoc life. A postdoctoral fellow in the lab of Tom

Rapoport at Harvard Medical School, Palazzo suspects that 95% of his readers are other scientists, many working on RNA or in related fields. Although he always gives priority to his bench research over blogging, Palazzo says blogging helps him to think about his work more clearly. "One time I posted a question about energetics of cells and one of my readers pointed out an article published in the 1990s that turned out to be very insightful." He also gets useful information by reading other blogs. "A lot of bloggers are bioinformatics scientists and computational biologists. Their blogs often talk about Web-based analysis tools," says Palazzo. "I find it useful to sift through those posts to find potential resources."

Although some of his posts are very "science heavy," Palazzo, like most scientist bloggers, does not talk about his unpublished research, or that of his colleagues. "Sometimes I will go to a talk and will be very excited about something I heard, but I hold back on writing about it," he says. For bench scientists, such openness might cost them a publication or cause them to get scooped. But there are exceptions. Jean-Claude Bradley and his students at Drexel University are experimenting with a live open lab notebook on his blog *Useful Chemistry* (<http://usefulchem.blogspot.com>) and wiki (<http://usefulchem.wikispaces.com>). The blog discusses and analyzes results, with links to the raw data on the wiki.

Bradley's group writes down the experimental plan, the results as raw data, observations, then conclusions—every detail a scientist would include in a lab notebook except that the information is available on the Web for everyone to see and comment on. "We don't just put things that work but also failed experiments. We thought that if we cannot use the data maybe others will find a use for them," says

Bradley. People have come to *Useful Chemistry* looking for the boiling point of a given compound or a chemical reaction. "It is encouraging to see that," says Bradley. "Part of what we wanted to do was put small bits of information out there that might be useful." He has not yet tried to publish any of the data on his blog but says he will soon be in a position to do so. He is well aware that most top-tier journals have guidelines precluding publication of anything that has already been reported, regardless of its format.

There is one case (*The Scientist* 21, 21, 2007) where a scientist blogger ended up becoming a coauthor on a paper thanks to his blog. Back in 2005, Reed Cartwright, a Ph.D. student in genetics at the University of Georgia, wrote an alternative interpretation of published findings about the mutant *hothead* gene of *Arabidopsis* (*Nature* 434, 505, 2005) in his blog *De Rerum Natura*. Several months later, Luca Comai at the University of California, Davis was publishing a similar interpretation in the journal *Plant Cell*. When he found out that Cartwright had already "published" the idea in a blog, he offered to make Cartwright a coauthor on the *Plant Cell* paper (17, 2856, 2005).

### Communities of Bloggers

Because scientist bloggers are few in number, they risk getting lost in the vastness of the blogosphere. A few websites identify science blogs and cluster them for readers. For example, *Pharyngula*, *Aetiology*, *The Daily Transcript*, and *Framing Science* are among the 60 or so blogs on <http://scienceblogs.com>. This website, created by the Seed Media Group (publishers of *Seed* magazine), serves as a one-stop shop for science blogs written by both scientists and science communicators. Currently the site contains 32,089 posts on science top-

ics and ten times as many comments from readers. According to the website, bloggers were selected based on their "originality, insight and talent and how they would contribute to the discussion on scienceblogs.com."

The organizer of this year's NC Science Blogging Conference, Bora Zivkovic, says the initial motivation for the conference was to "meet in person a bunch of bloggers that I talk to online." Applications arrived from all over the world and more than 170 people attended. The next conference will be held January 19, 2008, also in Chapel Hill. This conference brings together "scientists, science bloggers, science journalists, and science educators for a day of exchanging ideas and information," says Zivkovic.

The blogosphere can be overwhelming. Efforts to cluster blogs written by experts should make it easier for scientists, and those interested in science, to find what they are looking for. *Tangled Bank* (<http://tangledbank.net>) provides a bi-weekly showcase of "good" blog writing focused on biology and evolution. Other so-called blog "carnivals" include *Mendel's Garden* (<http://mendels-garden.blogspot.com>), a monthly collection of blog posts on genetics, and *Gene Genie* (<http://scienceroil.com/2007/02/17/gene-genie-the-first-issue>), which appears every two weeks and is dedicated to covering every gene in the human genome. For the uninitiated, *The Open Laboratory: The Best Writing on Science Blogs 2006*, for sale at Lulu.com, is a collection of 50 of the best science blog posts of 2006. "When people hear 'blog' they think of a personal journal with bad grammar or a highly biased angry political post," says Zivkovic, who put together the anthology. "People who are more comfortable with a book will see that blogs provide high quality science online."

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DOI 10.1016/j.cell.2007.04.032