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Tags, Blogs, Tweets: Social Media as Science Tool?

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Is social media changing the way we do science—even speeding it up? Preliminary data, and a growing number of cases, suggest that the answer is *yes*.

One now-famous example of its growing ubiquity is the social media storm that followed the publication of a NASA-funded paper in the journal *Science*, on 2 December 2010 (doi:10.1126/science.1197258). The authors of the paper claimed to have discovered a bacterium that could substitute arsenic in place of phosphate as a key nutrient necessary to support life.

Rosie Redfield, zoology professor at the University of British Columbia (UBC), wasn't buying it, and said so on her blog. Ironically, this was a communication platform that UBC graduate students chose to parody, along with Redfield, at their Christmas party. Asking the fake Redfield, "What's a blog?" the reply was, "it's a publication that nobody reads, not even reviewers." Their mockery was to be quickly proved wrong.

Redfield's blog post on 4 December articulated her criticisms of the arsenic paper. The post was intended mainly to clarify her own thinking; "I didn't expect anyone other than a few researchers to ever read it," she later blogged. But by the following day, her blog had catapulted from a readership of less than 100 to over 20,000.

The ensuing discussion on Twitter and across the blogosphere suggested a problem with the study's methodology. That online explosion sparked a collaboration encompassing the suite of skills necessary for Redfield and her colleagues to repeat the experiment. And so they did, publishing their results in *Science* on 27 July 2012 (doi:10.1126/science.1219861).

This social media-facilitated "peer review" is not the only way in which social networks are fueling advancements in science. Social media literally came to the rescue for Oregon State University ichthyologist Brian Sidlauskas during a trip to Guyana to catalog fish

biodiversity. Traveling 200 kilometers up the remote Cuyuni River, his field expedition team collected over 5000 specimens, some suspected to be new to science. Sidlauskas had assumed that they would assign their preliminary identifications to a family or genus while in Guyana, then bring the specimens home for more precise identification. But after arriving in Guyana, Sidlauskas learned that Guyanese export law required the specimens to first be identified to the level of species—a daunting task that could have taken months.

"I should probably have asked more questions before I got there," admits Sidlauskas. The situation intensified when a team member, Devin Bloom, had to leave unexpectedly early. The University of Toronto doctoral student, asked along because of his previous Guyanese experience, suggested before departing that Sidlauskas photograph each fish species and upload the images to Facebook, tagging fish photos to Sidlauskas's researcher "friends" from around the world. In about 24 hours, the flood of responses had identified nearly all of the specimens. (For the uninitiated, *tagging* is Facebook speak for attaching names to photographs, which generates an automatic alert to that person.)

Social media is also a boon for citizen science programs like eButterfly, a Canadian project that may help scientists to understand and mitigate the impacts of global change on butterfly diversity. eButterfly crowdsources data, allowing people to upload their observations and butterfly photographs through a data-input system.

Is there a downside to social media science? "As with any communication, one needs [to] consider who is doing the communicating," says Sidlauskas, who cautions that he already knew most in his social network as reputable experts.

There is a valid concern with social media about being scooped, Redfield says. "But the other side of that argument is

that when you blog about your ideas, they are effectively time stamped as *yours*."

Asked what it will take for less formal science communications to become more recognized in academia, Redfield quips that it probably requires "waiting for the old guard to die off." She suggests that academics who use social media to communicate science should speed this recognition by including these contributions in their curriculum vitae and tenure packages.

Academics recently discussed the impact of social media and networks on research at a conference in Berlin, Germany, hosted by the Alexander von Humboldt Foundation, and studies such as those by Anatoly Gruzd and his colleagues at Dalhousie University are beginning to track the use of social media in different academic fields. This embryonic research area is revealing that wikis, social network sites, listservs, blogs, microblogs, video, and teleconferencing tools are increasingly used by scholars across many disciplines to form new peer connections and collaborations, to both assimilate and disseminate research.

"Our studies confirm that most institutions don't [yet] recognize social media use as part of tenure and promotions activities," says Gruzd. In contrast, its users—particularly junior faculty members—already note both its direct and indirect benefits.

Every week or so, Sidlauskas gets tagged on Facebook as a fish someone is attempting to identify. Does he mind being tagged as a fish? To my tongue-in-cheek question, he responds that "most of the fish I study are very pretty fish." So no, he doesn't mind.

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