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Confessions of a Science Blogaholic: Highs, Lows, and Increasing Liabilities

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Social media have transformed the way we talk about science. Blogging, in particular, has become popular among scientists of all stripes and has proven to be a useful tool for engaging the public in scientific discourse. Science bloggers have also helped to instill change within academia, highlighting discrimination, misconduct, and gross errors in peer review. But for all the laudable activism, the thought-provoking commentaries, and the brilliant posts that make up the scientific blogosphere, there is an equal if not greater amount of scientific gobbledygook. And for scientists who choose to blog, it is getting harder and harder to attract and sustain an online audience, even for the very best science writers. Given this competitive online environment, is it even worth the effort of starting and maintaining a blog? What are the perks, if any, of becoming an online science sensation? What are the drawbacks? In this light-hearted essay, I explore these and other blog-related questions, as well as my own relationship with science blogging, as I seek to understand the current state of the scientific blogosphere.

Keywords: science blogging, science communication, scientific outreach, science writing, social media

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INTRODUCTION

Ideally, my weekday morning should look something like this: up early replying to emails while enjoying percolated espresso and toasted sourdough bread, followed by an uninterrupted hour of writing research articles before heading in to the university for a hectic day in the lab and lecture hall. More often my mornings go like this: wake with the best intentions of answering emails and writing papers but quickly distracted by online science news stories and commentaries, mainly from science bloggers.

I know I should be strong and click the "turn Wi-Fi off" button, but my mental cursor is weak and keeps drifting toward the bookmarks of my favorite blogs. Just 5 min, I tell myself. One tiny peek at *The Tree of Life*[1] to see what Jonathan Eisen is ranting about today … a quick skim of *Science 2.0*[2] to find out which group of people Hank Campbell has most recently managed to enrage … a harmless glance at *I F-ing Love Science*[3] to leave me cursing the computer for more. But of course, 5 min turns into 1 h and 5 min and now I am late for work—a victim of the biology blogosphere, a casualty of academic clickbait, and a sucker for scientific social media.

[1]https://phylogenomics.blogspot.ca.
[2]http://www.science20.com.
[3]http://www.iflscience.com.

Damn you, Larry Moran, for your engaging and witty posts[4] on genome evolution. I am pointing at you too, Ed Yong: it is not exactly rocket science to figure out that your blog[5] is intriguingly addictive. Never again will I let you hack my mind, *Mind Hacks*[6]! And oh how productive I could be if it weren't for your endless pharyngulations,[7] Mr. P. Z. Myers.

Sometimes my online morning meanderings are so extensive that I feel like beginning my classroom lectures by saying, "Hello, my name is David Smith and I'm a science blogaholic." And then 600 second-year genetics students reply in unison: "Nice to meet you, David." But my popular-science distractions are not all bad. The blogs I frequent provide me with much more than mindless distraction. On many occasions, they have helped me navigate the complex and changing academic landscape, given me new research and teaching ideas, and (more than anything) been a source of enjoyment and entertainment. Moreover, blogging (and social media in general) is arguably becoming an evermore integral part of research and academic life (Van Noorden, 2014), with many experts extolling the virtues of having a strong online presence (Bik and Goldstein, 2013; Osterrieder, 2013), while others warn of its pitfalls (Egan, 2016; Smith, 2016a).

SOME ADVANTAGES OF BEING A BLOGAHOLIC

When I first began a PhD program in biology I was naïve about the world of scientific research, anxious about what was expected of me as a graduate student, and concerned about where the degree would get me. I was constantly thinking: How will I ever write a thesis or find a fulfilling job afterwards? Moreover, I felt that I lacked the laboratory and writing abilities necessary to excel in my chosen program.

I know now that these feelings and questions are completely normal for a beginning graduate student. As I progressed through the program, I gained valuable knowledge from my supervisor, mentors, and courses and acquired many of the skills needed to complete a PhD and become an independent scholar. One resource that I found particularly helpful (and which was not part of the PhD curriculum) was reading blogs catering to graduate students, their experiences, and their unique questions and problems. Indeed, the blogosphere abounds with excellent advice columns and first-person accounts about surviving and thriving at grad school.

Today, graduate students and postdocs can access blogs such as *From PhD to Life*[8] by Jennifer Polk, which talks about the wide range of exciting careers outside of academia that are available to PhD graduates. Similarly, the award-winning blog *Speculative Diction*[9] by Melonie Fullick confronts some of the most challenging issues facing graduate students, including mental health, rejection, and doctoral attrition. For example, in a post titled "War of Attrition" Melonie writes: "While there is no single reason why students tend to leave [their program] (in fact it's usually a combination of reasons), a major take-away from the scholarship on this topic is that the supervisory relationship is of crucial importance—not only in whether students graduate, but also in their subsequent (academic) careers" (Fullick, 2013). Other blogs, such as *Gradhacker*,[10] *The Thesis Whisperer*,[11] and *Get a Life, PhD*,[12] provide concrete advice for completing grad school, including how to communicate effectively and efficiently and write a thesis.

In addition to easing my transition from undergraduate to graduate studies, blogs have helped me to understand complicated topics within my field of study (evolutionary biology). Early on in my PhD, I often found it hard to digest and understand research papers, even after spending hours meticulously studying a single article. This was partly because of my inexperience but also because the papers were sometimes poorly written and always riddled with jargon. Thankfully, popular-science blogs came to my rescue.

Blogs, and social media in general, have allowed researchers and educators to communicate their work to the broader scientific community and the public at large, giving them a voice outside of classrooms and peer-reviewed journals. Blogs have also helped to foster reciprocal dialog among scientists and between scientists and the public, such as through comments sections at the end of blog posts. I recall reading a post in the blog *Skeptic Wonder*[13] by Yana Eglit about a concept called Constructive Neutral Evolution. Yana was able to take this evolutionary topic, which I had been struggling with for days, make it understandable in a few hundred words and stimulate broad discussions about this new theory among diverse readers. You can imagine my amazement when I later found out that she was an undergraduate student. It is no wonder that she went on to blog for Scientific American[14] and enroll in a PhD. Like Yana, many of my colleagues and peers now actively blog about their research, attempting to make it accessible to people within and outside of their chosen fields. For some, these online activities helped open professional doors, including new research collaborations, conference invitations, and even journal publications (Herron, 2016). For others, it can lead to financial gains and book deals (Brookshire, 2016). And for some, blogging can launch a career as a full-time science writer (Crew, 2012).

Not surprisingly, the secret to great blogging is great writing, and unfortunately many scientists and students are bad writers (Gross and Sis, 1982), and academics as a whole have a terrible reputation for writing in a style that is opaque and inaccessible—or as one famous scientist put it: "turgid, soggy, wooden, bloated, clumsy, obscure, unpleasant to read, and impossible to understand" (Pinker, 2014). I have struggled with writing at various points throughout my life, which I have talked about before (Smith, 2016b). Reading blogs about effective writing as well as

[4]http://sandwalk.blogspot.ca.
[5]http://phenomena.nationalgeographic.com/blog/not-exactly-rocket-science/.
[6]https://mindhacks.com.
[7]http://freethoughtblogs.com/pharyngula/.
[8]http://www.universityaffairs.ca/career-advice/from-phd-to-life/.
[9]http://www.universityaffairs.ca/opinion/speculative-diction/.
[10]https://www.insidehighered.com/blogs/gradhacker.
[11]https://thesiswhisperer.com.
[12]http://getalifephd.blogspot.ca.
[13]http://skepticwonder.fieldofscience.com.
[14]http://blogs.scientificamerican.com/ocelloid/.

blogs by first-rate science writers, have helped me to overcome these struggles. When I think of exemplary science writers, John Hawks' blog[15] on paleoanthropology and evolution comes to mind, as does the writing of John Timmer, editor of *Ars technica*.[16] And I can't tell you how many times the *Grammar Girl*[17] blog has saved me from an erroneous comma and a "that" instead of a "which."

But as *Grammar Girl* likes to point out, great writing is not just about putting commas in the right place or coming up with good stories to tell; it is about having the discipline, focus, and confidence to sit down (or stand up like Ernest Hemingway liked to do) and put words on a page. Consequently, the blogosphere is bursting with tips on how to be productive, so called "life hacks." Blog posts with titles like "The 12 Habits That Are Killing Your Academic Creativity," "10 Ways to Boost Your Thesis Writing Output," and "Einstein's Secrets of Productivity," have become the mainstay of many major blogging platforms, such as Medium and LinkedIn. These kinds of self-help articles can come across like patronizing Tony Robbins infomercials from the 80s and 90s, but they can also be hard to stop reading. Instead of being thought-provoking commentaries, many science blogs are starting to feel like academic junk food. It is getting to the point where I need a life hack against life hacks—50 ways to take your blog addiction down the tenure track.

GETTING BOGGED DOWN AND DISILLUSIONED BY SCIENCE BLOGS

It is estimated that a new blog is created every 7 s and that there are nearly 3 million new posts every 24 h. It seems like everywhere I look online these days, I am bombarded with new blogs about breakthrough research, gee-whiz science, and university culture. From *Science Blogs*[18] to *Science Borealis*[19] to *PhD Life*[20] to *Study Hacks*,[21] I can't keep up with the number of blogs and blogging platforms devoted to science and academics, to say nothing about the growing number of science writers on traditional blogging platforms, such as Blogger and WordPress. The homepages of many peer-reviewed journals are now populated with links to blogs and other social media, most of which merely promote the journal's content. The last time I checked, the open-access publisher *PLOS* had over 20 different blogs, and *BioMed Central* wasn't far behind. Likewise, websites for some of the top popular-science magazines are being drowned out by blogs, so much so that I sometimes don't know if I am reading a news story by a professional science journalist or a blog post by a scientist or student.

It is inspiring to see so many people voice their opinion and to read such diverse points of view. But despite the ever-expanding number of blogs and bloggers, I am finding it harder and harder to locate compelling long-form scientific essays about contemporary research, and conversations with my colleagues and students suggest that I am not alone in feeling this way. Instead of uncovering quality posts, I am getting buried in short, bite-sized snippets of scientific news, and self-help gobbledygook, which all start to sound the same and read more like Tweets than thoughtful commentaries. More and more often I find myself moving away from blogs toward reviews, editorials, and perspective pieces in peer-reviewed journals for provocative and stimulating science writing, which is probably the way it should be.

For instance, when the Encyclopedia of DNA Elements (ENCODE) research project published their key findings (The ENCODE Project Consortium, 2012), there was an explosion of discussion and debate about their results and what it means for a stretch of DNA to be functional. Although there were some excellent blog posts written on the ENCODE controversy (Timmer, 2012; Moran, 2014), in my opinion the best commentaries came from the peer-reviewed literature (Doolittle, 2013; Graur et al., 2013). In a funny reversal of roles, some of the journal commentaries were refreshingly light-hearted and accessible, reading more like well-written blog posts than stuffy academic papers—for an example check out "On the immortality of television sets: 'function' in the human genome according to the evolution-free gospel of ENCODE" (Graur et al., 2013). However, it is arguably the blogs, not the peer-reviewed literature, that are leading the charge in pointing out academic misconduct and parasitic models of publishing, as any reader of *Retraction Watch*,[22] *Scholarly Open Access*,[23] and *Bad Science*[24] can attest.

Like any genre of writing, science blogging spans the gamut from excellent to awful, but to me it appears like the scales are shifting toward the latter. Providing everyone with a voice and a platform on which to speak is wonderful—provided that they have something insightful to say. Most high-school students, for example, don't have the experience and expertise to write about complex theories in evolution and ecology, just like most evolutionary biologists cannot convincingly write about what it is like to be a contemporary high-school student. Nevertheless, the blogosphere is now crammed with people writing about things they know nothing about. Mind you, for being so crowded the science blogging world is a comparatively cordial domain—intelligent design and climate change notwithstanding—and not nearly as inflammatory as those of politics or videogames, although it is not without its scandals (Helmuth, 2013). And, unfortunately, science blogging is still a male-dominated discipline (Shema et al., 2012) despite the fact that "female online science communicators are contributing to a diverse visibility in science communication, which can potentially … encourage [women] to pursue science education and careers" (AbiGhannam, 2016).

It might be getting harder for readers to find well-written science blogs, but it is even tougher for good science bloggers to get their writing noticed and attract an ongoing readership (Ranger and Bultitude, 2016). Even for the very best science

[15] http://johnhawks.net/.
[16] http://arstechnica.com/author/john-timmer/.
[17] http://www.quickanddirtytips.com/grammar-girl.
[18] http://scienceblogs.com.
[19] http://scienceborealis.ca.
[20] https://phdlife.warwick.ac.uk.
[21] http://calnewport.com/blog/.
[22] http://retractionwatch.com.
[23] https://scholarlyoa.com.
[24] http://www.badscience.net.

bloggers, developing and sustaining a large online audience can be tough, and the time required can be similar to a full-time job rather than a part-time hobby (Yong, 2016). Given the competitive online environment, is it even worth the effort of starting and maintaining a blog? What are the perks, if any, of becoming an online science sensation?

TO BLOG OR NOT TO BLOG

When done well, blogging can be an excellent way to promote and increase citations of your research. In an essay for the blog *Writing for Research*, Patrick Dunleavy, a political science professor at the London School of Economics (LSE), describes why researchers should be actively blogging about their work. "One of the oddest things that people in academic life regularly say to me," writes Dunleavy (2015), "is 'I'm not paid to write blog posts … I don't have time to do blogging … and in today's research environment, only citations count.'" Dunleavy goes on to describe how "a post on the right kind of blog, one with a big ready-made audience, [can communicate] your messages to far wider groups beyond academia itself … [creating] external impact for your work amongst practitioners in government or business or the professions as well." Dunleavy then recounts how an academic article by one of his LSE colleagues was read and downloaded less than 100 times, but a post about the same article on the LSE *Impact Blog* was read 42,000 times in 6 months.

Ultimately, Dunleavy (2015) presents the reader with the following query: "You've put eighteen months or two years of your life into doing the research in your article. You've devoted months more to writing the paper and sending it to journals, dealing with comments, doing rewrites and hacking through the publishing process. Why would you *not* spend the extra couple of hours needed now to pull out from your journal article the key bits needed for a good blogpost?" Great question. And one can't forget that in an age of alternative metrics (altmetrics), blogs can have a major impact on the way we determine and measure the scientific worth of a research paper (Piwowar, 2013). Indeed, many publishers, including Nature Publishing Group and Elsevier, are now providing altmetric scores for peer-reviewed publications—the more social media shares and blog posts about a particular paper, the greater the score.

Self-promotion, increased citations, and altmetrics aside, blogging can be a rewarding way to engage with your peers and the general public (Osterrieder, 2013) as well as a powerful but underappreciated tool for science education (Wilcox, 2012). Scientific outreach is becoming an increasingly important part of academic life. Many science-funding agencies now require applicants to incorporate outreach plans into their grants. Applications to the US National Science Foundation now need to include a section on the broader impact of the project, outlining how the proposed research will promote teaching and learning, and how it will broadly enhance scientific and technological understanding. Similarly, outreach activities can be important components of graduate-school applications, award submissions, and tenure and promotion dossiers.

Sometimes just the sheer act of blogging about your work and scientific discipline can lead to unforeseen opportunities and enjoyment. A colleague of mine, Matthew Herron, writes a blog called *Fierce Roller*,[25] which focuses on the spherical green alga *Volvox*, a model organism for studying the evolution of multicellularity. Recently, Matt reflected on 1 year of blogging:

> I still couldn't give you a coherent reason for doing this beyond 'I like to.' It's not because I think I'm going to convince creationists of their folly. It's not for the money (PZ promises me enough for a cup of coffee, but I'm still at a net loss). The only tangible benefit I've seen so far is that the blog played a role in getting me invited to write the *Volvox* 2015 meeting review, and much of the content of that paper was revised from blog posts. It's good writing practice, and I think it has improved my scientific writing. Maybe I'll keep it going for another year; we'll see (Herron, 2016).

As Matt articulates in his post, beyond "a cup of coffee" very few science bloggers will ever get paid for their work. And although outreach activities are becoming more valued by the academy, universities still value grant money, peer-reviewed papers, and student enrollment above all else. As laudable an endeavor as it may be, it is unlikely that writing a science blog, even one that is successful, will be a determining factor in securing an academic position or achieving tenure and promotion—but see Gbur (2016) for an alternative view—and in extreme cases it could even get you fired.

Inger Mewbur, Director of research training at the Australian National University and editor of the popular blog *The Thesis Whisperer*, recently wrote an article titled "If you blog, will you lose your job?" (Mewbur, 2016). In it, she describes some of the dangers (and rewards) of blogging in an environment where one misstep online can lead to serious personal and professional trouble:

> I'm often asked to talk about my work on social media in public forums. There is always at least one question from the audience along the lines of "will blogging put my job at risk?" … I used to dismiss these concerns out of hand, but now I don't. I talk about blogging with great fondness and enthusiasm, but I stop short of suggesting to others that they should do it. In fact, over the years I have become more and more cautious in the advice I give, despite the clear advantages I have enjoyed. My public engagement online has always been positive, but not so for other academics and sometimes the blame for this can be laid directly at the feet of their university. This morning I read yet another article of an academic being suspended from their job because of an Internet perfect storm. In this case the combination of highly public and controversial work, sexism, personal politics, homophobia and a breach of online privacy (Mewbur, 2016).

[25] http://freethoughtblogs.com/fierceroller/.

Mewbur ultimately concludes that if what you write about is uncontroversial and doesn't get in the way of your university duties than you probably will not get fired for blogging. On the other hand, if you veer into highly political or controversial subjects on your blog, one day you might just find yourself "hung out to dry by university management." And when considering the potential pitfalls and consequences of blogging it is not just the climate of your university that may matter (as to whether or not your blogging may get you fired), but also the larger political climate in one's community, state, or country. The fear of job loss, however, doesn't seem to have stopped some of the most famous blogging activists from challenging and criticizing anti-evolutionists, climate-change skeptics, and proponents of intelligent design. And perhaps online activism is when blogging is at its best.

Late in 2010, the journal *Science* published a paper describing how the bacterium GFAJ-1 could use arsenic to build its DNA, not phosphorous like all other living things (Wolfe-Simon et al., 2011). The study quickly went viral, garnering massive hype and news coverage. But ramblings from the science blogosphere, particularly from Rosie Redfield's blog *RRResarch*,[26] quickly suggested that all was not right with the paper. Eventually, the online criticism of the data helped to debunk the study—GFAJ-1 appears to use phosphorus in its DNA, just like every other living thing (Erb et al., 2012; Reaves et al., 2012). The arsenic-life debacle has now become a case study for how the Internet and social media can make science better (Rosen, 2012).

In spite of blogging success stories and the growing evidence that it is an effective tool for scientific communication, many researchers still remain skeptical of blogs and social media as a whole and are reluctant to use them as publication outlets or channels for stimulating discussion (Procter et al., 2010). Recent studies, however, suggest that that this reluctance is quickly waning and that increasingly scientists are employing and engaging with social media throughout the scholarly communication cycle (Van Noorden, 2014; Shehata et al., 2015), particularly early career researchers (Nicholas et al., 2015; Zhu and Procter, 2015).

By some measurements, I'm considered an early career researcher (I'm within 6 years of receiving my PhD), yet I'm still quite inept at using social media for professional purposes and my various attempts at doing so have not resulted in any obvious benefits but have cost me a lot of time and energy. As the communications liaison officer for my department, I am also under pressure to continuously post online updates about department happenings and to convince colleagues and students to join various social media platforms, all in an effort to promote the university. At times, this has left me feeling cynical about scientific social media. One accomplishment that I am proud of is using blogging for undergraduate engagement. Each term I mentor a team of undergraduate volunteers in popular-science writing (Smith, 2016b). Blogging platforms, such as Medium, have provided an excellent venue for these volunteers to showcase their work, and on multiple occasions local media have picked up our blogs posts.

KICKING THE HABIT…

Despite my predilection for biology-themed blogs, most of the key points in this article can be applied to science and academic blogs as whole. Moreover, for all my ranting, raving, and loss of productivity, I don't think that I will be giving up blogs anytime soon. Yes, my morning routine will remain a shining example of academic attention deficit disorder, a model of inefficiency. And as I'm forced to dig deeper and deeper to uncover intriguing scientific discourse—to find those perfect 1,000 words, that elusive blog fix—I will think of Rosie Redfield and all of the other bloggers who have improved the scientific processes through online activism. When I eventually do arrive to work with bloodshot eyes, behind schedule, and kicking myself for wasting time online, I will remind myself that unlike much of the peer-reviewed scientific literature, blogs are free to read and free to write, so whatever your feelings you can take 'em or leave 'em—unless of course, you are a blogaholic.

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DS conceived of and wrote the manuscript.

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[26]http://rrresearch.fieldofscience.com.

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