



Science Journalism's Unlikely Golden Age

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We live in a golden age of science and environmental journalism. In the face of the widespread decline of traditional publications, such as regional newspapers and national newsmagazines, and a broader media ecosystem awash with low-quality, sensationalized, sometimes intentionally misleading material, science and environmental journalists and their allies have stood up to assert the value of rigorous, factual, independent coverage and scrutiny. Here, we argue that there has never been more, better quality science and environmental journalism produced than there is today—and yet that the field itself and the careers of individual science and environmental journalists have never been more precarious (Powell, 2015; Bajak, 2016). We review key recent changes in science and environmental journalism, highlight some similarities and differences between the practices of science and journalism, and suggest potential avenues for strengthening science and environmental journalism in the coming decade.

Individual journalists and their professional societies, along with traditional news organizations, media entrepreneurs, and academic, foundation, and philanthropic supporters, have launched nearly two dozen high-quality digital science and environmental publications in the past decade (Semeniuk, 2013; Gutierrez, 2017), along with innumerable blogs, podcasts, and social media channels (Fausto et al., 2012). They have instituted fellowships (TON Editors, 2017), grants (Davis, 2016; Staff, 2017), and professional development initiatives (Ostrander, 2014) to help support science and environmental journalism. University-based programs are increasingly filling gaps in the traditional career ladder, providing entry points for early-career journalists and professional development opportunities for veterans.

Perhaps most strikingly, science and environmental journalists have self-organized for mutual support, forming small, informal professional groups and generating books, websites, blogs, and workshops dedicated to transferring knowledge, maintaining standards and best practices, and opening the field to the entering generation of science and environmental journalists.

Large technology companies now reap the advertising revenue that used to flow to journalistic outlets, which has caused the massive contraction of the traditional media industry.

Yet, science and environmental journalists today are producing more and better journalism than ever before, often publishing in a new generation of science-focused digital magazines.

Many of these publications are funded by foundations, but maintain their editorial independence and often syndicate content to more traditional for-profit publications. Examples of this model include *Hakai* (focused on coastal science and culture; supported by the Tula Foundation), *Sapiens* (anthropology; the Wenner-Gren Foundation), and *Spectrum* (autism research; the Simons Foundation). Others, such as *BioGraphic* (biodiversity science; California Academy of Sciences) are supported by science institutions, while still others are supported by some mix of subscriptions, crowd funding, venture capital, and advertising. Notably, none are fully supported by paying readers and advertising alone (Gutierrez, 2017).

The rise of foundation and philanthropic support for science journalism has engendered a concomitant concern about a loss of editorial independence (Rosenstiel et al., 2016). But, at the same

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time, the field of science journalism broadly has become more skeptical of the science and scientists it covers, rather than less so (Borel, 2015).

Many science journalists are drawn to the field by their own passion for science and increasingly are informed by their own education and experience in science. In 1963, for example, science journalists on average reported having just a few semesters of college courses in math and basic science (Small, 1963). It is now common for science journalists to come to the field after completing advanced degrees in science.

At the University of California, Santa Cruz Science Communication Program, for example, fully one-third of admitted students have completed a science master's or Ph.D. degree, while the American Association for the Advancement of Science's Mass Media Fellowship has for decades provided entry points to journalism for young scientists.

Despite these obvious affiliations with science, many science journalists take the traditional watchdog role of journalists seriously. Journalists, for instance, have been instrumental in driving a societal conversation about perverse incentives that dissuade individuals and universities from pursuing rigor in research (Check Hayden, 2008). BuzzFeed's science section has exposed sexual harassment in academia (Ghorayshi, 2016), and the data journalism site FiveThirtyEight has provided important coverage on the use and misuse of statistics in science (Aschwanden, 2015).

Despite the collapse of traditional career ladders in journalism and the on-the-job training that went with them, a new generation of science and environmental journalists is taking on the challenges of learning both traditional journalism practice and the ever expanding slate of digital media, distribution platforms, and reporting techniques that characterize the field today. Seasoned journalists are finding new ways to train, learn from, and collaborate with others. Working alone as individuals, together as self-organized groups, and through their professional societies, science and environmental journalists have shored up traditions, linked generations, funded reporting projects and awards, and recreated the community of practice once inherent in newsroom culture.

There is just a handful of college degree or certificate programs focused on science and/or environmental journalism training in the United States, with a similar proportion of university programs internationally. These include science and environment reporting tracks embedded in general journalism programs, programs devoted to science and/or environmental journalism specifically, and programs that teach science and environmental journalism as part of a broader curriculum encompassing science communication.

The UC Santa Cruz Science Communication Program, for instance, admits a maximum of 10 students per year, all with a science background, and prepares these students for full-time careers in science journalism or communication. Students are placed in internships that run concurrently with their classroom work, which focuses on essential journalistic skills, such as reporting, writing, and social and multimedia production.

Stanford University's Master of Arts in Earth Systems, Environmental Communication Program, in contrast, allows

students to customize their curriculum toward work in a variety of public-facing sectors, such as the media, education, business, and public policy.

A major goal of the two programs mentioned herein is to boost the diversity of the science journalism profession, which, like the sciences they cover and the media broadly, does not represent the ethnic and gender diversity of the nation.

Professional societies such as the National Association of Science Writers, the Society of Environmental Journalists, the Association of Health Care Journalists, and the World Federation of Science Journalists have increased training and professional development efforts, including training workshops at national and regional meetings and mentoring programs that match experienced journalists with students and early-career reporters.

NASW has supported a number of ambitious knowledge transfer projects in recent years. These include partial funding for *The Science Writers' Handbook*, a collaborative book produced by the members of a self-organized online group of freelance science writers (one of us, Thomas Hayden, is a member of the group and co-editor of the book) as well as support for the science journalism craft website, The Open Notebook, and an intensive workshop in the business of freelancing, Courage Camp.

In many ways, science and journalism are parallel pursuits. Both are practices of inquiry that take the pursuit of verifiable truth as their highest calling. Both are built on the individual curiosity and dedication of practitioners pursuing the public good, and both have well-developed traditions and professional structures that support this calling.

And, yet, there are significant divergences between the two professions. Science journalism explicitly seeks a broader audience for science content, while science strives to operate more or less independently of the breadth, volume, and enthusiasm of the audience for its results. This divergence has sometimes led science and journalism into conflict with one another.

"...[S]cience news is presented in a superficial and diffuse manner," writes mathematics education scholar John Niman in his 1974 essay "Is Science News Fit to Print?" (Niman, 1974) "This will lead to oversimplification of ideas and concepts." This is the standard criticism of science journalism by scientists, and it remains common today. It largely misses the point of science journalism, however, which is to inform its audience rather than to educate it, and to assess, critique, and contextualize science rather than to promote it.

Science and environmental journalists today live with a central irony: they have helped usher in a golden age in their field—and it might not be enough to save the field, their own careers, or the place of verifiable information in society. They now compete with a vastly expanding universe of poorly executed journalism, irresponsible click-bait content, and intentional misinformation that are undermining trust in and financial support for legitimate science journalism. This distressing situation may, however, provide a meeting point of shared interest for science journalists and scholars of science communication.

Formal linkages between science journalism and science communication researchers have traditionally been limited. This may in part be because the most pressing concerns of the two fields have been so different—journalists being more concerned with

issues of craft and business, and scholars being more concerned with how journalism's products are received by the audience.

To date, the focal point for research has typically been “science communication” broadly rather than science journalism specifically (for example, Kahan, 2014). This misses critical differences in practices, goals, ethics, and traditions of institutional science communication and science journalism, and further impedes useful connections between science communication scholars and science journalists. Similarly, when scholars do study journalism specifically, too often the “news organization” remains a primary locus of consideration. Science and environmental journalism is increasingly a freelancer's pursuit. Its quality is ultimately dependent on the success or failure of individual practitioners, and their financial survival over time.

Certainly, science journalism needs help. It remains to be established that science communication scholars can provide the help that is most needed. Based on our own observations and scores of conversations with professional science journalists, there is a robust level of skepticism within science and environmental journalism about whether the academics who study their work can provide insights that are new, helpful, and in keeping with the traditions and ethics of journalistic practice. But there seems to be more openness now to see if some mutual benefit can be found—perhaps driven by growing frustration on the part of journalists and researchers alike with the spread of false information and distrust of both their disciplines.

Recently, one of us (Erika Check Hayden) initiated a study of how science journalists can make better use of emerging

communication technologies. In collaboration with a technology partner, Erika Check Hayden and her team are investigating how to communicate about complex science topics, such as climate change, more effectively through social media. And in conjunction with the November 2017 Science of Science Communication III Sackler Colloquium in Washington, DC, seed funding was awarded for two research proposals explicitly linking science communication scholars and practitioners. Notably, however, the grants were awarded to teams including institutional science communicators rather than science journalists.

If the extinction of mass-market journalism itself once seemed almost inevitable, perhaps science and environmental journalism have now passed through an evolutionary bottleneck. Enough of the traditional craft and practice has been salvaged and enough new experiments and innovations have emerged to support a new burst of innovation and diversification. But only if the surrounding environment stabilizes into something more supportive of robust science and environmental journalism will this new radiation flourish. As it is, many of the brightest examples of recent success in science and environmental journalism are just a funding cycle or market downturn away from financial collapse. The current golden age could not have been predicted even a decade ago, and its tenuous success cannot be taken for granted in the decade to come.

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TH and ECH collaborated on this article.

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