



Broadcasting Ourselves: Opportunities for Researchers to Share Their Work Through Online Video

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For researchers, producing and publishing online video can be a means of directly sharing both our science and ourselves with a wide audience. However, media production often requires a substantial commitment of time, effort, and resources. Beyond this, publishing video on popular online platforms, like YouTube, is entering an ever-more crowded information marketplace. At the outset, considering the stories and distribution avenues specifically available to research scientists can guide their efforts in media production. In this practical perspective piece, I speak to a scenario of when media production is led or self-produced by a research scientist wanting to communicate their work. I present how research scientists have opportunities and access to stories that are rare among other professionals communicating science online. From disseminating the results of a peer-reviewed research paper, to making media about typically unseen aspects of science, online video is a medium that presents unique opportunities for researchers wanting to communicate their work. It can be a means of expanding the audience for and our own conceptions of scholarly work.

Keywords: science communication, video, YouTube, scholarship, digital media

INTRODUCTION

Ten years ago, in the lab, I caught something unexpected on camera. I was filming an experiment, recording what an ant queen would do when I reintroduced her to a group of her workers who had been separated from the colony. Through the camera's display, I watched the queen brush her antennae against a worker, smelling something she didn't like. She turned, flared her mandibles, and pounced. Biting the back of a worker's head, she held it down and painted the ant with a glandular secretion from her abdomen. This got the other workers' attention. They pulled the two ants apart but didn't let go of the marked worker. They held the worker down, pulling its appendages until they had, literally, torn it limb from limb.

I was shocked, mouth-agape in a moment of discovery. A doctoral student at the time, I was researching behavioral strategies ants use to prevent workers from reproducing. This was a new one. Over the course of the next few months, I filmed and photographed this behavior a lot. I ran experiments to induce it and figure out which chemical mixtures the ants were using. The work became a chapter of my dissertation and was published as a peer-reviewed article (Smith et al., 2012). A selection of the videos ended up published as the paper's supplementary material.

A few years after I published that research, I stopped talking about it in seminars. My research had moved on to other things. Now, the only place you can find this story is in the peer-reviewed paper, behind a paywall. If you were searching for it, you'd need to know a couple things: first, the technical term for this chemical death mark is a "Dufour's gland secretion." Second, the ants I published on don't exist anymore. The taxonomic group received a much-needed revision and the *Aphaenogaster* ants I researched became *Novomessor* ants (Demarco and Cognato, 2015). All this is to say that if you find yourself in the Chihuahuan desert of northern Mexico and the southwestern United States and see these ants, you likely won't know anything about their queen-worker conflict. The drama is playing out six feet underground, hidden from view. Meanwhile, my work telling this story is just as inaccessible, hidden in pay-walled, technical-jargon.

In hindsight, I was the person best-positioned to make sure this research story was accessible to people outside of my group of peer-scientists; accessible to a broad, science-interested public audience. I had an interest in online media production and video in-hand documenting this research. I had access to an institutional press office who could help pitch the story to journalists. And, I had a catchy hook: a newly discovered ant chemical death mark. At the time, I was unaware that all these things could be combined to effectively tell this story, and reach a broad audience.

The proliferation of accessible tools for media-making and self-publishing online platforms such as YouTube offer scientists many opportunities to share their work in new ways. In this perspective article, I address researchers who are interested in using or leading efforts based in online media to communicate their work. I am drawing on personal experience in merging online media production with my own research practice and using online video to help my colleagues share their work. From sharing initial observations to peer-reviewed research findings, I share ways in which online video publishing can be a means of connecting a researcher's work with a wide audience.

Communicating Peer-Reviewed Research With Media-Rich Press Releases

A primary output of academic scientists is the peer-reviewed journal article. Journal articles vet, communicate, and archive findings with our community of peer-scientists. With the open-access movement, video abstracts, and lay summaries, journals have increased the potential for public access into this literature. However, most people, outside of peer-scientists, don't go to a scientific journal to find new science. For most, mass media science news is where science is first encountered. While not every peer-reviewed scientific article will receive news coverage, many research stories can pique public interest. For researchers aiming to connect with a news-reading audience, an understanding of how research makes its way into news media is essential.

The most common sources for science news headlines are press releases. Research press releases summarize findings to reporters who might cover the work. Beyond summarizing,

press releases often include reflections on the research, such as statements of broader impact and motivations that guided the scientists to do the work (Shipman, 2015). Researchers make direct contributions to press releases through the quotes and the media they provide (e.g., still images, video), illustrating the work. Pieces of media and quotes are items that usually appear, largely unchanged, in resultant news articles. In fact, for many online outlets, it has become standard practice to post entire press releases, unchanged, as content (Autzen, 2014; Jarreau, 2014). This transfer of press release content to online news article is a path of media distribution that researchers are uniquely positioned to use. When researchers make and distribute media this way, they can find an opportunity to present themselves and their work to an extraordinarily large audience.

Over the past 5 years, I have produced and distributed 20 press-release associated videos, which have been viewed, in-total, over one million times. The videos are summaries of research papers that I ($n = 7$) and my colleagues ($n = 13$) published and worked with our institutions to issue press releases for. The research topics ranged from paleontology and astrophysics, to my own research on ants. These videos compliment the written release by presenting the research findings and providing the researchers a means of expressing why they feel their work is important (Smith, 2018). The videos range from 2 to 5 min. Most (75%) feature the researcher on-screen speaking about their work. The remainder are narrated in third person. All the videos are co-written by the researchers themselves and approved ahead of release by institutional public relations staff. Before considering the impact of these videos, the role of institutional public relations professionals should be briefly discussed.

Public information officers (PIOs) are central to using press-releases to communicate science. They author the releases and upload them onto distribution sites, such as EurekaAlert, on behalf of their institution. Learning how PIOs choose, translate, and present research stories through press releases is time well spent for researchers interested in mass media science communication (Shipman, 2015).

Within their institutions, PIOs are vastly outnumbered by the researchers they represent. For example, at my university, North Carolina State University, there are a total of four PIOs in our University Communications and Marketing office assigned to communicate the work of over 10,000 researchers (e.g., faculty, post-docs, graduate students, and research staff). Therefore, time-intensive tasks such as video production are more practically achieved when they are led by the researchers themselves or other communication staff.

To distribute all 20 press-release videos I've made, the PIO added a link to a YouTube posting of the video into the body of the press release, preceded by a short statement on the intended use (e.g., "A video presenting the findings of this study, for embedding in articles, is here"). When video file sizes are small enough, they have been uploaded directly into EurekaAlert for previewing. If a reporter covers the work via the press release, they will see an option to embed the video with their article or request the media file to edit or upload onto their site.

Though not every research video and press-release received media attention (11/20 received significant news media

coverage), many outlets that covered the research also used the videos. As a result, total number of plays on my postings is 665,700 as of June 5th, 2020 (median = 6,575; 25% = 2,700; 75% = 25,935). It is worth noting that, at the time, the YouTube channels to which these videos were upload had less than 1,500 subscribers, meaning these views originated from news media embeds rather than an established subscriber audience. In addition to these numbers, many media outlets, both traditional and new (e.g., *Washington Post*; *National Geographic News*; *SciShow*), requested the video files to edit and upload to their own channels. Though viewership numbers from many of those outlets are not public, the ones that are sum to more than the views of my postings of these videos.

Of course, the impact of these communication pieces is not just in number of video views, they can have a positive impact on both the profile of the research papers and the public profiles as scientists. For example, I used a press-release and video to communicate my own natural history work on the predator-prey interactions of two ants from Florida (Smith, 2019a). The research was published in a relatively low impact factor, subject-specialized journal. However, like the queen's chemical death mark research in the introduction, the paper was filled with dramatic behaviors captured on video. The press-release and associated summary video worked to raise the impact of the research, as demonstrated through the paper's associated "Altmetric" data. Altmetric is a service that calculates a score based on the attention that a peer-reviewed article receives online (Adie and Roe, 2013). The score is ranked relative to the other articles from the journal and across all tracked articles. The Altmetric score for this paper is first among all 718 from this journal and is in the top 5% of all 15 million articles ever tracked through the service.

A final example is a press-release video about colleagues' research describing a galaxy with a peculiar double-ring morphology (Pakdil et al., 2017). Like the previous example, the research was published in a subject-specific journal and, through the news coverage generated from the press release, has a top 1% Altmetric score relative to all articles ever tracked. However, the video alone has a large, traceable impact. The video is framed around the excitement the researchers had in making their discovery. It is an interview centered on the first author, Dr. Burçin Mutlu-Pakdil. In the video, Dr. Mutlu-Pakdil not only describes the research finding but relates how she felt doing the research and her excitement in telling her mother about the discovery. The researcher-centered framing of the video is reflected in the title, "Burçin's Galaxy," and the thumbnail (Burçin smiling, holding a picture of the newly discovered galaxy). Our decision to frame and name the video around Burçin, is reflected in subsequent media iterations of this story. A top search result for "Burçin's Galaxy" is Dr. Pakdil's TED talk about this research, which has been viewed millions of times. The first line of the description of the TED video reads: "What's it like to discover a galaxy – and have it named after you?" (TED Conferences, 2020).

Communicating Scientific Observations

The previous section focused on communicating end products of research, however, the beginning points of science can be sources of equally impactful stories. Most view the scientific

method as starting with a new observation or a question to pursue through hypothesis testing or further description. In my research, many projects start with a camera in-hand, trying to document something new, as was the case with the research in the introduction. The excitement that I get from an original observation becomes motivation for pursuing the more monotonous steps of research. I've realized that if my excitement over these initial observations is what keeps *me* engaged in science, sharing that excitement can be a way for others to engage with my work.

Seeing parts of nature in a way few others have is an extraordinary experience that research science provides. Unique experiences happen through access to, and use of, scientific visualization tools (e.g., electron microscope, high-speed video camera, micro-CT scanner), scientific infrastructure (e.g., museum collections, laboratory culturing facilities), and unique environments where science happens (e.g., an isolated field site, or ten feet deep in a pit excavating an ant colony). Documenting these experiences can provide the raw media materials for engaging stories. Framing these experiences in narratives about why we find ourselves in these environments, pursuing these insights, is a way to bring an audience into the process of scientific discovery.

Expanding my scientific process to include media making and storytelling has helped me find new avenues for scholarly impact with material that, in the past, has had none. Many research projects never proceed beyond an initial observation or hypothesis. Factors such as time, cost/funding, or available expertise prevent projects from getting the replication and experimentation they would need for publication. In the past, these projects live on only as preliminary data, archived on a hard drive. Now, when the initial steps of a project involve generating media (still images, video, etc.), I make it a point to collect that media so that it is not only useful for research but also self-publishable in a narrative video on my lab's YouTube channel (Ant Lab, 2020). Doing this, I've seen initial steps of a project reach audiences of hundreds of thousands of people and garner news media attention (Smith, 2019b). More importantly, it has been an effective means of moving my communication efforts more toward a two-way dialogue with an established audience.

Building an audience or subscribership on social media sites, such as YouTube, is key to successfully communicating beyond a bubble of colleagues (e.g., Côté and Darling, 2018). In addition to increasing direct reach, building audience numbers on many social media platforms unlocks tools and account features which allow for more effective engagement and communication. Sharing preliminary observations is an opportunity to build an audience. The frequency at which those stories can be generated, as compared to new papers published, allows for more consistent posting. In addition, focusing on the process of science provides a framework for communicating uncertainty, trial-and-error, and surprise inherent to science. All of these are messages that humanize science, as opposed to portraying science being a set of facts gathered and explained by experts. Humanizing portrayals of scientists can work to build perceptions of warmth and trust (Jarreau et al., 2019), which counter stereotypical concepts of scientists as aloof experts (Fiske and Dupree, 2014).

DISCUSSION

Given the two communication strategies I have presented above, here is what I would do to communicate the research outlined in the introduction. During the article's minor revision stage, I would pitch the story of the discovery of a "queen's chemical death mark" to my PIO, specifying that I would make a video to accompany a press release. I would complete the video ~10 days before the journal's paper's online debut date, allowing time for a PIO review. The PIO would post the release with the video URL "under embargo" on EurekaAlert or a similar service. ("Under embargo" meaning journalists can view the press release days before the paper is first published online, but they cannot publish articles until the embargo is lifted and the journal article is published.) With that, the research would have its best shot at reaching a mass media science news audience.

In addition to the video associated with the press release, I would make a video about the surprising observations associated with this study. That would be an opportunity to focus a narrative on why I was studying this and what further research might reveal. In that video, I would share observations I made during this research that I ended up never pursuing. For instance, I happened to do a chemical analysis of an isolated worker ant which revealed she was producing a near-exact match of a queen's chemical signature. Out of curiosity, I filmed her nestmate workers' response to her. To my surprise, they treated her like a queen. They picked her up, carried her into their colony and set her down on the brood pile, next to the real queen. This observation was never followed up due to time constraints and the need of additional field-collected colonies to repeat the experiment. As of now, it lives as a surprising observation, unseen, and archived on a hard drive for more than a decade.

These two research communication strategies do have some points of caution which researchers should consider. First, copying press-release materials to online media sites as news articles is not journalism. In fact, that practice has its own pejorative term: "churnalism" (Johnston and Forde, 2017). While churnalism abounds online, researchers should not expect all news coverage to only consist of materials and text provided in press releases. With videos, researchers should expect requests for footage so that news outlets can excerpt and edit to fit their stories. Second, with the practice of sharing observation-based narratives, researchers should be aware of how anecdotes work to drive narratives and induce meaning (Dahlstrom,

2014). This is different from deducing meaning and insights via analyzing data sets.

For either of these communication strategies to be successful, we, as researchers using media, must keep ourselves educated on media production and publication practice. Central to video making, academic journal- and self-publishing is copyright. Who owns copyright for research-associated media and what that means for licensing and publishing is specific to institutions, the employment or student status of the researcher, and research funding. Knowing policies for this is essential as many media outlets that request content from researchers will request signed copyright licensing agreements. In addition, media capture and publication formats are constantly evolving, offering new means of visualization. At universities, libraries usually employ digital media specialist who can offer students and staff guidance with these aspects of media-making and publication.

The communication strategies I have outlined are ones specifically available to researchers. Researchers are best positioned to lead efforts in making video summaries to accompany the publication of their peer-reviewed articles. Researchers can also publish first-person video accounts of the unique views of nature their work affords them. Considering this, I view creating both these types of media as part of my primary scholarly output. Producing and self-publishing video has expanded the audience for my scholarly work beyond my peer-scientists. Online video, and audiences it can reach, can offer scientists a new way to define, value, and communicate their work.

DATA AVAILABILITY STATEMENT

All datasets generated for this study are included in the article/supplementary material.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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