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The Scientist–Reporter Collaboration: A Guide to Working with the Press

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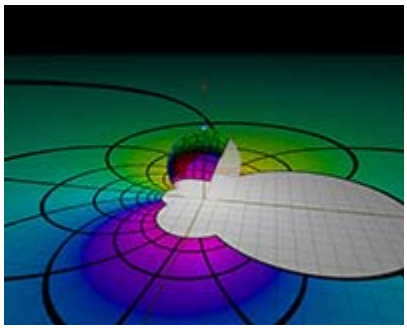

Frame from “Möbius Transformations Revealed,” courtesy of Doug Arnold and Jonathan Rogness. The short video was a winning entry in the 2007 Science and Engineering Visualization Challenge sponsored by the National Science Foundation and Science, and has had millions of viewers on YouTube.

Communicating science, technology, engineering, and mathematics (STEM) to the public can be challenging. Often, the language that researchers use among themselves is technical and difficult for non-experts to decipher. But as you probably know, communicating your research to non-experts is becoming mandatory. In a direct sense, funding agencies often require outreach for grant fulfillment. There are indirect benefits as well: Conveying the joy of discovery and the relevance of scientific results builds scientific literacy among the public---which of course includes both students who will eventually do research of their own and people who elect the policy makers who allocate funding. How many people know that what scientists do can be fun *and* interesting?

Benefits of Working with the Press

A well-crafted message. Working with reporters can help you distill your work to its essence, give you ideas for framing your research that might be useful in lectures, and help you see how your work relates to other research.

Power to reach a broad audience. Reporters have access to platforms that can reach audiences far larger than those for a scientific paper---often by many orders of magnitude. After press publicity, David Hu's YouTube video (Google: fire ant raft) had 2 million viewers; the original journal article has been cited by 25 scientists. Rachel Levy's Grandma Got STEM blog, picked up by boingboing and Slate, drew more than 10,000 viewers in one day. Press coverage can lead to invitations to give scientific lectures and help raise the profile of your home institution. Media coverage can have a dramatic effect on funding, because people (a) become familiar with your work and (b) understand what you do.

Connection to established researchers. Reporters often seek the opinions of highly respected and well-established scientists---colleagues who, for a junior researcher, could be intimidating to approach. We can learn from scientists' interactions with the press, both about the scientists' work and about how they communicate. When we meet a researcher we admire, their press articles can be an icebreaker, giving us a comfortable way to engage them in scientific conversation.

Inspiration for future scientists. Reporters sometimes create STEM-related articles and videos for children. An elegantly told scientific story can inspire the next generation of scientists.

Guiding Principles for Science Communication

The following methods for communicating science are inspired by approaches reporters take. They are great principles for scientists to keep in mind when creating visuals and preparing talks.

Embrace the idea that science is entertaining. "Entertainment" can have a bad rap---the connotation is that the material is necessarily trivial. We would argue the

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opposite: It means that the subject engages you, makes you curious about the world around you, and helps you understand your world better. Strive to be entertaining.

Tune your level of precision to your audience. Figure out a way to be accurate while providing a level of detail that is appropriate to the people you're addressing. In speaking to people outside your field, find a way to relay the meaning of findings rather than the details of your methodology. Find metaphors for your work that make it relatable, and use language that anyone can understand.

Surprise the audience. When you tell a story about your research or a particular finding, structure the ideas with a surprise in mind. In a video, you might do this by setting up a cognitive dissonance between the visuals and the audio. A story that asks viewers to think about the fastest organisms in the animal kingdom might have them envisioning cheetahs or peregrine falcons. If instead they see a small crustacean (a mantis shrimp) or a trap jaw ant, the structure of the story has subverted their expectations. This draws them in and sparks their curiosity.

Take your audience on a trip. Science stories are almost always travel stories---to the most exotic worlds. You can travel inside your own body, shrinking down to immerse yourself in a community of microbes; visit other planets or even other galaxies; go back in time, to when dinosaurs lived or when the universe was created. When you frame a research story this way, it's hard to imagine not wanting to go along for the ride.

Identify the mystery. Questions can be even more fun than answers. And in the pursuit of scientific ideas, you never run out of questions! Help your audience understand how your discovery prompts new questions. Take time to identify and share the mysteries in your own research.

Show that scientists are people too. This will seem obvious to most readers of this article. Yet pop culture representations make mathematicians and scientists alarmingly dopey and one-dimensional. Ugly glasses. White lab coat. Awkward. Narrow-minded. Not to mention usually Caucasian and male. Subvert this notion! Videos are an effective way to convey your personality and passion. If people see you as a relatable human and see first hand your excitement about your work, they will be more likely to be excited about it as well. Being interested in your own work doesn't make it less important or less serious. It offers an inroad for people who may not initially understand why [insert your research topic here] is cool.

Find ways to let people share in your discovery. With more and more researchers using video as data, there's more opportunity to let people see how the applied mathematics sausage is made. That's because the primary tools scientists use to analyze video are tools we all have: our eyes and our brains. If you can provide video data and give your audience enough context to know what to look for, they also can experience the joy of discovery. You may not know how to compose an entire video, but if you provide the pieces and the explanations, reporters and other science communicators can take it from there.

Tips for Visualizing Research Results

Read books on instructional design. The field of instructional design is all about working with a subject matter expert to communicate ideas. In this case you are the subject matter expert; taking advantage of instructional design principles can help make your message more visually appealing and clear.

Shop your ideas with the intended audience. Find people who will take the time to give you constructive feedback about what they understand and what they don't. Try more than one approach and look for the one with the widest appeal.

Consider the interplay between text, pictures, and sound. These elements should complement and reinforce each other. For example, it is not interesting to

listen to someone read from a slide. At the same time, you can't easily listen to a string of words and simultaneously read a different string of words. But you can look at an image and listen to words that describe the image.

Preparing for the Rapid Press Cycle

You want your research to be shared accurately and compellingly. Reporters want the same things, and often have the added constraint of a short turnaround time. When reporters cover your research, you become subject to the same deadlines. Preparation helps, in terms of both thinking through the story of your study and assembling materials---raw images, fact sheets, videos, PDFs of papers, and supplements. Consider the following suggestions for preparing for a reporter's call.

Prepare talking points. Whether for a radio show, a print story, blog post, or tweet, you should be aware of the message you want to convey and be ready to convey it at different levels of detail. Consider not only the question that fascinates you, but also the relevance of the research to the larger field or to the public generally.

Ask for questions in advance of interviews. Reporters often have a sense of the questions they want to ask in an interview and will share them ahead of time. This gives you a chance to think through the best way to communicate your ideas and helps you understand the reporter's intended focus for the story.

Ask for permission to check the quotes before publication. You may not be allowed to read the story before it is published, but most reporters will allow you to review your quotes. It is prudent to arrange for this before the interview; afterward, you should respond right away to confirm your quotes or make any necessary factual corrections.

Work with your institution's public relations staff. Public relations officers can advise you which interviews to accept, help you practice for radio and television interviews, write press releases, and help you create visuals, such as a poster for a conference. Take advantage of these experts: Enlist their help to communicate the importance of your research, ways in which it advances the field and fits into a larger context.

Anticipate misconceptions. Try talking to people who have no knowledge of your work to get a sense of what the public might not intuitively understand. Later, when you present lectures about your work, give interviews, or write articles, you can address the misconceptions before they arise. You can also get a sense of possible misconceptions from the questions you get after a lecture.

Keep a treasure chest. Collect striking, high-resolution color images. When photos can't do the job, try making a few striking videos. The idea is to tell the story with as little printed text as possible. Your students can store a large variety of these images online---a task made easier by digital photography/videography and online storage services. Never delete digital material---a reporter might have some use for it down the road.

Create a template email. The email should contain a PDF of original articles, links to images and video, and a list of knowledgeable outside mathematicians who might wish to discuss your work. Often, that list will grow to include mathematicians who have been sought out by the press to comment on your work.

Be prepared for short turnaround times. It isn't unusual to be asked for an interview or for answers to a set of questions in less than 24 hours. And if your research topic captures the interest of the press, you may get multiple requests at once. The more material you have prepared ahead of time, the easier it will be to take advantage of these opportunities.

Deputize Your Students

Hire undergraduate or high school students. These days, the fastest way to communicate materials to reporters is online, and students often know how to do that efficiently. Tasks include video file conversion (e.g., Zamzar or mpeg streamclip converts all files online for free), uploading of images and videos (Dropbox, wetransfer.com, and Copy.com) and rapid response to messages (Smartphones, Skype). All these technologies will change in time, and undergraduates are likely to stay up to date.

Hire students who care about visual aesthetics. Artists and photographers can be the most helpful, but whatever their background, you need to find students who don't require convincing that a figure or a video should be aesthetically pleasing. Once you are confident about a scientific result, devote as much time as you can afford to produce images that tell the story in as visually appealing a way as possible.

Make a presskit webpage. Making materials for the press available on the web can save you time and help get your research to interested parties. You could include a press release and images or videos, with clear guidelines (such as a Creative Commons license) to the rights of others to use them.

Encourage students to make webpages publicizing themselves and the work. Student webpages encourage them to take ownership of the research and identify themselves online to potential employers. The websites store images and press materials so they can be easily retrieved.

The Interview: How to Talk to Reporters

Talking to a reporter is quite different from giving a scientific talk. The Royal Society's motto, "Nullius in verba," translates to "take nobody's word for it." Just like scientists, reporters are paid to be skeptical and to ask hard questions to arrive at the truth. It is your job as a scientist to convey why you believe that your work is interesting and worthwhile. Science reporters are often already interested in your work, and in communicating it as accurately as possible. The task at hand is to work *with* the reporter to "tell the story."

Reporters are expert communicators. Reporters are trained in the craft of storytelling. For science journalists, the job is to communicate scientific work broadly. They can have useful suggestions on how to present ideas, what kinds of examples to use, and how to get an idea across economically. You can use these ideas in your conference talks or invited lectures, or even incorporate them into journal papers.

Reporters ask terrific questions. With practice, talking to reporters can even be fun! A science reporter might have been thinking about your field as long as you have---but from a different angle. Questions from an interested outsider can lead to deep thinking about the material and the process of distilling the material. Explaining it in different settings---in speaking to a reporter or in writing a journal paper---can bring you closer to your work.

Prepare in advance for the application question. Think about directions your work *might* take and ways it *could* improve understanding of your field or the world (universe?). The work doesn't have to have direct applications, but a possibility, even far down the road, will help the audience see where your work might lead.

Be aware that the reporter may have a particular angle in mind. The reporter won't generally let you read the story ahead of time. But it's within your rights to ask about the focus or angle of the story: You will then have the opportunity to clear up misconceptions about your own research goals or results, or, if asked to comment on another mathematician's work, you will have an idea of how your quote will fit into the story.

Why We Like Scientist–Press Collaborations

By capturing the imagination of the public, media coverage can be a powerful facilitator of research funding. Never before could developments in applied mathematics and science be communicated so rapidly to audiences around the world. Collaborating with the press gives you agency in that process. Working with media also gives you an opportunity to reflect on your research, define and redefine your research style, and provide your audience with a broader appreciation of the wide world of STEM and your place in it.

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