

Scientists: Engage the Public!

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ABSTRACT Scientists must communicate about science with public audiences to promote an understanding of complex issues that we face in our technologically advanced society. Some scientists may be concerned about a social stigma or “Sagan effect” associated with participating in public communication. Recent research in the social sciences indicates that public communication by scientists is not a niche activity but is widely done and can be beneficial to a scientist’s career. There are a variety of approaches that scientists can take to become active in science communication.

Science and technology play important roles in the nature and quality of our lives, so it is not surprising that as a society, we are increasingly challenged by problems that have a scientific component. Individual decisions about vaccines, regional choices about water availability, or global agreements about climate change all require that science have a voice during the decision-making process. The microbial sciences touch upon such a wide range of issues that scientists in those fields are particularly relevant to these discussions. If scientists do not participate in these dialogues, then others will fill the void and the information may not be accurate or science based. Scientists must communicate about science with public audiences in order for members of the public to make informed decisions about the complex issues that face us in our technologically advanced society.

Scientists who participate in outreach activities may do so out of a sense of obligation, for their enjoyment, for their own self-promotion, or for a number of other personal reasons (1, 2). However, many scientists are hesitant to engage the public because they feel that there is a professional penalty for doing outreach. This penalty is sometimes called “Sagan-ization” after the late Carl Sagan, who was a brilliant communicator but who was rumored to have been denied membership to the National Academy of Sciences because he placed too much emphasis on his public career (3, 4). Such anecdotes discourage scientists from communicating with the public. Scientists who participate in outreach often feel isolated, in part because there are few networks for such individuals to connect with each other. But do these anecdotes and individual experiences represent a larger truth or are they red herrings? Science communication research can shed light on the prevalence and motivations of scientists who communicate with public audiences. There is also growing evidence that outreach can positively impact scientists’ careers.

Survey results show that the majority of scientists are communicating with public audiences either directly or through the media. A 2014 Pew Research Center survey of American Association for the Advancement of Science (AAAS) members indicated that 98% of scientists have some level of interaction with public audiences (5), and of these, 86% said that such interactions occurred often or occasionally, indicating that they are not one-off experiences. This conclusion matches results from earlier studies, so it is not a recent phenomenon (6). A 2006 study done by the Royal Society in the United Kingdom found that 74% of scientists surveyed had “take(n) part in at least one science communication or public engagement activity in the past 12 months” (7). A survey of researchers who study microbiology of the built environment in-

dicated that about 75% served as information sources for the public (8).

If so many scientists are communicating with the public, why do the rumors persist that there is a professional price to be paid for not focusing solely on science? There are a number of barriers that can discourage scientists from participating in science outreach. Lack of institutional incentives may be one factor. Public outreach activities are not counted toward the tenure decisions at many universities. This may change in the future with the National Science Foundation’s (NSF’s) increasing emphasis on the broader-impacts (BI) component of grants (<http://www.nsf.gov/od/oia/special/broaderimpacts/>) and the fact that a growing number of institutions are more broadly examining the service component of the tenure decision. Another factor may be that scientists lack resources or their managers do not support outreach activities (7). Other components that influence scientists’ participation in communication activities include career stage and a sense of how well they communicate (9).

The majority of science communication is done by midcareer scientists (5, 7). At this career stage, scientists are well positioned to mitigate many of the barriers to public outreach. Midcareer scientists are the members of promotion and tenure committees, the grant reviewers and the mentors that can make a difference in the acceptance of the importance of scientists participating in science outreach efforts. These scientists are best positioned to encourage participation among their peers and the early-career scientists they mentor.

Participating in science communication activities can benefit a scientist’s career. The results of a study examining the science communication activities at France’s Centre national de la recherche scientifique revealed that scientists who were active in public dissemination published more papers and were more frequently cited in the literature than their peers who did not engage lay audiences (10). Science communication activities were not detrimental for the active scientists’ careers, although the positive effects were weak. Recent work examining the activity of scientists on the social media platform Twitter indicates that those scientists

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can increase their citation rates by participating in social media discussions about science (11). Scientists who are effective public communicators are able to explain their science in a compelling way without jargon, a skill that will be highly beneficial in the era of Team Science. As large groups need to be able to work across disciplines, clear communication is necessary.

There are several concrete steps that scientists can take to participate in or support science communication by scientists.

1. Seek out training in order to increase your effectiveness. There are many organizations that offer a variety of communication training opportunities. For example, there will be several science communication sessions at the upcoming ASM Microbe meeting. Participating in communication training can also be a great confidence booster.
2. Leverage your time and efforts by partnering with organizations that reach audiences you care about in your community.
3. Support your students, employees, and colleagues in their science communication efforts by encouraging them, sharing your experiences, and helping them prioritize these activities.
4. If you are an NSF grantee, then focus your BI work to “Broaden dissemination to enhance scientific and technological understanding.”
5. If available, take advantage of your institution’s BI office to help you form partnerships to broaden your reach.
6. Seek out scientists who communicate with the public and learn how they work.
7. Explore the science communication resources and programs from the scientific societies to which you belong. Groups such as Public Interfaces of the Life Sciences (<http://nas-sites.org/publicinterfaces/#>) also help scientists to find the knowledge and tools to develop public engagement approaches in the life sciences.

It is critical that public audiences understand the microbial sciences. Everyone’s lives are touched in some way by microbes, whether it is making decisions about the health of their family, such as whether to vaccinate, understanding the increasing coverage of the microbiome in the news, or appreciating the impact of marine microbes on our planet’s environment. We encourage you to engage with the public so that they are more informed about your science.

REFERENCES

1. Besley JC, Oh SH, Nisbet M. 2013. Predicting scientists’ participation in public life. *Public Underst Sci* 22:971–987. <http://dx.doi.org/10.1177/0963662512459315>.
2. Dudo A. 2013. Toward a model of scientists’ public communication activity: the case of biomedical researchers. *Sci Commun* 35:476–501. <http://dx.doi.org/10.1177/1075547012460845>.
3. Dean C. 2009. Am I making myself clear? A Scientist’s guide to talking to the public. Harvard University Press, Cambridge, MA.
4. Kennedy D. 2010. Science and the media, p 1–10. *In* Kennedy D, Overholser G (ed), *Science and the media*. American Academy of Arts and Sciences, Cambridge, MA.
5. Rainey L, Funk C, Anderson M. 2015. How scientists engage the public. Pew Research Center, Washington, DC.
6. Pew Research Center. 2009. Public praises science; scientists fault public, media. Pew Research Center, Washington, DC.
7. The Royal Society. 2006. Survey of factors affecting science communication by scientists and engineers. The Royal Society, London, United Kingdom.
8. Kahlor LA, Dudo A, Liang M-, AbiGhannam N. 2015. What are you saying? Challenges and opportunities for increasing visibility and understanding of indoor microbiological research. *Indoor Built Environ* 24: 682–688. <http://dx.doi.org/10.1177/1420326X14531000>.
9. Dunwoody S, Brossard D, Dudo A. 2009. Socialization or rewards? Predicting US scientist-media interactions. *Journal Mass Commun Q* 86: 299–314. <http://dx.doi.org/10.1177/107769900908600203>.
10. Jensen P, Rouquier J, Kreimer P, Croissant Y. 2008. Scientists who engage with society perform better academically. *Sci Public Policy* 35: 527–541. <http://dx.doi.org/10.3152/030234208X329130>.
11. Yeo S, Scheufele D, Brossard D, Xenos M, Brossard D, Xenos M, Nealey P, Corley EA. 2014. Building buzz: (scientists) communicating science in the new media environment. *Journal Mass Commun Q* 91:772–791. <http://dx.doi.org/10.1177/1077699014550092>.