



## How Field Stations Can Shape Public Perception of Science

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Scientists avoid absolutes, and the qualified explanations they offer often frustrate a public hungry for succinct, easily understandable answers. Scientists thrive in the realm of repeated observations and experimentation; and they aim to arrive at circumscribed findings that can be stated with expert authority. But most people live in a world of anecdotes and personal experience, and researchers have learned that people are biased and much more likely to follow their intuition than empirical data or an expert's interpretation of that data, especially when the results contradict what they already believe.

My research focuses on the challenges faced by social and natural scientists in reaching a public that is often uninterested, and sometimes even hostile, to their work. From exploring how scientists are drawing members of the public into their research, to surveying scientists and their allies at the recent Marches for Science, my projects focus on how science is communicated to nonscientists and how citizens can learn to distinguish between empirically supported knowledge and anecdotal information when making decisions.

**Field stations** are research institutions that can help the public gain a better understanding of how science works because they are real-world settings where researchers gather data, perform experiments, and in some cases, interact with the public. They offer opportunities for non-scientists and students to learn from scientists and see science in action. Nonscientists engaged at such stations can gain new knowledge to use in their political and personal decisions – which may result, for example, in citizens better able to promote policies to further environmental health and sustainability. What is more, individuals who begin to think more scientifically about everyday problems empower themselves and their communities to resist exploitation at the hands of interests seeking to manipulate facts.

### Experiencing Science through Informal Learning

Even more directly than most museums, field stations create spaces for scientists to engage with people in hands-on ways. The challenge for the scientists involved is to make their projects relevant and exciting to nonscientist participants, moving beyond preoccupations with jargon-laden talk. For nonscientists, the challenge – and opportunity – is to understand in more practical ways how science can impact their lives and thinking. Field stations can help both scientists and citizens meet these challenges because they often feature experiential, discovery-based activities. Though stations primarily exist to support researchers and their students studying a specific place, they can also provide a space for all ages to participate in field trips, nature hikes, workshops, seminars, and other informal learning activities.

The effectiveness of these experiences for teaching science remains to be more fully explored. But research so far shows that when nonscientists engage with scientists who are in the process of doing science, the nonscientists not only gain an appreciation and insight into the scientific method, but also come to better understand how science impacts their day-to-day lives. This helps to overcome the specialization of much of today's science, which makes it hard for nonscientists to comprehend and use. Further, the more the public is exposed to scientists, the more people are likely to trust scientists and their motives.

### Science and the Health of a Democratic Society

To remain democratic, a country's citizenry needs to be educated enough to know how to choose and support leaders and policies that will protect their health and opportunities for posterity. Natural and social sciences provide critical input by explaining what is happening in the environment and social systems. Elected leaders must serve the interests of all – not just the interests of those with more power or wealth – and citizens need to understand natural and social processes well enough to hold leaders accountable.

Classic examples of public goods are things such as air and sunlight that can be accessed simultaneously by anyone in a society. People do not have to compete for such public good resources and no one can be excluded from them. However, because human activity can decrease the quality of such goods, a properly functioning democratic government seeks to assure clean air and a healthy ozone layer through regulations, ideally guided by scientific findings based on empirical data.

Governments invest heavily in such knowledge and scientists have an obligation to communicate their insights by providing data and findings to the general public. Things can go very awry – for democracy and the environment alike – when distorted or false information overshadows sound, scientifically based information in public debates and public policymaking.

In a period when fake “alternative facts” are widely disseminated and threaten to undermine and crowd out trustworthy information, it becomes especially important for scientists to reach out to citizens who may be critical of their work or not understand it. Scientists must work diligently with the media, schools, and communities to communicate scientific findings with clarity and counter misunderstandings. Establishing field stations and reaching out to draw community members into hands-on project can help scientists become more accessible and credible to people who have not otherwise been interested or willing to learn how science works. If that happens, more citizens may be ready to listen to experts when they speak up about scientific consensus or debate on vital topics ranging from the impact of climate change to the importance of vaccination for children’s health.