

## Science Communication Training: What is Needed for Basic Science and Basic Scientists?

### Synthesis Report of a SciPEP Workshop

This report synthesizes the main ideas that emerged in discussions over a two-day workshop hosted by SciPEP (Science Public Engagement Partnership, of the Department of Energy and The Kavli Foundation) that brought together science communication trainers, scholars, and other experts with the goal of deepening their understanding of the needs and opportunities of basic science communication training. This report aims to further the objectives of this workshop by inspiring effective approaches for basic scientists and others doing, studying, or training basic science communication.

In this report, “basic science communication” refers both to communication by scientists who identify their work as primarily focused on basic research and communication by scientists and other professionals about basic science.

### Motivations for the Workshop

What is needed for effective basic science communication training? Many of the ongoing challenges in science communication training in general are well known: it tends to be focused on skills instead of strategic goals, it is seldom equitable, and it is rarely evaluated. A rich scholarly foundation provides many insights and tactics to address these issues, but primarily in the context of applied science and technology. When it comes to basic science communication, there is very little scholarship or community discussion.

A primary objective of [SciPEP \(the Science Public Engagement Partnership\)](#), a public-private collaboration between the U.S. Department of Energy (DOE) Office of Science and The Kavli Foundation, is to ensure that basic science engagement is supported, sustainable, and effective. The DOE Office of Science and The Kavli Foundation both support communication training for scientists they fund. While the results of the workshop aim to be immediately helpful to these efforts, the conversations are hopefully useful to anyone looking to empower scientists to communicate about basic science.

On May 16 – 17, 2023, the SciPEP leadership team hosted a group of experts at The Kavli Foundation in Los Angeles to discuss what, if anything, may be needed to improve basic

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science communication training. Throughout the workshop, there was an awareness that “basic science communication” encompasses two interrelated aspects:

- equipping any scientist or other professional to communicate about, or in the context of, basic research (also called discovery, curiosity-driven, or foundational research); and
- equipping scientists who identify as doing basic research to communicate broadly about science, including but not limited to basic research.

For both, there are a number of questions about whether special training considerations are needed. Do basic scientists have different motivations or needs to support their science communication activities? Should science communicators use specific frames for communicating about basic research (e.g., curiosity) than they do for applied research (e.g., utility)? How do we encourage connection between basic science and various publics? Do different publics want or expect to connect with basic, discovery research?

The following summary of insights was compiled by SciPEP leadership, informed by workshop conversations. It does not necessarily reflect the views of each participant.

## Unpacking Central Questions:

In exploring the broad questions outlined above, we identified two more concrete avenues of inquiry to help ground conversations throughout the workshop:

- Does a distinction between basic and applied science (or scientists) even matter (and to whom does it matter)?
- Which is more salient: training scientists (and other professionals) to communicate about basic research or training basic scientists to communicate about any area of science or science-related issues?

The focus of the workshop was not to definitively answer these two questions, and workshop attendees did not all agree on potential answers. It was important to raise and discuss these questions as they both provide context and framing for other workshop discussions.

## Basic versus applied science and scientists

Workshop discussions indicated it can be difficult to articulate why basic science (or scientists) did or did not merit unique consideration. Are there instances where basic science (or scientists) require distinct communication tactics? Discussions explored if basic research is more abstract, thus harder to communicate. Discussions also led to questions about whether basic research is more “ivory tower,” causing basic scientists to be less connected to interests and needs of different publics?



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Intentionally unpacking these questions without expectations of clear answers or consensus encouraged attendees to share and consider broad points of view. Notably, the question of whether the distinction between basic and applied science and scientists was particularly salient. This topic was revisited throughout the workshop and some perspectives shifted as a result of the conversations. The following observations were insightful:

- We still have more questions than answers. While research to date affirms that many scientists want to communicate, there is very little research about communicating basic science (Newman, 2021 and Besley, 2021).
- Currently science communication training approaches do not distinguish between basic and applied science or scientists. But the typical emphasis in training is on potential utility (application) of science as the primary form of relevance to publics.
- Anecdotally, those who identify as basic scientists seem to find the typical utility framing ineffective at best and disingenuous or alienating at worst, given that they are not necessarily doing science for an eventual application.
- Anecdotally, when it comes to training, basic scientists seem to need more help articulating and developing strategic science communication practices (such as identifying and aligning goals with target audiences) than scientists whose research is more applied.
- Institutional culture and context inform perspectives on whether (and to what degree) the distinction between basic and applied science needs to be communicated. How and to what extent this impact will manifest remains to be seen.
- Whether a distinction between basic and applied science matters may not be the right question. From a historical lens, the publics' relationship and view of science has never been contingent on this distinction. Currently the distinction seems to matter only in niche contexts, such as trying to secure funding and other types of support for research.
- 'Basic science' as a topic is only one context of the whole story of science. So, perhaps discussions should be reframed as exploring 'communicating *in the context of* basic science.'

Communicating about basic science or basic scientists communicating?

Should discussions about science communication training focus on 'communicating about basic science' or on 'basic scientists communicating?' Is one more important than the other?

Workshop discussions emphasized that basic research is too often left out of science communication efforts. The whole story of science will never be adequately shared if we continue to "ignore" basic science in science communication training. However, it was also

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recognized that scientists' motivations matter, and that if basic scientists are interested in communicating about salient scientific issues, such as addressing climate or vaccine misinformation, should we not provide trainings suited to that purpose? Anyone considering developing science communication tools, resources, or training programs will need to be clear on whether they are addressing one, the other, or both issues.

## Six Considerations for Basic Science Communication Training

Workshop discussions focused broadly on the interrelated themes below.

- Public interest in basic science
- Relevance or connection?
- Scientists' communication motivations and goals
- Common training characteristics, including evaluation, inclusivity, and other core competencies in science communication

For each theme, workshop participants shared data or insight from their experiences and explored whether there are any elements that are distinct or different for basic science or basic scientists. If there is something unique, those elements were discussed and how they should be taken into consideration as we evolve approaches to science communication training was explored.

### Public interest in basic science

Research from ScienceCounts shows that the way basic scientists connect with science may be different than their audiences. Scientists in more basic research fields tend to be "process" driven - they find meaning (joy) in the research process. In contrast, most American publics, as well as scientists in more applied research fields, are "payoff driven" - they associate the benefit of science with a future positive outcome (hope). So, there may be more needed in science communication training to help bridge the gap between scientists who are more process-minded with publics who are more outcomes-minded.

### Relevance or connection?

Often, scientists are encouraged to make their work 'relevant,' with relevance being used as a synonym for utility (and a downstream application). Is relevance only utility? If the answer is yes, what does relevance mean for basic science, which may have no eventual application? If relevance is not only utility, how else can science be "relevant" to audiences? What could the impact of this be on applied science communication? Is "connection" the missing piece in 'making basic science relevant' and what do we need to explore this further?



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While “making connections with your audience” is a fundamental pillar of strategic communication, there are broad differences in how audiences connect with science. What “connecting” means for basic science clearly needs to be unpacked more. Additionally, it remains to be explored how the “payoff” mindset observed in most American publics can relate to the often-used utility framing of science, and transitively what are the implications of this to relevance? While the eventual applications that emerge downstream from basic science may be of interest to some audiences, there is richness in finding the broader spectrum of connection and relevance about basic science by incorporating cultural relevance, connection to curiosity, and more.

## Scientists’ communication motivations and goals

Motivations and goals of basic scientists are not unique, broadly speaking. While basic scientists may prioritize a few key goals more than others (emerging data from Dr. John Besley, Dr. Anthony Dudo, and Dr. Todd Newman), all scientists identify with the same list of potential goals. A possible difference manifests in how those goals are articulated. Many participants who have had experience training scientists felt (anecdotally) that it sometimes took more effort to help scientists who identify as doing basic science to master certain core competencies related to strategic communication (including audience identification and articulating goals). A better understanding of this distinction may support development of additional training materials that specifically help explore effective tactics around basic science communication goals.

## Common training characteristics

Discussions exploring the evergreen training themes of evaluation, inclusivity, and core competencies revealed that in these three areas, as they pertain to communicating basic science, there is likely nothing distinct. There is a great need for more evaluation in science communication training across the board. Ideally, training programs or courses are developed either with an evaluator or with the eventual evaluation in mind, so that strategic goals are clearly defined and assessed. Science communication training programs often reflect and perpetuate inequities found throughout the scientific research enterprise. There is a perception that basic science research, and thereby science communication training, takes place at institutions that are considered perhaps more “ivory tower.” However, the culture, policies, and practices that perpetuate inequities at science institutions, while they may manifest more strongly in basic science, are not unique to basic science. In the context of this workshop, we wanted to know if basic scientists are being excluded. In the context of justice, we need to know who is systematically excluded because of the policies, structures, and rewards systems currently in place for science communication training. There was general agreement that there are core competencies that scientists and other professionals need to develop through science communication training, including strategic goal setting, cultural competency, listening, and empathy. While basic scientists might require distinct tactical skill development (e.g., achieving



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audience connection through curiosity), there appear to be no core communication competencies unique to basic science communication.

## Next Steps for Basic Science Communication Training

A key goal of this workshop was to elucidate concrete ideas to develop and advance basic science communication training. Initially, participants were unsure whether it was necessary to distinguish basic science from applied science (or basic scientists from applied scientists) when discussing communication training. There appeared to be a shift throughout the workshop to a greater sense that basic scientists may need some different kinds of support in certain aspects of communication training than their applied counterparts.

What do we need to do to improve basic science communication training? Dr. Rose Hendricks shared insights from work with Dr. Marissa Fond carrying out qualitative research and interviews with experts in the field about what next steps could look like for supporting basic science communication training. Their work identified priorities for the field at large to address through a series of questions, their rationales, and next steps to take. One example follows and the full report can be found [here](#).

### ***What does the field need to know about the role of training?***

- **Priority:** Determine the elements of training that are necessary and valuable for basic science communicators. Then, champion the programs or elements that provide the most value.
- **Why this is important:** Effective and equitable basic science communication and engagement rely on communicators receiving quality training; however, little is known about what exactly that entails.
- **Recommended next step:** Undertake detailed and thorough evaluations of training programs to better understand what works and what doesn't, for whom, and why.

Workshop discussions explored the pressing needs to assess the science communication ecosystem generally. In addition to the potential next steps laid out in [Basic and Beyond](#), there is already much work being done to evolve, improve, and reflect on the current scicomm training ecosystem. Research!America is working to assess what already exists in the scicomm training landscape. This work could be used to move towards a more desirable and thriving scicomm training ecosystem, shifting from a focus on solely core competencies to a focus on training strategies, tactics, and skills in their appropriate contexts. Additionally, an assessment of the infrastructure of scicomm trainings is also in progress, which would help address a



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variety of questions, including who receives training, when, and who isn't getting included at all.

Workshop discussions shifted from conceptual to concrete when participants were asked 'what three things do you think need to happen to make communication training for basic scientists more effective?'. Over fifty ideas emerged from the subsequent discussion - some ideas were totally distinct, while others were interrelated. Many clustered into the themes of *supply*, *demand*, and *training*. A selection of the responses includes:

- Empower communication professionals to work with basic scientists to build individualized training plans to achieve identified goals.
- Conduct more research and develop a better understanding around how, why, and when non-scientists perceive and connect to basic science.
- Support basic scientists to feel empowered to focus on process over product or forced "relevance."
- Develop evaluation tools that help assess how well various training approaches are at achieving specific goals, for example identifying which tactics can be effective for communicating basic science specifically.
- Understand audiences' values as they relate to how they form attitudes and opinions toward basic science.
- Develop a toolkit with concrete examples that highlight how basic scientists can "connect" their work to their audiences' values.

Additionally, a selection of the many potential areas to further explore was discussed. These areas include:

- **More discussions and tool development about the meanings of relevance, utility, and connection.** This idea was the priority concept that emerged from the workshop. This could also include examining when communications that focus on the process of science are particularly useful to better empower basic scientists to find opportunities that play to their strengths and motivations.
- Many suggestions coalesced around the tenets of *supply* (what is needed for communicators and practitioners to provide greater support to scientists), *demand* (the need to better understand the audiences participating in the engagement), and *training and evaluation* (how can trainings improve to better support basic science communication and how can this impact and intersect with supply and demand).
- **More examples about basic science that can be used in communications trainings** are needed. Currently, the majority of examples used in science communication training tend to focus on applied science, often climate or vaccines. Developing these examples



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may reveal the need for different approaches to help basic scientists master core competencies that appear to be more challenging when communicating in the context of basic science, such as goal setting, finding connection, and more.

- **Continued interrogation of whether and when basic vs. applied is a meaningful distinction** in science communication (or in science as an enterprise, for that matter). Additionally, any conclusions about science communication in areas where there is not a meaningful distinction between basic and applied would be relevant to all science communication.

For more information about other conferences, meetings, and papers by, or supported by SciPEP, visit [scipep.org](http://scipep.org).



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## Appendix: Workshop Participants

*This summary was developed by the SciPEP team and does not necessarily reflect the views of all those listed.*

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