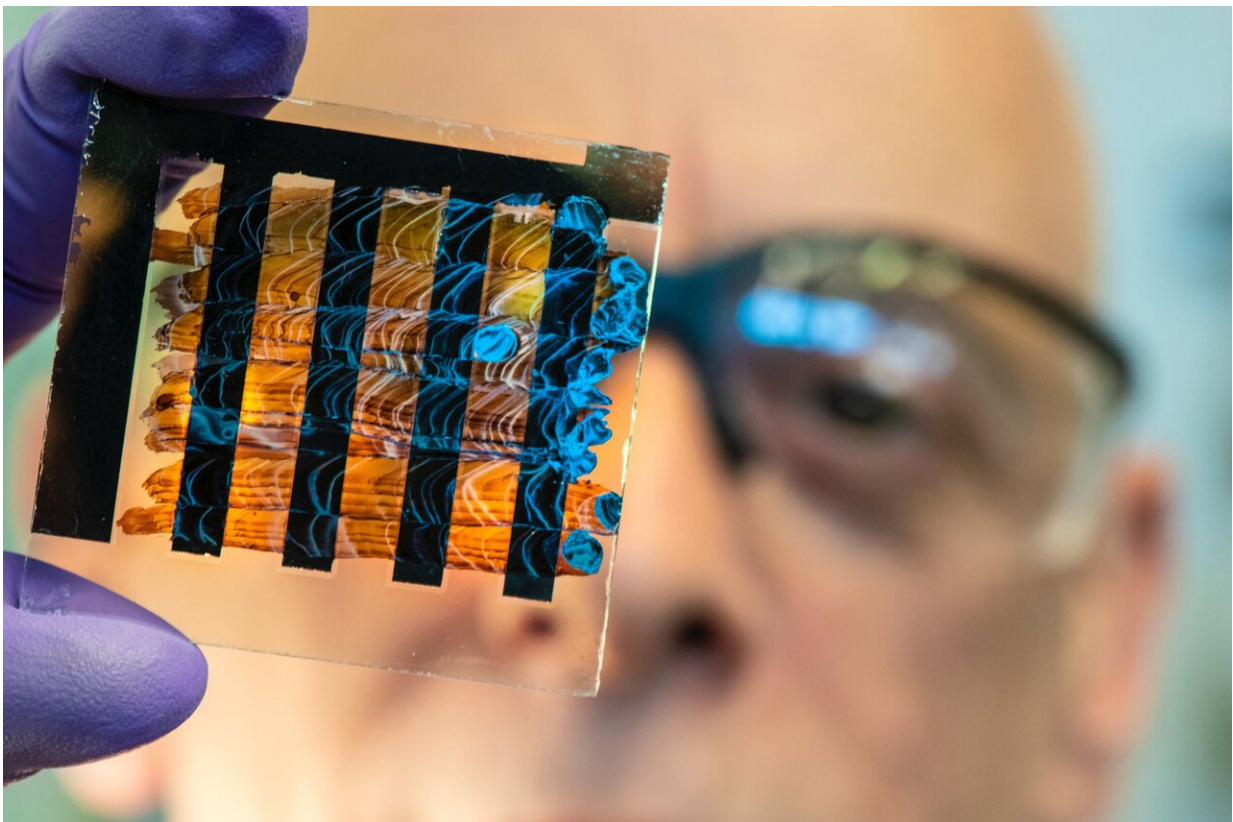


Five golden rules for effective science communication: Perspectives from a documentary maker

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Over the past three years, people from all walks of life have learned a great deal about different branches of science. The COVID-19 pandemic

introduced many of us to information about virology and vaccine production. Environmental disasters in every part of the world have brought concepts from meteorology and climatology to daily news reports.

In general, [people trust scientists](#) more than they do most other professions. But this isn't the case universally. Trust in science [dropped in sub-Saharan Africa after the pandemic](#). In other parts of the world, in particular the US, public opinion about science is driven by political ideology and is becoming [increasingly polarized](#).

As multi award-winning Australian filmmaker [Sonya Pemberton](#) put it during a plenary address at the [2023 Public Communication of Science and Technology Conference](#): "We have access to so much information, and yet simultaneously some areas of science are facing walls of doubt, disbelief and distrust."

So what's the solution? Communication, Pemberton told attendees at the conference, held in April in Rotterdam, in the Netherlands: "As science communicators we can help shape the conversations, the attitudes, and perhaps even help shape bits of our future."

Her assertion, and her approach to making films, is rooted in evidence from science communication research. To build trust with an audience, scientists must demonstrate that they are competent experts. But they must also come across as [warm, caring and human](#).

Pemberton—and we, a group of South African science communication academics who attended the conference—are part of a global movement in our discipline towards using [the science of science communication](#). In essence, this is about building our science engagement efforts on evidence, rather than on a gut feeling.

Pemberton has one guiding principle: know your [audience](#). She also has five golden rules for effective science communication:

- acknowledge uncertainty
- avoid polarizing messages
- check for biases
- incite curiosity
- embrace complexity.

Here's why she swears by these rules—and why anyone looking to communicate effectively about science with various audiences should consider doing the same.

Evidence-based science filmmaking

Some of the themes of Pemberton's films, produced by Genepool Productions, include cancer-causing infections, concerns and misconceptions around vaccinations and [climate change](#), investigating vitamins and dietary supplements, and a real-time journey through Australia's pandemic experience.

These topics, she said during her conference address, are "surrounded by a plethora of facts, figures, claims and counterclaims, resulting in increased polarization among people."

Early in her career, Pemberton realized a mighty challenge of science communication: often, science is communicated in a way that speaks primarily to other people who enjoy, appreciate or seek out science.

That's where her five rules come in. They are the way, she believes, to engage those who dislike, distrust or dismiss science. Her approach draws on the Yale University-based Cultural Cognition project, which involves an interdisciplinary team of scholars [using what they call](#)

"empirical methods to examine the impact of group values on perceptions of risk and related facts."

1. Acknowledge uncertainty

Sometimes scientists are wrong. It is not that they are lying or covering things up. They are simply sharing the best information they have at the time. But things change and new knowledge is added bit by bit.

Therefore, it is crucial to acknowledge the [uncertainty](#) and risk that science may hold.

Being open and transparent about uncertainty [increases audience trust](#) in science. An example of this is a story about a valid vaccine injury which Pemberton included in a 2013 documentary called [Jabbed—Love, Fear and Vaccines](#).

2. Avoid polarizing messages

There are as many pro-vaccine films as there anti-vaccine films. People generally watch the films that match their views. Many people are neither "pro" nor "anti" but rather [somewhere in the middle](#), along a wide spectrum of views. They may have [valid reasons for being hesitant or uncertain](#) about getting a vaccine, such as fear of side-effects and not trusting the government to deliver vaccines safely.

Science communicators should never signal that they are taking sides in a debate. This will only strengthen the "us versus them" rhetoric that leads to polarization and confrontation. Instead, it works well to deliberately (and respectfully) include different views, and to look for [shared values](#) and common ground.

3. Check for biases—especially your own

"I am deeply interested in exploring the intersections between 'what we know' and 'what we believe,'" Pemberton explained. This is linked to her third rule: science communicators should [confront their own biases and belief systems](#).

Everyone, including scientists and science communicators, interprets new information through the lens of their own identities and lived experiences. So, when people don't agree with us, it does not mean that they are ignorant or ill-informed. They simply interpret the information through the lens of their own identities. If you ridicule someone who has a different point of view, it becomes impossible to have a meaningful conversation.

4. Incite curiosity with stories and emotions

The more facts and data that science communicators throw at people—especially information that challenges their world views—the more likely they will back into their bunkers and eventually shut down. Instead of burdening an audience with cold, hard facts, expert communicators learn how to use the power of science [storytelling](#) to captivate attention, and [to evoke wonder and curiosity](#).

In Pemberton's film [Carbon: The Unauthorised Biography \(2022\)](#), Sarah Snook (who acted in the TV series Succession) is the voice of carbon. She narrates a first-person account of the story of carbon, starting with her birth during a star explosion and following her adventures in the universe. This documentary includes animations and an orchestral score to produce a fresh and compelling perspective on this life-giving element.

5. Embrace complexity

Science communicators should [acknowledge the complexity](#) of communicating science, and that it can be a challenging and contested space. Pemberton says that fear of scientific topics is good; it is what [science](#) communicators do with that fear that matters.

Once communicators understand why people feel anxious, fearful, angry or detached, those insights can be used to make messages that are relevant to them.

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