

## Why public engagement is important for neuroscientists

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**[Au: Please add a short Standfirst at the start of the piece. This should be 50 words maximum and should provide the key take home message or call to arms of the piece ]**

Public interest in science is the reason that Albermarle Street became the first one-way street in London [Au:OK? I have suggested this to ensure that there is a direct connection to the main topic of the piece from the outset]. [The Royal Institution](#), located at its northern end, opened in 1799 as an institute devoted to scientific research and scientific outreach. The many public events hosted there — including Michael Faraday’s demonstration of the principles of electromagnetism — were so popular that the street traffic outside the institute had to be restricted. As this story makes clear, science communication has long met with great public interest (correlating in Albermarle Street with an increase in traffic). Nevertheless, scientists can underestimate the interest of the wider community in our world, perhaps finding it comforting to imagine that our science is just too difficult for other people to really understand. For Michael Faraday, however, communicating science was part of scientific research. I feel strongly that neuroscientists today should reembrace Faraday’s example, by making science communication and public engagement part of our neuroscientific work. [Au:OK? As well as shortening and rearranging the text in this opening section I’ve suggested ending with this specific ‘call to action’]

Several imperatives that may motivate us to undertake public engagement. If our work is funded by public or charitable organizations, there are arguably strong moral reasons to do so and it’s also the case that many funders require us to have plans for public engagement. In addition to these drivers, I find that public engagement work is both immensely rewarding — it’s thrilling when someone finds your work exciting — and has a number of other advantages. [Au:OK? Or similar, to lead into the next few paragraphs that provide a description of some of these advantages of advantages?].

Public engagement provides an opportunity to involve the whole lab and thus to demonstrate the diversity of scientists. This is essential: research over many decades shows that school children asked to draw ‘a scientist’ still draw older white men in lab coats, with this bias becoming stronger in older children<sup>1</sup> and robust in many adults<sup>2</sup>. Providing a more realistic impression of the different people who work in science can help to shift these stubborn stereotypes: an international study found that there are fewer such stereotypes in countries where more females were enrolled in some form of tertiary education<sup>2</sup>.

Scientific communication can also inspire future scientists. Watching the Royal Institution Christmas lectures in 1977, when Carl Sagan spoke about the solar system, my imagination was captured by the idea that scientific research was an ongoing project. Now, I am no

astrophysicist, and Carl Sagan wasn't looking to promote scientific careers in cognitive neuroscience, but this example shows that you can never know who you might inspire when you carry out public engagement work.

Public engagement work also can (and should be) a way to increase our own communication skills, which can have positive effects on all our scientific endeavors — although scientists may not think of ourselves professional communicators, our work relies on our ability to communicate our findings. Public engagement can also widen our networks and the range of our potential collaborators, both of which are critical aspects of any scientific career.

**[Au: We wondered whether you could discuss the possibility that public engagement might influence a scientist's thinking about their own work/ the direction of research – if you have ever had an interaction that had this effect it might be interesting to briefly describe it here.]**

What counts as public engagement? Ideally, it has some element of interaction or conversation. Using social media can be a great way to start, as you can decide what kinds of engagements to look for and have some genuinely interesting conversations. Social media can also be an excellent way to promote your work and to continue discussions begun in person. Science fairs require more planning but can allow for exceptionally good public engagement and also enable capacity to be built, with a wider group of people becoming involved and receiving training and experience. For example, I have run 'Summer Science' exhibitions at the [Royal Society](#) in London that were staffed by my colleagues and collaborators, but also by other students from our institute as well as members of the professional services team: why should the senior scientists get to have all the fun?

There are other (slightly more terrifying) kinds of public engagement. For example, University College London runs stand up comedy nights where all the performers (except for the MC and the headline comedian) are staff and students. Although the first time that I took part I was so anxious that I considered simply locking myself in the lavatory, the experience was immensely rewarding: when I finished my set I wanted to do it again, and better. I have found comedy to be an effective way of improving both confidence and communication skills and it has led to other opportunities, including the chance to present a [TED talk](#) in 2015 and the Royal Institution Christmas Lectures in 2017.

Stand up comedy has also made me conscious of the ways that we work with audiences when we are taking part in public engagement. Common advice for those developing a science fair exhibit is to have three key messages that guide both the exhibit layout and the activities that you develop to enable discussions. This can be extended to all science communication work: it is important to consider what your key messages are and what you want people to take away from your engagement activities. The other key lesson from comedy is evaluation. Many professional comedians record their sets to work out which jokes work and which do not and similar evaluation activities are essential for public engagement work: get feedback on what people liked, what they valued, what they were hoping to see and what they thought could be better — and use that feedback to improve your own activities.

**[Au: Following on from this, we wondered whether it might be helpful to briefly discuss how public engagement activities are typically funded and whether/ how such feedback might also be used to examine whether the activities are delivering value for money?]**

Thinking about public engagement also means we need to confront our own biases<sup>3</sup>. In 1991 Carl Sagan was nominated for membership of the US National Academy of Sciences but not elected. Despite his excellent scientific profile, it has been suggested that his outstanding work in science communication may have counted against him<sup>4</sup>. Fifteen years later, the Royal Society found that academics considered that public engagement was done by “those who are not good enough for an academic career” **[Au: Please confirm that this is a direct quote from this paper]**<sup>5</sup>. These biases have since been shown to be unfounded: a French study discovered that those who did more public engagement work were also more active academically<sup>6</sup>. Nevertheless, there are reported to be three criteria that must be met before scientists judge public engagement work by colleagues to be ‘acceptable’<sup>7</sup>: the scientific work has to be reputable, the scientist needs to be senior and the public exposure must not be initiated by the scientist. Thus, the scientists with the least recent **[Au:OK?]** experience of actually doing hands on research and those that are the least interested in doing so **[Au:OK?]** are the only ones that other scientists will ‘permit’ to do public engagement<sup>3</sup> — the very opposite of what public engagement should be.

As these examples show, increasing the ways that we value and engage with public facing activities has the potential to reduce bias in scientists, as well as in the wider population. **[Au: would it be possible to comment here on some practical ways in which these activities might be valued/ rewarded in order to achieve this aim (for example, are there any ways in which they might be better recognized in hiring/tenure decisions)?]**

1. Miller DI, Nolla KM, Eagly AH, Uttal SH (2018) *The Development of Children's Gender-Science Stereotypes: A Meta-analysis of 5 Decades of U.S. Draw-A-Scientist Studies*. *Child Development*, 89(6), 1943-1955.
2. Miller, D. I., Eagly, A. H., & Linn, M. C. (2015). *Women's representation in science predicts national gender-science stereotypes: Evidence from 66 nations*. *Journal of Educational Psychology*, 107(3), 631–644.
3. Martinez-Conde S (2016) *Has Contemporary Academia Outgrown the Carl Sagan Effect?* *Journal of Neuroscience*, 36 (7) 2077-2082.
4. Davidson K (1999) *Carl Sagan: a life* (Wiley, New York).
5. Royal Society (2006) *Factors affecting science communication: a survey of scientists and engineers, 2006* (The Royal Society, London).
6. Jensen P, Rouquier JB, Kreimer P, Croissant Y (2008) *Scientists who engage with society perform better academically*. *Sci Public Policy* 35:527–541
7. Rödder S (2012) *The sciences' media connection—public communication and its repercussions, The ambivalence of visible scientists* (Springer, Heidelberg), pp 155–177

The author declares no competing interests.

**Related links [Au: If there is space on the page, we can include these – if not they will be removed]**

The Royal Institution: <https://www.rigb.org/>

The Royal Society: <https://royalsociety.org/>

TED talks: <https://www.ted.com/talks>