

How to make a new nose when it is off entirely and the dog has eaten it: the Lab Tales workshop as an approach to teach biomaterials trainees the art of narrative storytelling in science

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Introduction: Public support for—and understanding of—science is crucial for modern society, yet scientists receive no formal training on how to effectively communicate their science to the public. However, common complaints heard from both trainees and faculty alike are: (a) *my work is boring; the public won't care*; (b) *my work is too complicated to explain to the public*. These issues can be addressed by changing the communication strategy. The key problem is that science communication is fundamentally difficult. What works with one demographic may fail with another. However, storytelling as a communication strategy transcends demographic boundaries because we find narratives memorable, engaging, and relatable. This makes storytelling a powerful tool to reach a diverse audience, including underserved communities. To better harness this interest, I now run a yearly, NSF-funded summer workshop on science storytelling in collaboration with The Odd Salon, a non-profit outreach group I help co-produce dedicated to community-building through storytelling, and the Council on Science and Technology (CST) at Princeton University.

Materials and Methods: We ran our first workshop in the summer of 2021 over 3 days, and expanded our 2022 workshop to 5 days. The workshop structure covers a wide range of topics related to formal storytelling including: narrative arc theory; performing science history research to ‘find the human stories behind the research’; gauging an audience; and stagecraft. The workshop culminated in all students creating and presenting a 10 minute narrative science story on their topics of choice to the workshop.

Results: We are still compiling the pedagogical results of our second workshop, but we had to cap enrollment at 20 students with significantly more applicants on the waitlist, but our preliminary data are promising and the following summarize some key intake/exit survey results where students ranked comfort on a 1 (poor) – 5 (good) scale.

1. **Trainees felt more confidence presenting their work to broad audiences.** Prior to the workshop, 25% of trainees felt confident (ranking of 4-5) presenting to broad audiences, while 87.5% of trainees felt confident, and this included first and second year graduate students.
2. **Improved understanding of storytelling as a tool to describe their own research.** Prior to the workshop, only 17% of trainees felt they understood stories as a tool (4-5), while 81% felt confident in using storytelling after the workshop. This change was even more drastic when we surveyed trainees for how well they understood narrative structures (3-act arc, etc.).

Here, 0% of students (4-5) expressed awareness of narrative structures pre-workshop, while 79% felt confident (4-5) in using narrative post-workshop.

3. **Becoming aware of the history of their fields.** A major goal was to improve fluency in understanding how society got to where it is now, and how the research we perform does not spring into being *de novo*, but has a long, often millenia-old history. 42% ranked their comfort as 3-5 pre-workshop and 80% ranked a 3-5 post-workshop, with the greatest change being in the ‘3/5’ category, suggesting students would benefit from more time and training to develop historical narratives within the workshop itself.
4. **Public engagement.** All students expressed an interest to present at several of our public venues post-covid, and we hope to organize a series of shows through Odd Salon New York to showcase their stories. Additionally, we are working with the CST to start a podcast and local community lecture series to provide more avenues for engagement.

Figure 1: Image Tagliacozzi’s *De Curtorum* (1591) showing the “Italian Method” for nasal reconstruction, which was actually (and inadvertently) stolen from an inferior to an Indian technique invented ~2000 years prior.



Biomaterials Case Study: A key component of this workshop is a demonstration I give of a 10 minute talk on the ‘secret history’ of biomaterials, which spans: inadvertent, Western ‘whitewashing’ of the Indian origins, a 1400s manuscript titled “*How to make a new nose for someone when it is off entirely and the dog has eaten it*”, swords duels as a public health crisis, the Spanish Inquisition, and industrial espionage and ultimately helps to explain why we think the way we do about key aspects of biomaterials and regenerative medicine today. I will highlight this case study as part of this abstract and presentation.

Conclusions: Training students in narrative theory and science history can improve trainee confidence in presenting their own work to a broader audience. In addition to running this workshop each summer, we are hoping to find a way to present a condensed version of it at major society meetings to reach a broader audience.