Scientist as Storyteller

How to Give an Effective Science Talk

Eloise A Marais

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Why Communicate Science Effectively

Convey relevance of your research.

Why is what you do important? What do you do all day in the lab?

Increase impact of your research.

Communicating your research to potential end users in an accessible way increases its application beyond scientific discovery.

Inspire next generation of scientists.

If we explain concepts, ideas, findings clearly and enthusiastically, we increase appeal and passion to pursue a career in science.

Curtail misinformation.

Miscommunication has consequences.

Now more than ever, we need to be able to tell the public about our science to curtail fake news.

Provide the public with all information needed to make informed decisions.

Funding.

If funding agencies and grant reviewers don't understand your research, you won't get funded.

Typical Science Presentations

Elevator Pitch (< 5 min).

Typically used to inspire further discussion, invest in your research, identify opportunities for collaboration. Focus on research findings and impact. (2-3 slides).

Conference (15-30 min).

New research to garner interest, get feedback from the audience, motivate discussions that may pre-empt reviewer comments or concerns in the peer-review process. (1 slide per minute).

Research Seminar (1 h).

New research with published research sprinkled in the introduction to advertise what you've done previously. (1 slide every 2 minutes).

Funding Interview (variable).

High variable content requirements. Often a project plan demonstrating that the project is feasible and you are the most suitable candidate to take it forward.

Celebration Talk (1 h).

Broad and very accessible to a diverse audience. Dominated by published work and the contribution it has made to advancing science and its impact on society.

You: The Storyteller

Know Your Audience.

Your audience determines what material to present, what material to avoid, and how much background to provide.

Prepare your talk for the lowest common denominator (e.g. Master's or 1st year graduate student, or researchers outside the field).

Remember, you've been working on this topic for months or years, but for most of your audience this is the first time they are interacting with the topic.

Tell A Story.

The presentation should have the structure of a captivating story:

- Setting the scene (background)
- The buildup (materials and methods)
- The climax (results: moment of revelation)
- The denouement (final outcome, relevance and impact)

Show enthusiasm.

Enthusiasm is infectious. If you're not excited about the topic, your audience certainly won't be.

You: The Storyteller

Body Language.

Convey enthusiasm. Face (make eye contact with) the audience, not the screen.

Practice Makes Better.

Practice your talk at least once before presenting to keep on time, reduce nerves on the day, gain familiarity with the content, and ensure the talk has flow and cohesion.

Video record yourself and play it back to critique your presentations and improve.

Command the stage.

Scientists are generally polite about not asking questions during talks. But, if you do encounter someone who does and it stands in the way of you finishing on time, take control by suggesting that you continue the discussion later.

Keep on Time.

Stick to the time limit. Practicing the talk beforehand prevents this.

Nerves.

Inevitable! Let nerves work for you.

Laser Pointer.

Only use to direct the audience's attention. Overuse is distracting.

Answering Questions

- This is a skill that develops with practice, so take advantage of every opportunity to present your research.
- Know your topic well to avoid the embarrassment of saying “I hadn’t thought of that!”
- When asked a questions thank the audience member for the question.
- If you’re not quite sure what an audience member is asking or the rest of the audience may not have heard the question, repeat the question before answering. This also gives you time to think through a coherent answer.
- Avoid fumbling through an answer if you don’t have one. Your audience can see through this.
- Keep answers brief and on topic so that there’s time for more questions.

Slides

General Best Practices:

- **Less is more**. Keep slides simple to convey the main message.
- Use a plain **background**. Avoid Microsoft slide templates.
- Keep **text** to a minimum and only use when absolutely necessary.
- Avoid **bullet points** (unlike this talk!). Scientists salivate when they see images (time series, maps, scatter plots etc.)
- Use 18+ **font size** for text (sometimes need to use smaller font size for figures).
- Use Arial-equivalent **font types**. Avoid decorative fonts (e.g. Times New Roman).
- **Animations** are fine, but keep to a minimum. These are distracting and frustrate the audience.
- **Videos** can be effective, but be prepared for the possibility that these don't work. Have a plan B, which may just involve you taking the audience through what they would have seen.
- Each slide must **deliver a message** and the message must be clear (final line on the slide or title of the slide).
- **Know everything** you've added to the slide. Anticipate questions from the audience and be ready to answer them.
- **Acknowledge** sources and contributors.
- Don't **read** your slides. Know what's on your slide (why practicing is so important).

Slides

Title Slide:

- Introduces you and your talk to the audience, so include the talk title, your name and contact details, names of contributors, and a catchy image.
- Opportunity to also thank the chair for inviting you (if this is an invited talk).

Introduction/Background:

- Provide the audience with a broad, accessible and comprehensive introduction. In seminars and long-form conference presentations (30 min) the introduction should be 30-40% of your talk.
- Convey why your work is important. Remember, you are all doing important work. This is where you convey to the audience why it's important!
- Opportunity to provide the audience with all the information needed to follow your talk. You may have been working on this topic for months or years, but this may be the first time your audience is interacting with the topic. Make sure that they at least follow the introduction.
- Use to demonstrate that your work is contributing to scientific knowledge (expose knowledge gaps that motivate your work).

Slides

Research Slides:

- Make clear what's the main message of each slide. What is the key outcome of your analysis?
- Avoid broad-brush phrases like "the model performs well", "concentrations are very high". Put your work in context that the audience can understand. Instead "the model has a bias of less than 10%, and so the new mechanism addresses the factor of 2 model bias highlighted by Author et al.", or "the concentrations far exceed levels safe for human health".

Images/Figures:

- Must be clear and uncluttered. Audience shouldn't be left to wonder what each color/line is, what the units are, what data is shown. Often it helps to use the laser pointer to take the audience through elements of images you want to highlight.
- If comparing observations and a model, acknowledge contributors that provided the observations (verbally and on the slide). This demonstrates collegiality and that science is a team effort.
- Label everything clearly (axes, figure header, legend).

Slides

Conclusion Slide:

- This can just be a bullet point list of take-home messages that you leave for the audience to read at the end of your talk. It's not always necessary to take the audience through each one. This can be laborious and dull.
- For PhD students often this can instead be a list of work/analysis still to be done.
- Some presenters use this to acknowledge funders and/or members of their research group (PhD students/postdocs) who did the analysis.

*Save your presentation as a **PDF** if there are no videos. This mitigates PC and mac formatting issues.*

You: The Audience

Often a sign of a successful presentation is if the audience asks questions!

Engage.

You're not watching a movie. It's a privilege to have a scientist share their research with you. Make them feel welcome.

Don't open your laptop and check your phone during a talk. That's rude! This is only okay at large meetings. If you want to look something up, note it down and do it later.

Ask Questions.

A question is not an indicator of ignorance, but of curiosity.

PhD students and postdocs that ask questions at conferences get noticed!

Keep questions brief, clear, and concise.

Asking questions can be intimidating. Write it down during the talk. This is helpful to formulate the question more clearly.

Assess Others.

Scrutinize the quality of presentations by other scientists to learn how to give an effective presentation, and what not to avoid. This includes fellow PhD students, early career scientists, your supervisor(s), well-established scientists.

Resources

Listen.

Podcasts: Science Magazine, Nature Magazine, Science…sort of, Hidden Brain, You're The Expert, Radiolab, StarTalk.

Read.

Science Magazine and Nature Magazine opinion and discussion pieces, and blogs posts (subscribe to their mailing list).

Science/Nature books written for the public.

Watch.

Science documentaries and interviews. Cosmos, Blue Planet, Planet Earth. PBS and BBC have great, accessible science specials.

Discuss.

Take opportunities to discuss your research with your PhD colleagues, friends, family (possibly your most critical audience!).

Resources

If I understood you, would I have this look on my face? Book on communicating science by Alan Alda

The Alda Centre for Communicating Science: https://www.aldacenter.org/

COMPASS: https://www.compasscicomm.org/who-we-are

Tips and pointers by Daniel Jacob (Harvard):
http://acmg.seas.harvard.edu/presentations/2006/gsf_presentation.ppt
http://acmg.seas.harvard.edu/presentations/2016/presentation_tips.ppt

How to give a dynamic scientific presentation:
https://www.elsevier.com/connect/how-to-give-a-dynamic-scientific-presentation

Steven Crammer's presentations guides (Harvard-Smithsonian):
https://www.cfa.harvard.edu/~scranmer/cranmer_htgat.html

Nature blog on scientific presentations:
http://blogs.nature.com/naturejobs/2017/01/11/scientific-presentations-a-cheat-sheet/