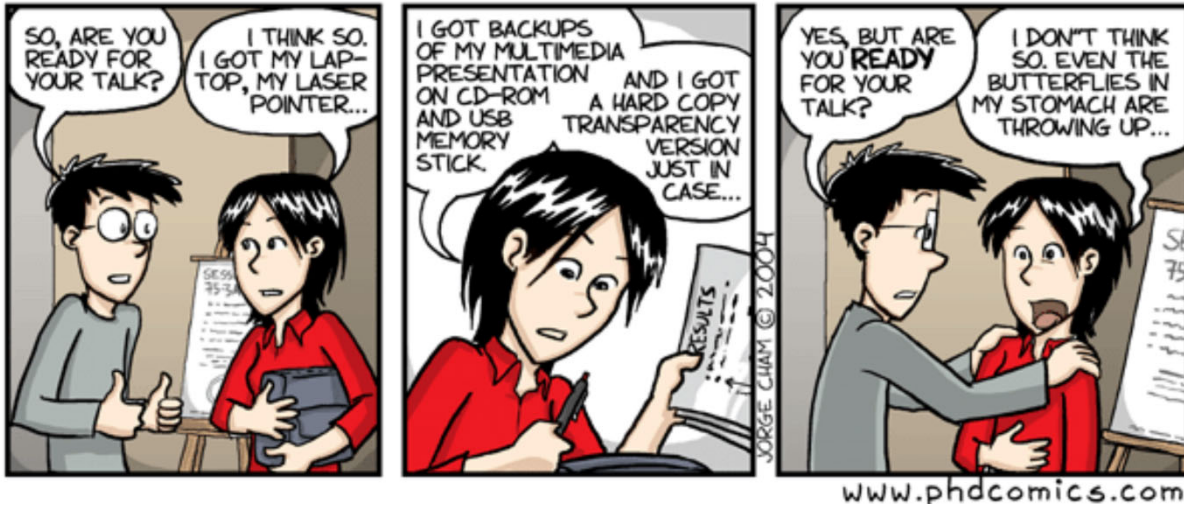


Tips for giving a good scientific talk:

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Goal: educate your audience about a scientific result (often yours).



Planning your talk

1. Tell a story, excite your audience.

A talk is not simply a recitation of results and methods.

2. Use structure

a. *Introduction*

What is the problem? Motivate the audience to get excited about the problem to be solved. Should be general, why should a biochemist or biologists care, not specific to a sub-specialty.

b. *Methods*

What methods were needed to solve the problem, focusing on the innovation brought in the research presented. Even within a section, structure is important. Nothing is worse than a rambling collection of

slides. As you enter and leave each section or sub-section of a talk, it is good to summarize when the talk is longer (25-60 min). You could say “for this experiment, we had to integrate three key advances. Have a slide per advance, and then end the section, saying “now we have the critical infrastructure for the experiments to investigate...” Repetition is good. Your audience will space out at various times, trying to bring them back in is helpful.

c. *Results*

Work through the logic of the argument, don't just throw up raw data.

d. *Discussion & Conclusions*

What has the field learned, perhaps address next steps or new research enabled.

3. A talk is not a mystery.

One successful strategy is to give the main result to motivate listening to some of the details before revisiting the key results and expanding upon them

4. Slides with large graphics and minimal text

-Once concept per slide

-Don't write out full sentences

-Maximum 3-4 bullet points with 3-6 words

-Note, you are not going to read your slides like a text from a paper, you are going to *present* the research.

-Bullet points highlight a key concept. Your talking will expound on that point and fill it in. Preparing slides like this takes time and is harder for the speaker but much better for the audience. They will be very grateful. The audience does not want to be read a paragraph or a figure caption from a paper.

5. Keep slide content minimal and readable. Clarity is paramount.

- Don't use fancy power point backgrounds and especially not ones with water-mark like graphics.
- Consistent formatting helps audience, speeds up slide preparation.
- Avoid bad color combinations (blue and red on black, yellow on white).

6. Color can improve readability and telegraph importance of text

- I find all text in one color is boring. For example, in my slides, I use black for title (28 pt), blue for bullet point (24 pt), green for technical details in sub-bullet point.

7. Slide title should be the key takeaway point of slide and short.

- Personally, I limit my slide title to one line. This takes lots of wordsmithing. I often start with a long title and refine.
- Bad titles include "Data" or "Gel analysis"
- Exceptions for "Outline" and "Summary"

8. Timing: one slide every 2-3 minutes for teaching.

You should plan for 60 min presentation and 15 min of questions. In a research talk at a scientific conference, no more than 1 slide every min. That means 20-25 slides for the papers you will be presenting. Using the standard format above, you can start to determine how many slides you will need for each major section (Introduction, Methods, Results, Discussion and conclusion).

9. Use animations to build complexity on a slide.

- If the science point needs a fair amount of information, sequence in the elements as you need them.

-You can overwhelm audience with too much information. If the slide is dense, the audience will be reading your slide rather than listening to you.

-Avoid PowerPoints more whimsical animations They will distract from the science being presented. Rather, focus on sharpening the logic and language of your presentation.

10. Good clear graphics matter.

-When presenting others work, you may need to present the results panel by panel for clarity from the back of the room. Using animations to make things come and go can help. This takes more time, but is much easier on your audience.

-If you are not talking about elements of a graphic, make it go away. I will make a small white box and group it with the graphic. This isn't an inappropriate figure manipulation to take a figure down to its key elements. What is best in a scientific paper may not be best in a scientific presentation.

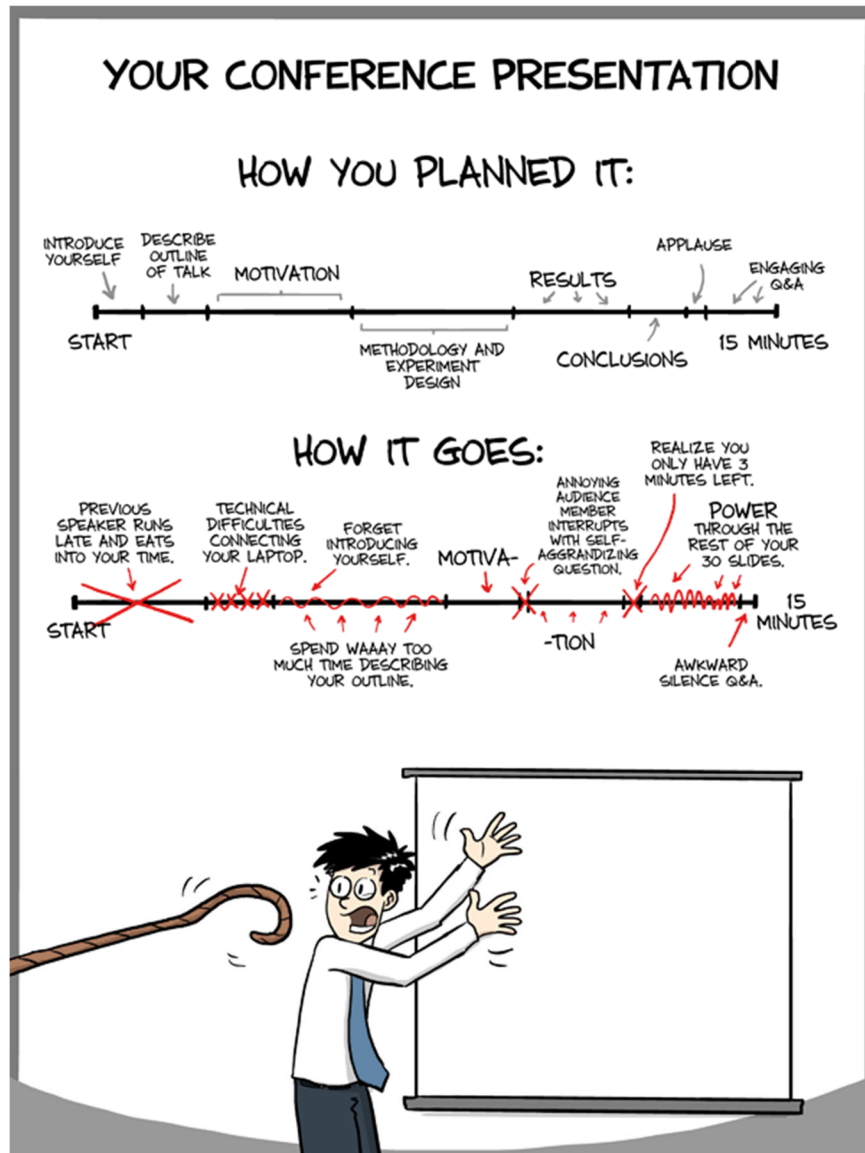
-When trying to develop background material, I will often type a term such as "actin structure" into google and then look at lots of images to find one that has the key information that I want, but no more.

-Cite the paper where the graphic came from. "Hernandez, *Science* (2019)" is sufficient. Large html links are distracting.

-Make sure presented graphics are not low resolution (*e.g.*, fuzzy). You can often get high resolutions images from the publishers web site when looking at an html format of the paper. Or, you can zoom in on a graphic that so it fills a screen and then do screen capture. There is a simple cropping tool in PowerPoint.

11. A first draft is not a final product

- Creating a talk takes a lot of iteration. Just getting the information from a paper onto a slide is not sufficient. Key to the story telling is the layout of the information, its positioning in the narrative, and its presentation. Yes, giving a good talk is telling a compelling story.
- I often use the tiled slide view in PowerPoint to understand the larger structure of my presentation and refine its logic and flow.



Mechanics of giving a talk

1. Convey enthusiasm!

2. Look at the audience and engage them.

You should know the material so you don't need to read it off the slides.

3. Stand by the screen, if possible.

The audience can then look at you and your slides at the same time.

4. Be sparing in use of a laser pointer.

-Nothing is more distracting than a bright dot on a screen making lots of circles and never going off. Your audience will stop listening to you and like a kitten follow the dot, while wondering how long until the dot goes away. All science communication has stopped at this point.

-Never point laser pointers at the audience. Some laser pointers are not eye safe, particularly green ones.

-Modern panel TVs with a glossy front don't reflect a laser point (not a problem for our classroom). Be prepared with a solution (or ask a host).

5. Walk the audience through the slide, especially plots of data.

-Explain the data, don't say "here are the results." In a sentence, summarize the experiment that is being done and then describe the axes of the data, point out the key data (a good use of a laser pointer), and then state how you can come to a particular conclusion based on the data the audience is seeing.

-Then state how this particular piece of data and conclusion helps with the getting to the larger story.

-Your job is to guide the audience through the logic of the argument.

6. Don't stride around or fidget. Avoid "um" and "like"

You want the audience focused on the science you are presenting, not quirks in presentation style. If you have time, watching a video of a practice talk is a great way to uncover our personal quirks, albeit humbling at times. Modern cell phones make this very simple.

7. Practice makes perfect.

-Sub-vocal verbalization is no substitute for actually speaking. Actors have dry runs of performances and good presenters do too. I practice most science talks I give at least 3 times, and I have been doing this for more than 3 decades. The first time is very rough even for material I have presented before and I have to push my way through. The second time I repeat rough sections, often multiple times. For new material, I find at this point some part of the logic I am trying to present does not work as well as I would have wanted and I have to refine the slides.

-During additional practices, I refine timing and focus on transitions.

-Check your timing. Nothing is worse than a talk that is too long. It shows a lack of respect for the audience and a lack of preparation by the presenter. A talk significantly too short misses too.

-Present to a few colleagues or classmates ahead of time, if possible.

They can give great feedback to refine your talk. Every talk members of my group give to an outside audience is first given to our whole group where we help refine the logic and presentation of a talk. We can easily spend 60 minutes giving feedback on a 15 min talk.

-May want to memorize a key sentence or two for difficult slides, you don't want to memorize the whole talk. It comes across as stilted.

-Make sure graphics are readable from the back of a room.

8. Optimize your talk for the audience.

- Think about how your audience is going to hear/process the information, not just about how you are going to get the information you have learned.
- Talking too soft, too loud, and/or too fast is a common mistake
- Remember, show enthusiasm. Smile occasionally, make eye contact.

9. Getting ready for presentation day.

- If possible, practice in the room where you are going to present or find a comparable room. This can help minimize nervousness. Even today, I try to get into a lecture hall or stand at a podium well ahead of my talk and look at what the audience will look like from the podium before I start my talk.
- Practice hooking up a computer and presenting the slides ahead of the talk. If you can't do it a day or more ahead of time, arrive a minimum of 15 min ahead of time. Have a copy of your slides on a USB drive and a google/dropbox drive.
- Bring a power cord for your laptop. Most laptops shouldn't have a problem going 75 minutes but it never hurts to be prepared.

PRESENTATION B I N G O!

Speaker bashes previous work	Repeated use of "um..."	Speaker sucks up to host	Host falls asleep	Speaker wastes 5 minutes explaining outline
Laptop malfunction	Work ties in to Cancer/HIV or A.I.	"...et al."	You're the only one in your group that showed up.	Blatant typo
Entire slide filled with equations	"The data <i>clearly</i> shows..."	FREE Speaker runs out of time	Use of Powerpoint template with blue background	References boss (past or present)
There's someone wearing same clothes as yesterday	Bitter Employee asks question	"That's an interesting question"	"Beyond the scope of this work"	Someone bobs head fighting sleep
Speaker forgets to thank collaborators	Cell phone goes off	You've no idea what's going on	"Future work will..."	Results conveniently show improvement

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