Brangwynne Lab Guide to Giving a Good Talk  
(Updated Feb 21, 2024)

Communicating your science effectively is as important as the science itself. Indeed, there is great science that withers because it is not clearly communicated, and there is “only ok” science that has an outsized impact due to it being clearly and energetically conveyed to the community. Giving scientific talks in front of colleagues has always been a critical aspect of the scientific enterprise. I have given hundreds of talks, real and virtual, with audiences ranging from 5 people to thousands, and am always striving to improve. Below are some of the things that I’ve learned from friends, colleagues, and mentors over the years, which I try to keep in mind in preparing talks. I encourage you to think about incorporating these ideas as well – it will be well worth the time invested!

1. Thank the organizers and convey your enthusiasm for being there. How great is it that you are given the honor of sharing your work and ideas with others?! Don’t force it, but if you can think of a little joke or story to break the ice (“So great to be here again - the last time I was in this city was on a trip years ago, when I proposed to my wife!”), this can be helpful for signaling to the audience that this is going to be an engaging talk from a non-robot, and that they should pay attention (see #2).

2. Think about the structure of your talk as being two pyramids on top of one another. Start out with broad, high level questions and concepts, keeping in mind that your first job is to convince the audience that you are discussing things that are worthy of them paying attention (“no, now is not a good time to pull out your phone”). Then zoom into more specific, particular questions, concepts, etc., that inform the broader ideas that you first hooked them with. Then towards the end of the talk, start backing out to put the specific points you have made into the broader context. Remind the audience about why this is an interesting problem, which you first introduced to them in the beginning of the talk.

3. People remember two things: pictures and stories. Think back to the last few talks you have seen, even the ones from earlier this week. What do you remember? Probably it is some images they showed, or perhaps a story that tied the talk together. Humans like to see things, and powerful images are always good – so you want compelling images in your talk. But stories can be just as powerful. Try to tell them a story, and if you can “personalize it” that is even better. “I became interested in this problem after I watched an aunt suffering from dementia...” or “I started thinking about this problem when I was on a trip to Mali and I realized that River blindness is a major issue”. In any case, make sure you have a narrative that carries the story forward from one slide to the next.

4. Keep it to one concept per slide. As a test for whether this is true or not for a given slide, you should be able to say the concept in a single sentence that does not have commas
and leave you out of breath in the end. You could even consider putting this sentence explicitly at the bottom of every slide, although the title at the top of the slide might cover it already.

5. **Minimize the number of words on each slide.** If you can get rid of words, do it. If you can replace words with a picture, much better. Nobody likes to sit in the audience trying to read bullet points off of someone’s slide – nothing says “bad talk” more clearly than a bullet list. Some of the best talks do not have any text whatsoever – have a look at some of the top TED talks (which, it should be noted, are not quite the same as science talks that you would typically be giving) – no words!

6. Along the lines of the last point, if math equations are important to what you are trying to convey, then certainly include them. But keep it to one key equation per slide, making sure that you explain what the variables are, and what the physical interpretation of the equation is. Be sure that you make it clear what the concept encoded by the equation is – few people can look at an equation for a few seconds and understand exactly what it implies about the dynamics of the system etc. For example, if you show the Flory-Huggins free energy, be sure to say “This equation ultimately describes the competition between entropy, which wants things mixed, and molecular interaction energies which may favor phase separation”, pointing to the different terms as you do.

7. **Each slide should be uncluttered.** Do not show graphs with data unless you are going to walk the audience through what the graph shows. Do not show data just to show the audience that you did a bunch of work. *Anything that is not signal is noise*, and the more noise there is, the more difficult it is to convey the key point.

8. If you show graphs, make sure the axis labels are large enough to be visible. Do not show a graph whose axes are not labelled or are not visible to someone without a magnifying glass. This will annoy your audience.

9. **Practice the talk to make sure that you have enough time.** You could be giving a great talk but if you go over time at the end you will annoy your audience and then it will not be a great talk. Or the Chair of the meeting will stand up and force you off the podium. So avoid this. Generally, keep in mind that less is more – going slowly to make sure you hit the key points is always better than speeding through things and hoping the audience keeps up. If you do find yourself jammed with running out of time, it is probably better to skip slides, rather than do a mad rush through the last 10 slides where the audience will not get anything out of it. Try to stay calm, and say something like, “in the interests of time, I will skip these slides about a specific example of this phenomenon, but in the last few minutes, I want to share with you what this implies for cancer”.
10. We all get nervous standing up in front of a bunch of other humans, especially strangers, who are starting at us (!). This is natural and normal and will never go away even if you have given hundreds of talks. But over time you will get used to it and your nervousness will not be so obvious. But often the most important thing is to get started well. So if it is a really important talk (job talk, big symposium etc.), you should write out what you are going to say for each slide, paying particular attention to the things that you want to say on the first few slides, as you “get the motor running”. Even if you do not remember to say exactly what you wrote out, your mind will be primed with the phrases and concepts and it will flow more easily.

11. Do not assume too much about what your audience already knows. In psychology there is the concept of the “Curse of Knowledge”, which is that once you have learned something, it is difficult to imagine back to what it was like before you understood it. For that reason, many speakers make the mistake of not explaining basic concepts or steps in their logic, because it is difficult for them to imagine that the audience does not know this already. Generally, there are always going to be people in the audience that need you to walk through things more slowly, so err on the side of assuming that the audience doesn’t know anything – even for those audience members that already know what you are explaining, they will enjoy the satisfaction of being ahead of the curve. You can also think about this in the context of the “pyramid” structure described above – start out with easy concepts that everyone can probably get, and then get more specific and detailed as you get into more challenging concepts.

12. Make sure that you attribute images and figures that you have taken from the literature (or the web etc.). You also want to make it very clear what is your work, and what is the work of others. If you did something in collaboration with someone else, make sure you say that and make it very clear. If it looks like the person is not crediting others properly, the audience is left with a bad impression. If it is a job talk for a faculty candidate, I would be asking myself, “would I want that person as a colleague if it seems like they are trying to hog all the credit for themselves?”. Probably not.

13. In the Q&A, try to stay calm and positive. Nobody is ever going to complain if you begin your response with “that is a really great question”. Also if you are stumped, remain calm and say something like “that is really interesting, and we have not really explored what that could mean. I’d be happy to talk to you about that more offline”. If someone becomes aggressive or accusatory in their questioning, it is likely more a reflection of them being a jerk than any flaws in your talk or reasoning, and the other audience members will probably recognize this. So don’t stoop to their level and be aggressive back. Stand your ground and politely tell them that you hear their point, for (a nonsensical) example “If I understand correctly, you are critical of my model that phase separation drives metastases, because it would not explain cadherin downregulation. I think that is an interesting point, but in fact there is recent work suggesting that cadherin interactions reflect a collective assembly process. But it sounds like you have a strong opinion about this, let’s discuss it in more detail offline”.
14. Over the last few years, especially during the pandemic, virtual talks have become more prevalent. The points above are probably all equally valid for virtual talks, some even more so. For example, we all know that it is even easier to be distracted while watching a virtual talk. So as the virtual speaker, you really need to have a clean narrative to carry your audience along. The other thing challenging about virtual talks is that you usually cannot really see the audience well, and so it is harder to “read the room” (are they bored, engaged, confused?). Moreover, without a live audience, you can’t feed off their energy – ultimately, it is just you alone in front of your computer, trusting that people are listening. For this reason, even if you don’t normally encourage questions during in-person talks, you might consider stopping every 10min or so and asking if the audience has questions. This is a good way for you to, at least partially, read the room, and try to pick up a bit of the audience’s energy.