

Scientific Presentations



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The problem

Scientific presentations occur in a very unusual setting. Audience members, for the most part, sit in an unfamiliar room, surrounded by mostly unfamiliar people. Many of them have travelled a long way to be there, and may still be suffering the effects of crossing multiple time zones and losing their luggage (if they came via London). By the time you take to the podium, they may have been in their seats for several hours, having listened to many speakers before you, and are likely emotionally unsatisfied by the lunch that turned out to be remarkably poor value for their conference registration fee. Throw in the fact that many of them will be non-native English speakers, and the challenge of entertaining them for a few minutes seems a pretty formidable one.

Unfortunately, boredom and science presentations often go hand-in-hand. This is not a major problem if you are listening via the internet. If, after 30 seconds, the speaker has failed to grab your attention, you simply switch to something else. However, at a conference or seminar, this is much harder to do, since you actually have to get up and walk out, which can be awkward if you are stuck somewhere in the middle of the room. Thus, boredom is much more likely, particularly if this is not the first talk of the day that you have heard. In extreme cases, your boredom will occasionally spill over into anger, accompanied by thoughts of some of the infinite other ways you could have used those 15 minutes more profitably.

As scientists we like to believe that we have much bigger brains than ‘normal’ people, and it is these gigantic brains that allow us to publish our work using the most spectacularly incomprehensible language. Perhaps unsurprisingly, even other scientists do not necessarily understand this language, so non-experts have virtually no chance. Presentations offer an opportunity to bridge this gap in understanding, and yet it is one that is often wasted.

The following is a collection of tips, quotes and general musings about scientific presentations that I have accumulated over the years, and presented in a fairly random order. It’s not an exhaustive list, nor is it meant to be a set of serious rules that everyone has to follow. After all, as long as (most of) the audience are awake and not throwing things at you, you’re probably doing ok.

Why bother learning to be a good speaker?

‘I get paid to do good science, and how I present it is frankly unimportant. The data speak for themselves’. Does this sound familiar? If so, you have the perfect attitude if you never want to be invited to present your work anywhere, ever again. For the rest of you, read on.

Everyone needs to speak. You may not always stand on a stage in front of hundreds of people, but you communicate every day. Communication skills are available to everyone, which means acquiring them is a choice. Given this choice, would you rather communicate well or poorly? Would you prefer to be remembered as an interesting or a boring speaker?

Getting a job. Some jobs have stronger requirements for effective communication than others, but no job advert ever asks for a poor communicator, someone who is afraid to speak to more than one person at a time, or someone who seems rude. Good communication skills will literally never be seen as a negative quality.

Passing the torch. From time to time, even the staunchest anti-communicator may be called upon to impart knowledge to another human being. Teaching things to your children requires, among other skills, an ability to turn complex topics into simple explanations...So does teaching your grandmother to use the internet...Or showing the new employee how to fill in her time sheet. None of these processes are enhanced by poorer communication skills.

Your reputation is important. People who consistently publish great papers walk into rooms and other people whisper ‘she is a top scientist’. After seeing the same top scientist present their work poorly, people instead whisper ‘great scientist, terrible speaker’. Why would anyone willingly allow this to happen?

You are being judged. Like it or not, your colleagues, peers, and even potential reviewers and employers are in the audience, and they will judge you. Harshly. On paper you might be the best scientist in the universe, but if you cannot explain what you have done and why it is important, your significance will be largely lost on the audience.

Free travel. Being known as a great speaker can get you invitations to speak all over the world. In other words, somebody else pays for you to go to places you would love to go but prefer not to pay for, and once you are there, you will do 1-2 hours of work (often less) and spend the rest of the time networking and sightseeing. There is no catch: it is as good as it sounds.

Oral presentations

Break the rules. Very often people stick to the standard format that goes something like this: Background/introduction; Methods; Results; Discussion/Conclusions. Whilst this is the logical order of a presentation, the fact that everybody knows this template means that you do not actually need to label every slide accordingly. Instead of wasting slide space with these titles, leave them out completely and put the space to good use.

Do not re-read the title slide. Chances are that the session chair has already mentioned your name and presentation title, which have probably been on screen for several seconds. By repeating this information, you simply waste valuable floor time. Instead, launch straight into the next slide.

Keep acknowledgements brief. If you have an acknowledgements slide at the end, make any verbal acknowledgements very brief, two sentences or less, and leave the slide up as you finish your talk. Most of the audience members have no idea who your co-workers are, nor do they need to hear your gushing tributes to them.

Tell a story. Human beings respond emotionally to stories. Even hyperactive children will sit down in complete, unmovable silence for long periods of time when they are told a good story. If you can craft your project into a story, rather than a disjointed series of steps followed by a load of numbers, there's a much greater chance that your audience will want to hear how the story ends.

Ditch the outline slide. Unless your audience is full of goldfish, nobody needs to be told what is on the agenda. Your title slide should already have told them. The only exception to this rule is if the presentation is extremely long, in which case, my advice is to write it all in a book. That way, the audience can put it down when they get bored, or return it for a refund.

"The trouble with the world is that the stupid are cocksure and the intelligent are full of doubt".

Bertrand Russell

Use Twitter logic. Before you start preparing your slides, write down a clearly defined take-home message that fits in a single tweet, then devote the entire talk to making sure that your audience actually take that message home.

Company/institute/group logos. These are fine on the opening and closing slides, but are not needed on anything in between. Rest assured that if you give a great talk, the audience will remember your name, and most likely, where you are from. You are not selling the logo in the same way that major brands are, so there is no need to try to imprint it in peoples'

memories, whilst also sacrificing valuable slide space. There is no need to repeat your name or e-mail address on every new slide, and the same applies to logos.

Do not just copy-paste. For every slide that you create using copy-paste (or screenshots), you might just as well have spent the equivalent amount of time standing in front of each audience member and slapping them hard in the face. At least the latter method might wake them up. Copy-paste is lazy and thoughtless, and your audience deserve better.

“Do not let traditions stand in your way: research is not about fostering mediocrity. Do not let templates cramp your style: your priority is to give a superb talk”.

Jean-Luc Doumont

Do not read from a script or your slides. Rather than come up with my own scathing critique of this habit, I will leave that honour to Nobel Prize winner Peter Medawar: “Under no circumstances whatsoever should a paper be read from a script. It is hard to overestimate the dismay and resentment of an audience that has to put up with a paper read hurriedly in an even monotone”. I concur, and the same applies to reading from slides. If you do not know your main talking points without on-screen prompts, go back and practice until you do.

Stick to the time limit. Nobody will complain if you finish your talk early. If you go over the time limit, members of the audience will wish to inflict physical harm on you, especially if you are speaking right before lunch.

Paragraphs have no place in your slides. Paragraphs are for manuscripts and books. Slides are for ideas, graphics and other exciting paraphernalia that involve little or no text. By copying whole paragraphs into your slides, you are showing the audience that you cannot even be bothered to edit the results of your lazy copy-paste operation.

Face your audience, not the screen. The audience made the effort to come and listen to you talk. Make them feel like it was worth it by actually giving your talk *to* them, not away from them. If you protest that you need to see the screen so you remember what to say, then you are not ready to stand on the podium yet and should go back and practice some more.

Keep it simple. Nobody, and I mean nobody, wants vast technical details, nor do they want the history of the method, your lab, yourself, or the universe. A simplified analogy or schematic is almost always better than a technical summary.

No sound effects. You are a grown adult, and should therefore realise that sound effects accompanying transitions are never acceptable in a presentation unless the audience consists entirely of children below the age of ten. Even then, do not be surprised if some of them criticise you in the Q & A session afterwards.

“A scientist who takes time off to lecture to schoolchildren will soon learn whether or not he has his audience in the palm. Children cannot keep still, and if they are bored, they fidget. The lecturer may sometimes feel he is addressing an enormous audience of mice, but the moment the very young are interested, they sit still”.

Peter Medawar

Moderate your speed. If you are at a conference, it is a near certainty that there will be non-native English speakers in the audience. These are the people you should be thinking of when determining the speed of your speech. Processing information that is being delivered in a foreign language requires slightly more time, regardless of how talented the listener is.

Reduce the references. Naturally you should always acknowledge other peoples' ideas and work, but citations take up valuable slide space. Reduce the size of the citation text slightly, place the citations at the bottom of the slide out of the way, or better yet, think of a way to avoid having to put too many citations in. Extensive reference lists belong in your manuscripts.

“See yourself as a guide for budding scientific minds, not as a guardian of traditions. Lead these young minds on the path to independent thinking, not to conformism”.

Jean-Luc Doumont

Ditch the laser pointer. Is it really necessary? Clear, simple slides should make it easy for the audience to look where you want them to. If there is so much content on the slide that you feel a laser pointer is necessary, a better solution would be to simplify the slide by separating it into two or three, or then to remove some of the superfluous material.

Cut the abbreviations. Unless they are terms so widely used that you are certain everyone will remember them, avoid abbreviations completely. In a talk of 20 minutes or less, it is unlikely that any expression will recur sufficiently for it to need to be shortened. The possible time savings are equally probably insignificant.

Avoid noisy backgrounds. Your goal is to make following your talk as easy as possible. Any unnecessary slide noise prevents you from doing that. Common culprits include brightly coloured backgrounds, text superimposed over a photograph making reading difficult, and superfluous logos, personal details or graphics. If it is not central to your take-home message, it is not needed.

Check your spelling. Your credibility hangs delicately in the balance if your audience sees that a) you cannot consistently spell basic words, and b) you are not sufficiently aware to notice that you cannot consistently spell basic words.

“The human brain starts working the moment you are born and never stops until you stand up to speak in public”.

George Jessel

Limit or eliminate your stats. In general most people have no interest in which tests you used, so do not waste a slide telling them. Raw statistical output is also an absolute no. Your take-home message should be so simple and clear that you can probably avoid mentioning stats at all in your talk. If you think it is likely that someone will ask a stats question, try putting the essential info in a hidden slide that you can show if and when needed.

Label your graphs. Use clear fonts, include measurement units, and place titles horizontally so the audience do not need to crane their necks (thanks to the great Paavo Komi for this tip). Make it as easy as humanly possible to understand the point of the figure.

“When you contribute a socially acceptable mediocre talk or impenetrable text, have you done anything to be proud of?”

Jean-Luc Doumont

Consider your animations carefully. As a general rule, animations should be used only when it is necessary to keep something hidden until a bit later. Bringing in each line of text with swirling, dissolving or otherwise unnecessary animations looks gimmicky and unprofessional. If you have to use them, just make things appear without any ceremony.

Do not just copy-paste figures and tables. If you are presenting your work then you have the data at hand. Re-draw the figures in an audience-friendly way. If you insist on taking them straight from the manuscript, at least tidy them up using editing software first. If you need to use someone else’s work, request the original data from the author, or use tracing software to make your own figure.

Give them the highlights only. Yes you have put a lot of effort into your project, and yes you want to share every last detail, but the audience does not want to hear it. They came for the highlights only, so be brutal and cut out anything that does not help to get your take-home message across.

One project per conference talk. Do not be tempted to try and suppress more than one study into a single talk unless the talk lasts for more than half an hour. You might think that the second study follows logically from the first, but there is a limit to how much information the audience can absorb, and once you introduce more than one set of results, confusion becomes inevitable.

“If the audience won't take a scientist's word for it, they won't take his slide for it, either”.

Peter Medawar

Tell them why. ‘Because it has never been studied’ is not a good rationale for your study. Some things have never been studied because our species simply does not need to know or care about the results. State your rationale early, and make sure it convinces the audience that your work was necessary. If this stage fails, so will the rest of the talk.

Equations should be an imprisonable offense. Literally nobody has ever sat in an audience hoping that the next slide will be full of equations. Contrary to what some adolescent-minded individuals think, an audience will not be impressed by how smart you must be to understand complex equations, they will simply begin mentally throwing darts at your face. If they are fortunate to have a memory for faces and/or names, they will never listen to you speak again.

Nobody is as interested in your simulation results as you are. So show them sparingly, and do not ramble on about them for five minutes. If a miracle happens and somebody is interested, give them a handout or refer them to your paper.

Make your tables simple or do not show them at all. If there are more than about six numbers in the table, then it will not serve its purpose. For one thing, people beyond the second row will not be able to see the numbers, and for another, nobody can take in that much information in one sitting. Instead of the table, try a chart of some kind, or just tell the audience the main result of the table in one or two sentences, and save them from a boring slide.

“In all affairs it's a healthy thing now and then to hang a question mark on the things you have long taken for granted”.

Bertrand Russell

Always end well. If you often struggle to finish your talk without resorting to the horrendous ‘erm...that’s it’, try to prepare the final sentence before your talk, adding it to the slide notes if necessary so you don’t forget it.

Why practice your talk?

So that you are not surprised. If you forget what is on the slides and what is coming next, the chance of you panicking goes up considerably. Practice helps you to form a blueprint of each slide in your mind so that as soon as you see it, you remember the key points. As funny as it looks from an audience perspective, fainting on stage will not help your career.

"Words - so innocent and powerless as they are, as standing in a dictionary, how potent for good and evil they become in the hands of one who knows how to combine them".

Nathaniel Hawthorne

So that you really know your topic. Practicing your talk will often raise new questions in your mind, and perhaps lead you to interpret the story in a slightly different way. For example, you may come up with a simpler analogy to explain a complex theory, or decide on a new schematic to show the results more clearly. Without practicing, these insights are less likely to strike you.

To help you keep to time. Without practicing, it is very difficult to know how long the whole talk will last. This is not such a problem if you are speaking for one hour, because you can skip slides if it is taking too long or spend more time on a slide if there is plenty of time. However, if you have anywhere between 10-20 minutes, the timing is much more important. Few things are more embarrassing than being cut off by the session chair when you are still describing your methods section.

To calm you down. The more you practice, the more likely you are to feel confident. Feeling confident about your talk will make the days leading up to it much more comfortable, and probably improve the final result from the audience's perspective.

To show respect for your audience. Every single person in that audience has seen the program, read your title, and maybe even your abstract. By coming to listen to your talk, they are investing time in you. By failing to prepare, you are showing each of those people that their time is worth nothing to you. As Nobel Prize winner Peter Medawar once wrote, "An audience is more indulgent to a speaker who loses his place, muddles his slides, or even falls off the rostrum than to one who has given any evidence of treating them with less than due respect".

So that you finish strong. Anyone who says 'ok, that's the end of my talk', or 'I'll stop there', or something similar, should be forcefully removed from the auditorium and not allowed to return. Most people will remember the ending, so make it memorable by hammering home your key message.

“The man who makes a bad thirty-minute speech to two hundred people wastes only half an hour of his own time. But he wastes one hundred hours of the audience's time- more than four days- which should be a hanging offense”.

Jenkin Lloyd Jones

Poster presentations

A poster is not an excuse to pin your manuscript on the wall for an hour or so. If it was, it would be called a manuscript session, except it wouldn't because there would be no need to arrange it in the first place. All of the congress participants could just sit at home in their underwear and read your work without having to listen to you talk about it.

“Of all of our inventions for mass communication, pictures still speak the most universally understood language”.

Walt Disney

Consider having printed handouts with you. You can put more technical (read: boring) information in them for those visitors who are more familiar with the topic and want the specifics. Keep in mind, however, that these people are almost certainly in the minority. The average passer-by will (hopefully) be intrigued enough by your title or figures to stop and chat, and as a non-expert, they will want a comprehensible summary.

Contrary to what you may have learned, every social encounter in science is not an excuse to try and impress others with your in-depth knowledge. To quote Albert Einstein, “If you can't explain it simply, you don't understand it well enough”.

Print your poster on canvas instead of paper. It may be slightly more expensive, but it does not require you to travel around with a giant poster case. Instead you can fold it, put it in your suitcase, and forget about it until the day of your session.

Prepare a two minute presentation that briefly summarises the motivation for your study and the main findings. You may only be required to stand next to the poster, but somebody may ask for a short summary without wanting to read the whole thing.

Speak up. Most poster sessions occur in noisy rooms, often with simultaneous sessions running. You are competing with the other voices around you to get your message across, so use simple language and project your voice.

“The more elaborate our means of communication, the less we communicate”.

Joseph Priestley

Keep the text on your poster to a minimum. Try to include eye-catching figures, since these are what will draw people towards your poster. Your work may be worthy of a Nobel prize, but if it is presented in a boring, text-filled poster, nobody will be aware of it because they will not bother to stop and read about it.

Your poster is probably in a room full of other posters, competing for the (limited) attention of passers-by. This should influence every aspect of your poster design, from the size of the font (large enough to be seen from three metres away), to the use of figures and colour. Design a poster that would grab your attention, and there is a good chance it will work on other people too.

Wherever possible, avoid using full paragraphs on a poster. Your job when designing the poster is to shrink your project down into highlights, not to copy-paste an entire manuscript onto one large page.

Avoid abbreviations and jargon. If this means that you have to simplify the text then do so. If this in turn requires more space, then sacrifice something else unimportant. It is far better to clearly present less information than to poorly present lots of information.

When deciding whether or not to stop and read more, the average passer-by will devote one or two seconds of their attention to your poster. In that short time, they need to perceive your work as interesting, understandable and relevant. Let these be your design criteria.

Make sure your figures and photos are high resolution. Poor-res photos will look terrible when blown up, especially on canvas posters.

Keep methods information to a minimum, and avoid technical summaries at all costs. Detailed methods information can always be included on a separate handout if necessary, but the majority of people will be more interested in the motivation for your work, the main results and the implications.

Avoid 3D graphs. You may think that they look cool, but actually they rarely present the results more clearly than a 2D plot.

Include personal/institution webpage links on your poster. This is free advertising, and if they were interested enough to read your poster, they will likely be curious enough to visit your website for more information.

Label graphs and figures in a way that tells the reader what they are looking at. This allows you to avoid long, complex legends, and increases the visual impact of the results.

Prioritise the truly important information. Most people will not be interested in who you acknowledged or whose work you cited. Make the text for these parts smaller, allowing more space to get your main message(s) across.

Check for spelling errors and be consistent with references and other format issues. Mistakes like this only highlight your lack of thoroughness, and it is unlikely that whoever is paying for your poster to be printed will volunteer to pay for another one after the mistakes have been noticed.

There is a good reason why black text on a white background is so common: it works. Coloured backgrounds make integrating figures more difficult, they may look different once printed, and often make reading more difficult.

Dealing with questions

Do not thank every single person who asks a question. They are asking for information from you, so there is no need to thank them. In order to appear sincere, you have to actually be sincere. Thanking eight different people for their insightful questions makes your gratitude seem false.

Think before you speak. Wait until the question has been asked, and then take a few seconds to think about what you will say before you actually start answering. It isn't rocket science, but it will make a big difference to the clarity of your answer.

Do not say “that is an excellent question” every time you are asked one. It is difficult to believe that you actually think five consecutive questions are all excellent. By praising them all, you not only appear insincere, but you look like you are trying to pander to the audience by being overly polite. Rather than professional, there is a risk of seeming desperate. If a miracle happens and you do get a string of great questions, at least vary the beginning of your response each time. For example, after the second humdinger, you might say “Again, this is a very important/relevant question”.

Learn to say “I don't know” in many clever ways. Many people are reluctant to admit that they don't know all the answers. This is odd given that by definition we cannot possibly know all the answers, and indeed it is in our interest to not know them. If we did, we would not need salaries and research grants to find the answers, and would all be forced to try (in vain) to use our PhDs to get a real job. My advice is to prepare a few stock “I don't know” answers. For example, “this is a good point, we are currently testing that idea in our lab” (if in fact you are), or “I appreciate the suggestion, perhaps we can look into that”. Nobody expects you to have performed all of the possible studies in this area, so do not apologise for not having done them.

Keep your answers short. There is only one thing worse than a long, aimless question, and that is a long, aimless answer. If you don't know, say so. If you do know, answer in twenty seconds or less. If the question does require a war and peace answer, give the highlights in your response, then add that you will be happy to tell the full story after the session. Every single audience member will thank you for it.

Hidden slides and handouts. Very often, giving a talk requires you to suppress months or even years of work into 15 minutes or less. Some of the information that you are forced to remove is still valuable, and could be put into a handout or hidden slide. The latter is especially useful if you are repeatedly asked similar questions each time you present on this topic. Few things are more impressive in a Q & A session than a speaker who has the answers ready in a clear and concise hidden slide.

Dealing with bullies. Unfortunately, some scientists give the rest of us a bad name by essentially bullying people with harsh questions or aggressive comments. There are a few solutions if you find yourself in this situation. Try using calm, neutral statements that make it appear that you agree with the questioner, such as “I can certainly see your point, and perhaps we could have done X and Y differently...”. If this fails to defuse the situation, agree to disagree and move on. If you are brave enough, you could suggest that the two of you continue the discussion after the session, as you may find that their bravado is reduced once they no longer have the thrill of the audience watching. Just don’t use the words “let’s take this outside”. Scientists and fist fights do not mix.

Prepare answers for non-experts. Sometimes it is the simple questions that trip you up, because you have never had to explain your work to non-experts. Be prepared to answer as simply and concisely as possible, remembering to avoid jargon and abbreviations. If you can explain your work to a non-expert then you are unlikely to come unstuck in a Q & A session.

Dealing with the serial questioner. If an audience member asks a string of questions and is taking up a lot of time, once you have had enough, break eye contact and walk a few steps away to show that you are ready to move on. If they are really persistent, finish your next answer, then immediately look elsewhere and ask if anybody else has a question.

Public speaking resources

Speakers

www.TED.com. Your one-stop shop for public speaking inspiration. Look out for Ken Robinson in particular- note that he doesn't use any slides or props, just knowledge and experience (with a bit of British humour of course).

www.youtube.com. Endless entertainment. Find classic speeches, film quotes, spine tingling oratory and loads more.

www.juliantreasure.com. Homepage of Julian Treasure, a fascinating speaker with an extremely engaging style. Features plenty of tips on vocal preparations for public speaking, as well as links to his great TED talks.

www.mannerofspeaking.org. Homepage of John Zimmer, full of tips and analyses of great speeches.

<http://www.artofmanliness.com/2008/08/01/the-35-greatest-speeches-in-history>. A collection of some of the all-time great speeches, including excerpts.

www.scientific-presentations.com. Homepage of Jean-luc Lebrun, mainly aimed at scientists but full of great links and information relevant to all public speakers.

Slides

Slideshare (www.slideshare.com). Website for sharing slides from all fields of expertise. There are many examples of bad slides here, but equally as many great examples to inspire you.

www.garreynolds.com. Fact-filled website of best-selling author Garr Reynolds, with a vast sea of information about slide design.

<http://www.youtube.com/watch?v=meBXuTIPJQk>. A masterclass from Jean-luc Doumont, a fascinating speaker and educator in a wide range of topics related to communication.

Books

Nowadays it is difficult to keep track of all of the books in this area, but here are a few of my favourites:

Presentation Zen, by Garr Reynolds. Interesting book about presentations that differs from the more mainstream books in this area. Features many examples of good versus bad slides and provides links to many more.

Talk like TED: The 9 Public-Speaking Secrets of the World's Top Minds, by Carmine Gallo. Very insightful analysis from Carmine Gallo, who has also published a great book specifically about Steve Jobs's speaking techniques.

Confessions of a Public Speaker, by Scott Berkun. A thoroughly entertaining book that has deservedly received very good reviews.

The Quick and Easy Way to Effective Speaking, by Dale Carnegie. No list of public speaking books would be complete without an offering from one of the world's great communicators.

Lend Me Your Ears: All you need to know about making speeches and presentations, by Max Atkinson. A comprehensive guide including plenty of exercises to help you take concrete steps towards improving your talks.

General interest

www.online-literature.com. Home of The Literature Network. Absolutely packed with classic literature references and author biographies. The best part is that you can read classic books online for free.

<https://www.toastmasters.org/>. An organization devoted entirely to helping people to improve their public speaking skills. They have divisions all over the world, including in Finland.

Depending on where you live, you might also want to search for public speaking organisations. In the USA, for example, there is the National Speakers Association (<http://www.nsaspeaker.org>) and in the UK there is the Professional Speaking Association (www.thepsa.co.uk). I suspect there are many other examples around the world.