

Tips on giving talks

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The following are some tips about giving math talks. Some of the advice may seem obvious, but there is not a suggestion here that I haven't seen violated by someone. Often that someone was me; that's how I know this is good advice.

Planning

- Know how much time is allotted for your talk. Break your talk down into sections and know how much time you mean to spend on each; write schedule notations (“10 minutes,” “35 minutes”) at the relevant points in your notes so that you'll realize in time if you're far behind or far ahead.
- Know your audience. Will you be speaking in front of graduate students? Experts in your research area? Mathematicians from a variety of areas?
- Practice your talk in advance, with a real audience – one person is enough. No matter how carefully you write your notes, there's going to be some howling mistake that you don't notice until you are actually standing at the board in front of another human being trying to explain your argument.
- If you're using slides, make the slides before you leave on your trip. If you're not, you may find it useful to TeX up notes: what you scrawl on the back of a paper towel may make sense to you when you write it, but less so when it's time to give the talk, and even less the *next* time you have to give the same talk.

What should go in the talk?

- Tell a story. At the beginning of your talk you should mention some topic, problem, or theorem that everyone will agree is interesting. Your goal is to present a question to which the audience will want to know the answer; this provides suspense. You then satisfy the audience by providing the answer, or providing a partial answer, or providing the answer to an analogous question. . .

- Explaining too little is a much more common problem than explaining too much, especially among younger mathematicians with something to prove. Nobody ever gets mad at you for spending the first 15 minutes of the talk explaining your problem to those who have never thought about it before; even the audience members who are familiar with your problem will learn from your exposition how *you* think about it.
- On the other hand, you don't need to include a formal definition of every mathematical entity that appears in your talk. If you are talking about modular forms, you don't need to spend 10 minutes going through the precise definition; this will be boring for people who know the subject and unenlightening for those who don't. It is enough to explain that a modular form is a function on the upper half plane which satisfies certain transformation laws under the group of Möbius transformations, and which satisfies a certain growth condition as the imaginary part of τ goes to ∞ .
- How do you know if you're including too much exposition? In an hour talk, you should make sure to start speaking about your own work, at latest, halfway in. In a 20- or 30-minute talk, especially if the theorem is fairly technical, you may have to devote the body of the talk to definitions and motivation and trim your discussion of your own work to a theorem statement near the end.
- The most interesting part of your paper to *you* is the technical obstacle that you overcame in Lemma 5.23 by cleverly estimating for an error term. Be warned that this is not the most interesting part to your audience. Spend your limited time explaining why the theorem is interesting and what the large-scale architecture of the proof looks like. If there's no time for both, explaining why the theorem is interesting takes precedence. If you leave out details, people will ask you about them after the talk – but if you leave out the motivation, people will just tune out!
- Make it clear which results are yours – and which are not. You don't need to give full bibliographic references on the blackboard – it's sufficient, when mentioning someone else's result, to give the authors' names and a publication year.
- Try to include examples if at all possible. Examples clarify the main points, and give people who may have drifted away a chance to return their attention to your talk.
- Never say anything negative about your theorem or yourself in your talk – don't say your theorem is “trivial,” or that your paper contains “no new ideas,” or that you'd like to generalize your theorem to arbitrary Kahler manifolds but “you don't understand them.” A wise person once told me, “There are plenty of people who will be happy to tell you if your theorems are trivial – there's no reason to do their work for them.” Perhaps this

is obvious, but you should also avoid saying negative things about *other* people's theorems!

Slides and blackboard

- For an hour-long seminar, most people prefer the flexibility of a blackboard talk: the blackboard gives you the flexibility to add or omit material as you see fit, and it forces you not to go too fast. For a half-hour talk, the time-saving that comes with slides usually makes them a better choice. Slides are also useful if the talks require a lot of complicated diagrams and pictures; of course, in a case like this you can give your talk primarily on the blackboard and show one or two slides when it's time for your diagram.
- The main thing to remember about slides is that it's easy to put too much information on each one. If your slide looks like a page of your paper, there is *too much stuff* on there. A good rule of thumb: you should allow between 30 seconds and 1 minute per slide, and the slides should have little enough text that it should take no more than 1 minute to read every word aloud.
- Don't cover your slides, revealing each line as you present it. This means that the last line of your slide will be in view for about 5 seconds; annoying for everyone who's taking notes. Similarly, if you're writing on the blackboard, don't write something down and then immediately erase it!
- Number your slides. Someone asks a question at the end of your talk – you have to rummage through your slides to find the relevant one – now they're randomly permuted and you have to fix this problem before the next time you give the talk.
- Handwritten slides are fine if your handwriting is neat. Otherwise, TeX them up – but use a large font so you're not tempted to violate the 1 minute rule! LaTeX provides a “slides” documentclass which makes perfectly nice slides; if you really need something more fancy (e.g. if someone asks you to give a “PowerPoint-style” talk) you can use a package like `LaTeX-beamer` or `prospcr`.

During the talk

- *Don't go overtime.* The three surest ways to irritate the audience, in ascending order of irritatingness, are: a) incomprehensibility, b) overpacked slides, and c) going overtime. Cases a) and b) at least have the mitigating feature that your audience can ignore your talk and they've only wasted an hour of their time. But c) is really pushing it. If you have planned the timing of your talk well, you shouldn't find yourself with 5 minutes left and 20 more minutes of material. If you do, be realistic with yourself

about what you can really say: it's better to make one point clearly than two points incoherently. If there is something you feel you absolutely *must* mention and there's no time, an acceptable last resort is to say "I'm sorry, it seems I've used up my time; I didn't get to talk about the equivariant-hyperlocal case, but I'd be happy to do so in the question period if anyone likes." Someone will oblige you.

- One way you may, through no fault of your own, end up in a rush is if there are lots of questions throughout the talk. This is, of course, great for you, because it means people are paying attention. If you feel a question is taking you too far away from the main point of the talk and you are worried about time, it's perfectly acceptable to say to the questioner, "Let's finish discussing this point after the talk."
- It's natural to find yourself aiming the talk directly at the person who's sitting in front, who you know understands your problem, and who is nodding vigorously throughout. Try to avoid this – that person is going to enjoy your talk whatever you do! Make sure you keep talking to the whole room.
- Finally – have fun!