

HOW TO GIVE A GOOD 20 MINUTE MATH TALK

WILLIAM T. ROSS

A colleague of mine wrote a nice piece about how to give a good mathematics colloquium talk. It is definitely worth a read. Paul Halmos also has a few words about giving talks.

Like colloquium talks, many twenty minute talks are terrible. This is rather unfortunate and does real damage to mathematics. Though not all talks need to be Periclean masterpieces, they should, at the very least, be organized and well-delivered. Here are a few pieces of advice.

Before the talk:

Prepare. Unfortunately, many mathematicians think it is kind of cool to prepare their talks at the last minute. They think their brilliant results will carry the day. They have a name for people like this. They are called people who give bad talks. Spend lots and lots and lots of time thinking about your talk before you even make the first slide.

Practice. Most good speakers I know tell me how they spend the morning before a talk giving their presentation to their empty hotel room – sometimes twice. This way, they get the timing, diction, and perhaps jokes, just perfect. Yes you feel pretty stupid doing this, especially if the maid walks in, but your audience will appreciate a talk that is delivered smoothly.

Use beamer. Its the 21st century. Enough said.

Not every topic makes a good twenty minute talk. Topics which involve numerous definitions (more than three) and lots of set up are just not appropriate for twenty minute talks even if it is great mathematics. I've seen too many twenty minute talks that really should have been mini courses.

Don't put too much on one slide. Too many formulas and definitions on one slide are hard to follow. Use pause in beamer to give your audience definitions and formulas one at a time.

Less is more. Many people (especially graduate students) think they have to present every result they have. Talks like this appear frantic and are impossible to follow. Limit yourself to just a few of your results. You can always mention in words how your $L^2(dx)$ results extend to the $L^p(wdx)$ case. A limited but well-presented selection of your results will do more for your cause than a new-slide-every-ten-seconds review of everything you proved since the 8th grade.

No more than 3 new definitions in one 20 minute talk. After three new definitions, I'm lost. When I mean new definitions, I don't mean laying down standard notation (Let D be the open unit disk and $H(D)$ be the analytic functions on D). I mean definitions that an audience will not have seen before. More than three definitions and you will be talking to the two experts in the field and yourself. Talks are supposed to inform everybody that went to the trouble and expense of attending the conference – not just the experts in your particular area.

Date: May 7, 2019. Reprinted with permission from William T. Ross, Department of Mathematics & Computer Science, University of Richmond. See <https://blog.richmond.edu/wross/2008/03/26/how-to-give-a-good-20-minute-math-talk/>.

Don't include any proofs –none! Twenty minutes is too little time to prove anything and, truth be told, an audience always stops listening as soon as you say, “Let me say a few words about the proof.” Trust me on this one. An audience listens to maybe 8-10 twenty minute talks in a day. They really have no patience for the technical details of any particular talk. Your talk is an advertisement of your results. An interested person – perhaps a competitor trying to get the same results – can always ask you about it afterwards.

Don't use too much non-standard notation. This goes back to an earlier comment. Keep in mind that with beamer, your notation will always be on a slide that has already passed. The audience will quickly forget what $A_{p,q}(G^*, H^*)^v$ represents.

Include some simple examples. A good illustrative example beats a theorem any day of the week.

Don't make too many slides. Express many of your ideas in words. The best talk I ever saw had four slides. I'm not kidding. Click through too many slides and you will quickly lose your audience.

During your talk:

Face your audience: Too many speakers when using beamer (or Power Point) face the screen while they click through slides. This makes for very boring and impersonal talks. Face the audience and only glance back just to make sure you are on the correct slide. If you have prepared enough, you should know your talk by heart anyway.

Don't read formulas. It is quite tedious to listen to people read aloud long formulas. Just say, “The above formula is an upper bound for the function f ”, and not “An upper bound for f is b squared pi squared g squared plus some constant c all divided by r squared v cubed times the integral from minus pi to pi of the absolute value of the function hq ”. Yikes! This is tedious to listen to and eats into your allotted time.

Explain why you are interested in what you do. Mathematicians are often introverted and think there is no room for passion and excitement in mathematics. I always like talks where the speaker explains why they find this line of thinking particularly interesting. Be bold and have an opinion.

Don't give an outline of your talk. Your public speaking professor is dead wrong on this one. Most outlines go something like this: Definitions, history, statement of the main results, proofs, applications, open questions. This type of outline communicates absolutely no information. Every mathematics talk has that outline. Plus, this eats away at the time you could have spent on a good motivational example. Remember, *tempus fugit*.

Be gracious. Having organized conferences and special sessions myself, I can tell you that it is a lot of work. From getting the funding, to getting the room and the laptop, to getting the visas, making the website, to making the schedule – conferences are a lot to pull off. Be sure to briefly thank the organizers in a meaningful way. Something more than, “First I'd like to thank the organizers for inviting me”.

End on time! There is absolutely, positively, without-a-doubt, no reason whatsoever why a speaker needs to go over their twenty minutes. A well-thought out and well rehearsed talk should end on time. There is nothing that ruins a perfectly good talk than going overtime. It upsets the schedule for everybody else – especially in parallel sessions. I've always wanted to have a trap door that would whisk long-winded speakers away.