Category Theory Virtual Postgraduate Seminar
Guidelines 2021

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There is only one rule for this seminar:
Every speaker will give a good talk.

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Introduction

This document is to give you:

1. some criteria I think any “good talk” should satisfy, and
2. some suggestions as to how to go about achieving a “good talk”.

I’m sure you will agree that these things are personal to some extent, and some aspects of giving a good talk can’t be captured by a simplistic list of guidelines. However, I believe that the general standard of talk-giving among professional mathematicians is...not that great, and I guarantee that if you follow these guidelines your talk will be better than the average of all the talks I have attended in my life.

Giving a good talk is difficult. It takes hard work in the form of preparation as well as the effort actually expended during the talk. Colloquium-style talks with a broad audience are probably the hardest. For colloquium talks or conference talks I still spend weeks preparing. It is much easier, and less work, to give a bad talk. However, the benefits of giving a good talk go far beyond the immediate benefit of people understanding you.

I believe that we as a research community are wasting a lot of time by giving, and sitting through, incomprehensible talks. Think of it like this: it takes a long time to prepare a good talk, but if you give a bad talk to 50 people, you have wasted 50 hours of human time on earth. Whereas if you give a good talk, you are contributing to the spreading of knowledge and understanding through the world.

I know that the research community doesn’t necessarily put a lot of value on giving good talks, compared with, say, publishing in prestigious journals or winning huge grants. I think that is part of the problem with what I call the ingressive research environment. A more congressive research community values the sharing of knowledge, and not just among experts. It values the ability to explain things, which is a way of bringing people in. I think we can work towards a more inclusive, congressive research community. Giving good talks, and valuing good talks, is one way we can do that.

1 Criteria

I think a good talk satisfies the following criteria, most important first:

1. It should be comprehensible.
2. It should be engaging.
3. It should be informative.
4. It should contain some interesting mathematics.

The most common error that speakers make is that they focus so much on (4) that they completely fail to achieve (1). Remember: there is no point telling people something interesting if they don't understand a word you’re saying. There’s also no point if you’re so soporific that they’ve fallen asleep
before you get to the point, hence point (2). And I think of point (3) as this: I would like everyone in the audience to go away having learnt something.

There is still an old-fashioned prejudice that being incomprehensible equates to being brilliant, and conversely that being comprehensible means you’re not brilliant. I hope you agree that this is false, and is a poor excuse for being incomprehensible. In this seminar series I will make it a clear part of the description that comprehensibility is the aim, and I will remind the audience that comprehensibility is actually an aspect of brilliance, in my opinion. I think we need to change the culture.

2 Basic rules

Here are some basic rules I think should be applied to every talk. None of them is difficult, so why not apply them?

- **Always put your title up.** If you’re using boards, write the title on the board. This seminar series will all be on slides, so it’s less of an issue as you’ll probably use Beamer and it will put your title on the first slide fairly automatically.

- **Always start by thanking someone.**
  - If you are speaking at a conference, thank the organisers. Unless you are an organiser, in which case thank everyone for coming.
  - If you are a visiting speaker, thank the person who invited you.
  - If you are speaking at your home institution, thank your colleagues for coming.
  - If you are a PhD student, also acknowledge your adviser/supervisor.

- **Always put your plan up.** Your talk should be organised into numbered sections, and you should give your audience an idea of how the talk will go by telling them what these numbered sections are.

- **Always begin with an introduction**, at least a spoken one. (I often start with an informal overview which ends with me putting my plan up. Then the formal part of the talk begins.)

- **Never begin with the word “Definition”**. Nor the word “So”.

Finally, for this series I think it would be kind to stop and ask people if they have questions, at least at the end of every section. (In live talks I do it more often, but in virtual talks I think it can be clunky.) I would recommend always doing this in hour-long research seminars, but not necessarily in shorter or more formal talks. Personally I still do it in formal talks, partly because I actively want to make all talks less formal. It also helps convince people you’re a friendly person who really cares about the audience.
3 Never run over time, ever

You should never, ever run over time. This sounds hard, but it is simply a case of caring, and then planning properly. Here’s how to do it:

1. Care. Running over is an imposition on your audience. Moreover, many people will stop listening if you run over, and will start feeling negatively towards you. Whereas if they like your talk, and you indicate that there was more you wanted to say, they will ask you in the questions (see below).

2. Divide your talk into sections, and decide in advance how long each section should take. Write this down on your notes so that as you get to the end of each section you can check whether you are keeping to your schedule. This way you can make small adjustments early on, rather than having an undignified scramble at the end. When using slides I work out how many minutes I have per slide on average, so that I can check the slide numbers against the clock to see how I'm doing.

3. Plan something dispensable at the end, so that if you run out of time you can abort without missing something important. And in the unlikely event you have time left over, you can fill the time in with something. In particular this means that your main result should not be at the end. Get it out there earlier. One thing you can always do is have your last slide be “Future work” in point form. Then you can talk about it for as little or as much time as you have left at the end.

4. Plan your talk to be shorter than the time available, to allow for interruptions, mishaps, and errors in your timing.

5. Run through your talk in advance, to see how long it takes. When I was a PhD student I practised all my talks at a blackboard to an empty room, sometimes two or three times.

6. After your talk, observe whether it was the correct length or not. After giving a few talks you should learn what is a good rate of slides per minute for you. If your talk turned out to be too long, your next talk should have fewer slides. Please don’t fit more into your talk by just talking faster.

7. My rough rule of thumb was one slide per minute when I used 4:3 slides. Now I use 16:9 slides and often divide them in two, so I go for one slide per two minutes. Note also that transitions make things take longer and give you less flexibility for speeding up if you need to, so it’s useful to make a note of the number of pages of your pdf as well as the number of Beamer frames.

8. Remember that nobody ever minds if you under-run. In fact, it probably makes most of the audience happy.

9. If, even doing all this, you still run out of time, stop talking. It’s better to say “I’m sorry I didn’t have time for all I planned, but my time is up so I’ll stop here” even if it’s mathematically awkward. You can also say “I was going to say something about xyz but my time is up” and then if the audience likes you the first question in question time will be “Could you tell us about xyz?” and everyone will laugh and be on your side.
4 How to prepare

1. Start by making a plan. This should include section headings and timings. Aim for about 4–6 sections and remember:
   - The introduction should be completely intelligible by everybody in the audience.
   - The first couple of sections should be mostly intelligible by everyone. It is unlikely that anything original would go here—it should be expository, going over the basic background for the talk.
   - I think it is acceptable for the last couple of sections to be harder. Some people won’t completely understand them, but they should still have an idea of what’s going on. This is where your new work goes.
   - Imagine the top world experts on your subject are there (which they might be). I think it’s a decent idea to have five minutes at the end that are aimed at them. After all, it is still important to showcase your work.

2. What is the main result you want to tell people? There should usually be basically one result, or one “thing”.

3. What is the main thing you want non-experts to take away from your talk? Some people will be at your talk out of general interest rather than specific research interest—make sure they get something out of it.

4. Plan your slides. Personally I plan them by hand, sketched on paper that I divide up into small-scale “slides”. This is because I use a lot of diagrams and I can’t think exposition at the same time as typesetting diagrams. More details about this follow below.

5. Consider writing out everything you will say in your talk. This is a good idea until you are an experienced speaker, and especially if you are not a native English speaker. I continued to do this for at least the first ten years I was giving talks. I am still likely to write out the introduction, so that I can start smoothly and then get into my stride.

6. The best way of being sure your talk is the right length is to try it. You might feel silly giving a talk to an audience of the empty set, but nobody is watching so it doesn’t matter! You can also time each section so that you know how long you should be spending on each section during the actual talk. You could even find a friend to practise for. Practising your talk is really the only way I know of getting rid of nerves as well (other than having an innate sense of your own overwhelming greatness).

7. For Zoom talks, practise the technical aspects as well. We will build that into the process.

5 Writing slides

As all our talks will be virtual I would like them all to be on slides. It is possible to give a virtual talk with live handwriting but I would like us all to use slides.
I am going to assume you’re using Beamer but you don’t have to. However, I will only be able to help you with typesetting issues if you’re using Beamer (and I can help you with diagram issues if you’re using PSTricks).

I personally believe that slides should not exactly make sense without the talk. If they do, there’s too much information in them: that’s what the paper is for. They should be an aid, not the entire talk. Looking through the slides alone should give us the idea of what the talk is about. I recommend not putting too much text on slides, and I also recommend reading out everything that is on every slide during the talk – the audience is going to do that anyway, and they probably won’t listen to whatever you’re saying while they’re reading the slide to themselves.

Here are my tips for slides. Some of these tips are specific to virtual talks. I use the word “slide” and “frame” interchangeably.

1. For virtual talks: I like to put a grey box in the top right corner for the video of me. This ensures that my face won’t cover any part of my slides. In the live talk it’s not really an issue as the screen share will have its own area on Zoom, but on the video recording Zoom will probably place your face at the top right (that’s what it does for me anyway). You can try it yourself to figure out how big it is going to be, but it might vary depending on the Zoom version being used.

2. Pick your Beamer style and colour-scheme deliberately. I remove all of the extra adornments from the default, except the frame numbers, and I am often asked how to do that as people seem to like it. Also decide whether you’re going to use serif or sans-serif. I resisted sans-serif for ages because I preferred reading mathematics in serif. At some point I switched to sans-serif because I found other people’s sans-serif slides much cleaner to look at.

3. I think most people’s screens are wide these days, so pick 16:9 as your aspect ratio as you can then fit more on each slide. For projected talks I use 12pt, but for virtual talks everyone is at their own computer screen and I think 11pt or even 10pt is fine. I think there’s a big advantage to being able to fit more on a slide, so that the audience can keep more of the material in front of them at once, as if there were multiple blackboards.

4. If you’re using wide slides and smaller text, consider splitting your slides up into parts so they act like several slides that can be simultaneously displayed, so that the audience doesn’t have to try and remember the previous slide when you move on.

5. I strongly recommend making the frame numbers not list the end frame number. So that they don’t say things like “3/24” when you’re on frame 3. This is so that you can have a slide that’s padding at the end: if you run out of time you can just stop before you get there, without anyone ever needing to know.

6. Start with an enumerated list with your plan. Use those numbers as section numbers throughout, and make sure it is clear which section we’re in at any given moment. My preferred way to do that is to have it in the frame title on every frame.
7. Try to make your slides have a clean and clear layout. It really helps the audience.

8. Don’t put too much detail. I think it is rarely appropriate to put full details of a proof. At most, give the main idea of the proof, and then anyone who’s interested can look it up in your paper.

Transitions

By “transitions” I mean where you’re still on the same slide, but you’re making things appear or move. So in Beamer this is where you’re using things like \pause, \uncover, \only.

1. Please do use some transitions. I think it’s too much to put an entire slide up at once. But don’t use too many, as it’s distracting, and reduces your flexibility with timing.

2. Please don’t use the kind of transition where some of your slide is “grey” and then it becomes black when you “uncover” it. I think it’s really distracting.

Here’s my process for making slides

1. Sketch slides by hand in pencil on paper.

2. Type up slides roughly, but mostly without diagrams.

3. Do the diagrams.

4. Fine tune the layout and add transitions.

6 The talk itself

Giving a talk is a form of performance, and it is natural to be nervous. Preparation and practice are two good ways to combat this. One point of this seminar is to give you some practice in a friendly environment! It is difficult to make a handy checklist of “how to give a good performance” but if there’s any aspect you’re particularly worried about feel free to ask me and I’ll do my best to help you with it.

I think virtual talks are more scary because anyone in the world could be there, and you can’t see them all. But they’re also less scary because you can be safely at home, you can have a lot of notes in front of you without anyone seeing, and it’s really a lot more like slides with a voiceover, so it’s less dependent on the “performance” aspect.

7 Benefits of giving a good talk

A good talk massively benefits the audience, but it also benefits the speaker as well. Here are some of the benefits:
• It publicises you and your work, and might provoke interesting questions from the audience which will stimulate more research.

• It helps you understand your work better and can form the starting point for planning the paper you then write on your work.

• A good talk means that people in the community will feel positively towards you and are more likely to remember you. Of course, they will probably also remember you if you give a really spectacularly awful talk.

• If you give good talks you are more likely to be invited to speak at other departments. This is good for raising your profile (and for your CV).

8 Procedure for this series

[This might be updated as we may need to work some things out as we go along.]

I will meet with you (virtually) at least twice to help you to prepare your wonderful talk, but you must do a certain amount of preparation before we meet. We can meet earlier than the suggested timeframe if you want more time to prepare (which I encourage – I try and start 8 weeks before a talk).

1. **At least four weeks before your tentative talk date** we will meet to discuss your proposed title, abstract, and plan with section headings and timings. You can draft these in advance and send them to me, but if you’re stuck we can figure them out together. Making your plan should help you write your abstract. It is much easier to write your abstract *after* writing the whole talk, but in practice we usually have to make something up earlier than that!

2. **At least two weeks before your talk** I will go through the whole talk with you. You don’t need to *give* the talk in full, but we will talk through every slide and discuss the structure, explanations and timing. I will almost certainly suggest edits to your slides so please be willing to edit them! (I just want to help you to give a good talk.)

3. If necessary, we will have one more iteration to check your edited slides. But this could just be you emailing them to me and me commenting.

4. We will pick a talk time that is appropriate for both your timezone and mine.