Topic: How to give a Research talk

Introduction

By a "research talk" we mean a presentation of 5-60 minutes, given to a group of people who are motivated and intelligent, but who may not know much about your particular area.

NOTICE: There are some differences from what businessmen and researchers talking. That's due mainly to a difference in the style of presentation needed for technical material.

1. What to say?

Let us consider the main points.

Firstly, you should usually see your talk primarily as a "taster" for your work, rather than as an in-depth treatment. So two very useful questions to ask are these:

- Who is my primary audience?
- If someone remembers only one thing from my talk, what would I like it to be?

If you have the answer to these questions pinned down, you can use them as criteria when deciding what to say and what to omit. And don't forget to tell the audience the answer to the second question!

Secondly, your talk must have a beginning, middle, and end. You need to ***(1)*** introduce yourself; ***(2)*** present your research question and why it matters; ***(3)*** describe how you conducted your research; ***(4)*** explain what you found out and what it means; and ***(5)*** conclude with a summary of your main points.

Thirdly, you have to use examples.

Most of us do research by trying to solve a bunch of related problems, finding some suitable framework in which to solve them, and then generalising and abstracting our solution. For example, if the problem is to find out whether a function

evaluates its argument, then a suitable framework might be denotational semantics, and a generalisation might be abstract interpretation.

The Awful Trap is to present only the framework and the abstraction, leaving out the motivating examples which you used to guide your work. Many talks are far too abstract. They present slide upon slide of impressive-looking squiggles, but leave the audience none the wiser.

It is utterly vital to present examples which demonstrate the points you are trying to make. When you give a definition of a property, or a mathematical structure, or some new notation, give examples to show what the definition captures. When you give a theorem, give examples to show what it means in practice.

Of course in a written paper you must be careful to fill in the details, and state precisely what is going on (though a good paper has plenty of motivating examples too). With any luck, your talk will persuade your listeners to read your paper, but a talk is the wrong medium in which to demonstrate your mathematical virtuosity.

The need to motivate and illustrate your talk with examples is probably the most important single point in this workshop, because so many talks fail to do so. Ask yourself again and again: “Have I illustrated this idea / theorem / definition / technique / algorithm with an example?”.

Fourthly, you have to say enough without saying too much.

The tension is this: you need to say enough to convey the essential content of your idea, but you must not overwhelm your audience with too much material.

The best way out of this dilemma is to adopt a non-uniform approach to your talk; that is, treat some aspects in more detail than others. It may be painful not to talk about the other parts, but it is better than only giving a superficial treatment to everything, or over-running your time.

Given that there are bound to be people in your audience who don't know the area at all, some overall introduction / motivation is usually essential. But do avoid the temptation of spending five or ten minutes on rambling introductory remarks.

Sometimes, for example, people start with a slide listing prior work on the subject of the talk, or with an abstract description of what the talk is about.

Don't waste time on this - instead jump straight in with an example which demonstrates the problem you are addressing. Remember: if you bore your audience in the first few minutes you may never get them back.

Fifthly, be honest with your audience.

Avoid the temptation to conceal problems you know about in your work. Not only is it dishonest: it is also ineffective. A bright audience will find you out.

Furthermore, if you are open about the difficulties, you may find that someone makes a suggestion which turns out to be just what you need. Get your audience to help you do your research!

2. Visual aids

Technology hints

Use a projector. A research talk is just too short to be able to give a sensible development on the blackboard.

Consider writing your slides “sideways” (landscape-style). This allows you to write larger, increasing legibility, and usefully limits how many things you can write.

Overlays (combined with use of color) can be very helpful when presenting complicated examples, because they reduce the amount of new material to read on each successive slide. However, much of the advantage is lost if you pick up the slides to align them properly: the audience can't keep their eye on the old stuff to see what's new.

Some heuristics: for view graphs, stand up and drop them on the floor at your feet; if you can't read them that way, the print is too small.

What to put on a slide

When you writing slides remember that people can read and take in only very little information. Six or seven “things” on one slide is quite enough.

Slides shouldn't repeat what you plan to say, but they should emphasise it; don't waste visual bandwidth on things you are also going to say. People who copy their paper onto slides and then read from them are immensely irritating. You should plan to talk ABOUT what's on your slides, not read it. Hence this may mean you need separate notes to remind you of what you want to say.

It is conventional to start with a contents slide, giving the outline of your talk. Don't. It takes a precious minute to talk through it, and your audience won't understand it till later. Certainly never include such trivia as “introduction”, “conclusion”. These are understood as a necessary part of every talk.

On the other hand, about a third of the way through, it can be quite helpful to draw breath with a slide which says “This is what I have discussed so far, and now I'm going on to cover these areas”, or some such. This can help to reorient your audience, and make it clear that this is the moment to ask questions if they are lost already. Another way to add signposts is to begin each section of your talk with a slide containing only the title of the section.

Text on slides

In particular, when you first write the slides it's natural to write lots of bullet points and whole sentences of text, because you write down everything that you want to say. Once you've done this, try to remove as much text as possible, by ***(a)*** converting text to other forms (and note that small animations can be invaluable for guiding an audience's attention around a picture), and ***(b)*** presenting the remaining text as concisely as possible. This is hard work - text is faster to create than pictures, tables, etc - but it results in a much better talk. By the way, graphs often say more than tables.

Preparing slides

Don't start writing slides too early. So don't make too much time available. As indicated earlier, we often mull over what we are going to say for a week or two beforehand, but only actually write the slides the night before. This has the merit that the material is absolutely fresh in your mind when you give the talk,

though you do need to have a clear idea in advance of what you are going to say. But you shouldn't write slides in the last night before talking. This is a poor situation.

Regard with extreme prejudice the temptation to pull out old slides from previous talks, and glue them together into a new talk. It almost always shows. Somehow the old slides are never quite appropriate (it's fine to simply repeat a complete previous talk, of course).

3. Giving the talk

Let us consider the main points.

Nerves

If you don't feel nervous before giving a talk, especially to a large or unfamiliar audience, you are a most unusual person. Do try steady, deep breathing beforehand, and relaxation exercises, but don't expect to feel calm.

If you can make eye contact with your audience, then do so. A talk is greatly improved if the audience recognizes they are being talked to rather than being talked at.

Presenting your slides

Some people hide most of their slide under a piece of paper, revealing it line by line, as they go through it. Occasionally this is just the right thing to do, but people quite often do it all the time, which we find a very irritating habit. Perhaps it helps to focus listener's attention on the part you are talking about, but it is also rather condescending: “you can't be trusted to listen to me if I show you the next line too”. If you find yourself wanting to use this technique, ask yourself whether the material would not be better split over two slides.

There are exceptions: when you have a punchline to reveal, for example, or when you need to emphasise that something proceeds stage by stage; but it is a technique to use very sparingly. The inexperienced speaker especially doesn't need the extra hassle of messing about with a bit of paper.

An overriding goal must be to make the slides themselves as invisible as possible. It is the content that is important. This leads to a couple of other don'ts: don't use slides with a rip-off backing sheet; don't use a ring binder to hold your slides during the talk, especially if you open and close it between each pair of slides; don't switch off the overhead projector between slides. Each of these emphasises the existence of the slides as entities in their own right.

The only reason you use a projector is so that people can see your slides. So don't block their view. For this reason it is often better to point at the screen than at the slide. In a big lecture room a pointer can help with this, but try not to bang the screen with it - it makes everyone else's eyes go funny.

Timing

Don't overrun. It is selfish and rude. Either you will be cut off by the chairperson before you have reached your punchline, or you will compress others talks, or you will make everyone late. In any case, you audience's attention span is limited, so you probably won't manage to convey much in your over-time period.

Run through your talk at least once in advance so you know how long it will take. It probably needs to be cut down. As you get more experienced, you will learn how long a single slide lasts in your talks. The average for most people is probably 2 to 3 minutes. Plan a couple of places where you can leave out a bunch of slides, and check your watch when you get to them.

It's a good idea to have a couple of slides at the end of your talk which you can use in the unlikely event that you finish early, but which you usually expect not to use.

Don't forget to leave time for questions at the end.

Ending

Make it obvious when you have finished! Otherwise you will have those excruciating few seconds of silence while the audience decides whether to applaud. It mostly comes down to the tone of your voice. If you finish with a sentence that

clearly wraps things up and then say “thank you” in the right tone, it's obvious you have finished and the audience will applaud. Practice beforehand, it's easy.

If you have a moderator, don't ask for questions - it's their job. If you don't have a moderator, ask for questions after the applause.

During Questions and Answers session you have to keep your cool; give direct answers; be complete, but don’t ramble. You may do pause, take notes, and say “I don’t know” (at least sometimes) or “I will look into it”.

It’s so good when you have anticipated questions and can show additional slides for answering.

Conclusion

Without a doubt it is worth putting thought and effort into presentation skills. Your work, no matter how brilliant, becomes valuable to others only in so far as you communicate it to them.

Self-study materials

1) How To Make an Oral Presentation of Your Research.
   URL: http://www.virginia.edu/cue/ presentationtips.html.
   Abstract: Simple sample of Oral Presentation Outline.
2) Mark D. Hill Oral Presentation Advice: A Generic Conference Talk Outline.
   URL: http://pages.cs.wisc.edu/~markhill/conference-talk.html.
   Abstract: Sample of conference talk outline template.
3) Andreas Zeller. Perfect Talk. URL: https://www.st.cs.uni-saarland.de/zeller/GoodTalk.pdf.
   Abstract: Instruction of presentation creation as the Sample of handout.
4) Making PowerPoint Slides. URL: http://www.iasted.org/conferences/formatting/Presentations-Tips.ppt.
   Abstract: The tips about slides design.
5) Mike Dahlin. How to Give a Bad Talk URL: http://www.cs.utexas.edu/~dahlin/professional/badTalk.pdf.
   Abstract: The tips about bad slides design.