Preparing Defense Talks
for Proposals, Projects and Theses

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I found recently that I keep repeating the same advice to my students that are preparing a defense talk. Rather than keep trying to remember all these points every few months, I am taking the time to write them down. These comments apply for both undergraduate and graduate students.

1. **If the work was worth doing, the talk about it is worth rehearsing.** Make sure to rehearse and time your talk (with a friend as an audience member, if you can). Running through the talk often changes your understanding of how you want to present, which topics to present, and in what order. You also want to be comfortable with the content and flow of the talk, to save energy for responding to questions during your defense.

   This is of equal importance to the slide contents themselves. Too many students underestimate the value of this - slides presented poorly confuse an audience.

2. **At the talk, the most valuable quantity is your audience's (i.e the committee's) response.** In reality, it is the committee's questions and discussion that are the 'value added' for the defense. Your goal is to identify the most important contributions, techniques and results of your work to make the nature and value of *the core of your work* clear for the committee. Ideally, the talk is a tightly structured summary of your thesis/report that also provides a springboard for discussion.

3. **How many slides to use?** I used to feel strongly that one slide for every two minutes of a talk was the maximum. I then had an MSc student (David Snyder) use almost twice as many slides as minutes available in an excellent defense talk. After some thought, I've come to conclude that what is important is that 1) the pace of the talk is comfortable without dragging, and 2) that the content and organization are clear.

   If when rehearsing the talk you feel rushed - in any way - seriously consider what you can cut out of your talk. This might be slides, or simply what you say about the slides. If the flow feels awkward, consider what you can change to make the flow feel natural. The less the audience has to work to understand *what* you are presenting, the more energy they have to *think* about and *respond* to your work.

4. **Do not use an 'overview' slide.** Rest assured - professors expect that you will provide an introduction, followed (in some order) by related work, methods, results, discussion, a conclusion and future work. Taking a couple of minutes of the talk to present a slide illustrating this does not engage the audience. It just reduces available time to talk about

things that the committee does not already know about.

In my experience, a better approach is to start with a simple example or illustration of the problem and main results, identify the main contribution/conclusions of interest, and then use these to structure the talk. I'll be hooked, whether I like it or not, because then I know what the talk is 'really' about, and then want to be taken through the details. In essence, this is similar to how trailers are used to motivate people to see a new movie.

5. **Duration.** Try to fill about half the time with your prepared talk. For example, if you have been given an hour to talk, aim for a talk of 30 minutes in length at most (not including questions). This makes sure that you keep the talk short and focused, and avoids the defense stopping before you've finished, or before you've had a chance to benefit fully from the committee's opinions and feedback.

6. **Use extra slides to prepare for questions.** When you create slides that you decide later you won't use in the main part of the presentation, move them behind your final presentation slide. Then, when the committee asks questions, if you created a relevant slide, you can use it to illustrate your point. It is often a good idea to have some of the results that you don't present in the main talk in extra slides at the end as well.

7. **Bring the document.** Have a copy of your proposal/report/thesis with you at the defense, so that you can refer to specific sections if the committee wants clarifications.

8. **Drafting the talk.** I suggest 'outlining' the talk first - fill in the goals, contributions, and main findings, create slides for the main sections, etc. It's easier to fill parts of a structure in, rather than create the talk from start to end, usually. There's probably a bit of alternation here - outline a bit, fill in a few details, get stuck, try outlining a bit more, fill in more details, etc.

The key idea here is to see the big picture - if you don't know the form of your talk, you can't pace the talk to emphasize the main points. Once you have a complete rough draft, then go ahead and do whatever feels natural to fill in the details. For myself, I tend to choose a section and 'polish it,' and then move on to the next section. In the final stage, I make a number of passes over the complete talk to reorder topics, and remove or replace unimportant or awkward content.

9. **Use the force (of images).** Think carefully about where images, plots and graphs can communicate definitions, concepts, data, algorithms and results quickly. This is a very powerful way to include more content in a talk without taxing the audience. Well-chosen graphics can often help the committee immediately see a point faster and more clearly than you could present it in words alone (in particular, it allows you to show, rather than describe relationships and structure). One of my PhD advisors (Dorothea Blostein) once suggested drafting talks and papers by starting with the figures, which I've often found to be very useful.

As an example of using images to organize the presentation, I recently had a PhD student (Lei Hu) use section title slides that included images from the section about to be presented, which he would briefly summarize. This helped him engage the audience by foreshadowing the main ideas in a way that was easy for the audience to follow, and insured that they saw each of those images twice, making them easier to remember.