How to Give a Good Research Talk*

Stephen D. Scott

*Adapted from Sally Goldman’s slides.

Why Are We Here?

• For your work to have significant impact, it is essential that you can convey results to your community
• Your technical reputation depends on colleagues’ reaction to your talk
• When on the job market this skill will be crucial in getting a research position in academics or industry
• Giving a good talk is a skill you can learn
• I will give you guidance and tips on giving a good talk

Goals of a Talk

• Goals:
  – keep audience’s interest (and attention)
  – convey technical material
  – communicate a key idea of work
  – provide intuition
  – convince audience to read your paper
• Non-Goals:
  – show people how smart you are
  – expect audience to understand most key details of your work
• Note that this meta-talk focuses on giving a conference presentation or job talk; other scenarios, such as teaching, can have different contexts, goals, and approaches

Outline

• Goals of a talk
• Planning stages
• Structuring your talk
• Slide preparation
  – What to do
  – What to avoid
• At the talk
  – What to do
  – What to avoid
• Concluding remarks

Planning Stages

• Know your audience:
  – What is their background?
    • general CS (or math, or EE)
    • somewhat specialized audience
    • highly specialized audience
• If someone has spoken before you:
  – Look at paper/abstract of relevant talks that preceeded yours
  – Prepare to use context provided

Scheduling (if you can)

• If possible, schedule your talk at 10:00
  – most people are awake
  – few have gone back to sleep
• Bad times to schedule talk:
  – right before lunch since the audience is thinking about food
  – after lunch since the audience is more likely to be sleepy
  – late afternoon since people will be running out of steam
• Best to have room that will be comfortably crowded
Structuring Your Talk

- Use a top-down approach:
  1. Introduction: define problem, present a “carrot”, put in context, and give outline at end of introduction
  2. Body: high-level summary of key results
  3. Technicalities: more depth into a key result
  4. Conclusion: review key results, wrap up, give future work

The Introduction

- Define the Problem
  - minimize use of terminology
  - use pictures/examples/props if possible
- Motivate the audience (give a “carrot”)
  - why is problem important?
  - how does it fit into larger picture?
  - what are applications?
- Discuss related work
  - table useful (mention authors and dates)
- Succinctly state contributions of your work
- Provide a road-map (outline) at the end of the introduction

Concept Class of One-Dimensional Patterns

- The instance space $\mathcal{X}_n$ consists of all configurations of $n$ points on the real line
- A concept is set of all configs. from $\mathcal{X}_n$ within unit distance under Hausdorff metric of some “ideal” configuration of $k$ points, where Hausdorff distance between configs. $P$ and $Q$ is
  $$H(P, Q) = \max_{p \in P} \left( \min_{q \in Q} d(p, q) \right),$$
  where $d(p, q)$ is distance between $p$ and $q$
- If $P$ is any configuration of points on $\mathbb{R}$, then concept corresponding to $P$ is $C_P = \{ X \in \mathcal{X}_n : H(P, X) \leq 1 \}$
- $X$ is a positive example of $C_P$ if $X \in C_P$, and is a negative example otherwise
- Concept class of one-dimensional patterns is $C_{k,n} = \{ C_P : P$ is a configuration of $\leq k$ points from $\mathbb{R} \}$

The Body

- Abstract the key results
  - focus on a central, exciting concept
- Explain significance of your work
- Sketch methodology of key ideas
  - keep it high-level, emphasizing structure
  - use pictures/diagrams if possible
  - provide intuition (helpful when someone later reads your paper)
  - gloss over technical details

The Technicalities

- Take key result (or part of it) and go into some depth
- Guide audience through difficult ideas
  - give overview
  - state result
  - show an example
  - review
- It is this portion of your talk that typically grows when you give a 50 minute talk
The Conclusion

- Provide a coherent synopsis
- Review key contributions and why they are important
- Discuss open problems/future work
- Indicate your talk is over (for example, “Thank you. Are there any questions?”)
- Be ready to answer questions
  - If there are points you glossed over that you expect the audience may be interested in, you may want to prepare some slides (just in case)

Slide Preparation—Do

- Decide what you want to say and say less!
- Allow an average of 1.5–2 minutes for each slide
  - exact amount of time determined by practice
- Use Repetition
  - “Tell them what you’re going to tell them. Tell them. Then tell them what you told them.”
  - realize that 20% of your audience at any given time is thinking about something else
- Use pictures/diagrams whenever you can

Slide Prep—Do (cont’d)

- Check your spelling
- If you use a slide more than once, duplicate it
- PRACTICE!
  - give a practice for your colleagues, advisor, friends, pets, etc.
  - be ready to redo all your slides
  - practice again
  - be sure that all your material projects on the screen and contrast is good
  - make sure it does not take too much time
    (Beware PowerPoint’s timer!)

Slide Preparation—Don’t

- Overload slides
- Intend to use too many slides
- Put some detail on the slide that you do not want to talk about
- Get bogged down in details
- Try to give a core dump

Slide Prep—Don’t (cont’d)

- Show complex equations
- Show complex code (even pseudocode)
- Have a slide that introduces a point that you are unsure of (unless you want to give the audience a chance to attack you)
- Present last-minute results (they are probably wrong)
- Have slides that you are not using mixed in with the rest
- Write messy, write (or use a font that is) too small, misspell words
At the Talk—Do

- If you expect the audience to take notes, provide copies of your slides
  - Rarely the case at a conference or colloquium/job talk
- Dress appropriately—this shows respect for your audience
- Have eccentricity (but not too extreme)
  - Make it fun/easy for people to remember you
  - Extreme eccentricity is bad for younger people

Be EXCITED about your work!

Remind; don’t assume
- If you assume a standard result, provide the audience with a brief reminder

The Ignorant Audience Law: someone important in the audience always knows less than you think everyone should know, even if you take the Ignorant Audience Law into account

Talk with Sufficient Volume

- Make eye contact and “read” the audience
  - Change victims
- Be with the audience
  - Walk toward and away from the people as well as left and right to break down implicit barrier

Point to the screen, not slide/computer monitor
- Use a pointer, not hand/pen

Bring props, if appropriate

Ask real and rhetorical questions to keep audience engaged

Deflect obstructionists:
- Tell them you’d like to talk to them after the talk (about the interesting point made) because the point is a detail, tangential, has a long answer, you need to think about it, etc.

End on time!

At the Talk—Don’t

- Talk too softly, mumble, or speak in a monotone voice, use “um”, “ah”, ...
- Read your slides
- Focus attention on the screen—you’ll end up talking to the screen vs. the audience
- Stand so that you block the projection
- Mention a detail/point you don’t want to talk about
- State a definition or other important concept without also printing it on the slide
- Darken the room (unless necessary to see) since it entices audience to sleep
- Babble on when you have nothing to say
- Run over time

Concluding Remarks

- Follow the guidelines provided here
- Take every opportunity you can to give talks (and thus get practice and feedback)
- Remember that the guidelines for structuring your talk must be adapted to each specific talk
- Preparing a good talk takes time: do not expect to throw it together at the last minute
- Practice for colleagues, etc. to get feedback
- AND: you will give better talks and reap the rewards that follow