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 <u>at end of introduction</u>

  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) <u>at the end of the introduction</u>

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 <u>Hausdorff metric</u> of some "ideal" configuration of k points, where Hausdorff distance between configs. P and Q is

$$H(P,Q) = \max\left\{\max_{p \in P}\left\{\min_{q \in Q}\{d(p,q)\}\right\}, \max_{q \in Q}\left\{\min_{p \in P}\{d(p,q)\}\right\}\right\}$$

  and $d(p,q)$ 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

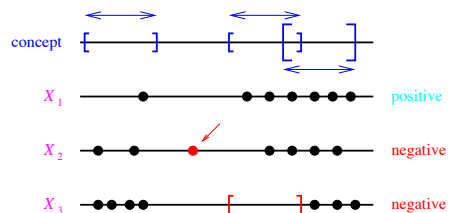- Concept class of one-dimensional patterns is
$$\mathcal{C}_{k,n} = \{C_P : P \text{ is a configuration of } \leq k \text{ points from } \mathbb{R}\}$$

Concept Class of One-Dimensional Patterns

- Each concept c is a set of fixed-width intervals on real line

- Each example X is a set of points on real line

- Example X is positive if and only if:

  1. each of X's points lies in an interval from c

  2. each interval of c contains a point from X

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 slides

  – 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)

- Use a large font (at least 20 pt)

- Make neat/orderly slides

- Use overlays or other "scaffolding"

- Use color/animation (in a meaningful way; not just to attract attention)

- You need not use full sentences

- Number your slides

- Write reminders, key phrases, etc. on paper or in PowerPoint's notes

---

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 Preparation—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

At the Talk—Do (cont'd)

- Be EXCITED about your work!

- Remind; don't assume

  - If you assume a standard result, provide the audience with a brief <u>reminder</u>

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

- **<u>Talk with Sufficient Volume</u>**

- 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

At the Talk—Do (cont'd)

- 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