

CSC 595 - Research Skills

Communication #2: How to Give a Talk

Nishant Mehta

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First rule: Do NOT read the title!

Motivation

Giving a great talk takes a lot of effort. Why bother?



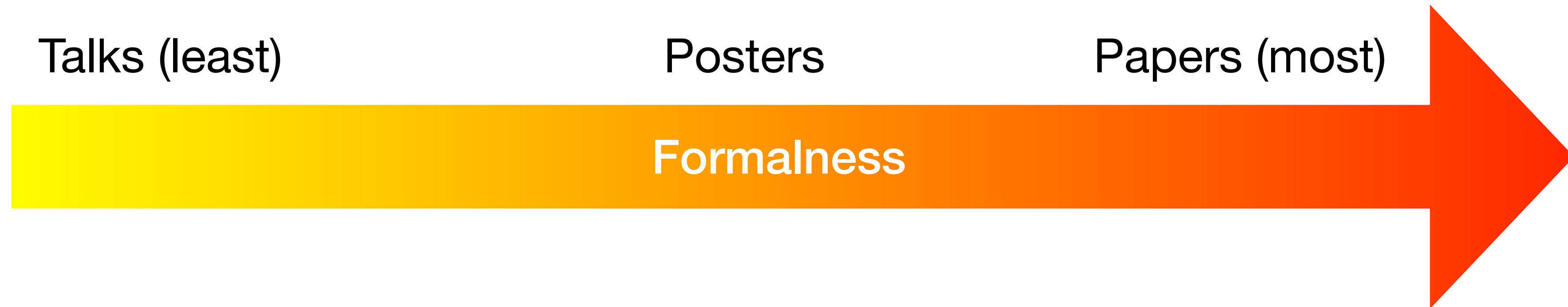
- You inspire people. You entertain people
- People adopt your ideas
- People talk to you. You get new ideas
- One day, people invite you places to give talks



How Can I Prepare a Talk?



The Nature of a Talk



A talk is an advertisement for your paper. Use a talk to motivate someone to read your paper

Rookie Mistakes OR Ways to Give a Bad Talk

- Covering EVERY result from your paper
 - Papers are comprehensive
Talks should give two to three take-home messages
- Presenting everything formally, giving all details
 - Papers are formal
Talks are informal



Rookie Mistakes OR Ways to Give a Bad Talk

- Writing in complete sentences
 - Papers use complete sentences
 - Talks use sentence fragments and big fonts
- Lots of text
 - Always prefer visuals over text
- Multiple messages on a slide
 - Each slide should have at most one purpose



Rookie Mistakes OR Ways to Give a Bad Talk

Rookie Mistakes OR Ways to Give a Bad Talk

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- In 99% of cases, slow unrolls annoy the audience and also slow you down
- Use within-slide transitions sparingly

The Nature of a Talk

- Talks use minimum detail necessary to convey simple messages
 - Audience can't absorb/remember complicated notion in a talk
 - Audience can't process a lot of math in a talk
 - Audience can't pay attention to 10 minute (or even 5 minute) proof in a talk

The Nature of a Talk

- A bad talk tries to make the speaker look really smart (but doesn't teach anyone anything)
- A good talk:
 - makes the speaker's difficult results look approachable
 - gives the audience a take-home message, new knowledge

The Nature of a Talk - Storytelling approach

- Storytelling is a great way to give a talk. Examples:
 - The passion that drove you to work on the problem
 - “This work is the result of a sequence of mistakes and misunderstandings”
- All of the positive advice about story-telling for writing a paper also applies to a talk
- Even better, since talk is informal, you can more heavily use aspects like suspense, entertainment, building to a climax than you can in a paper

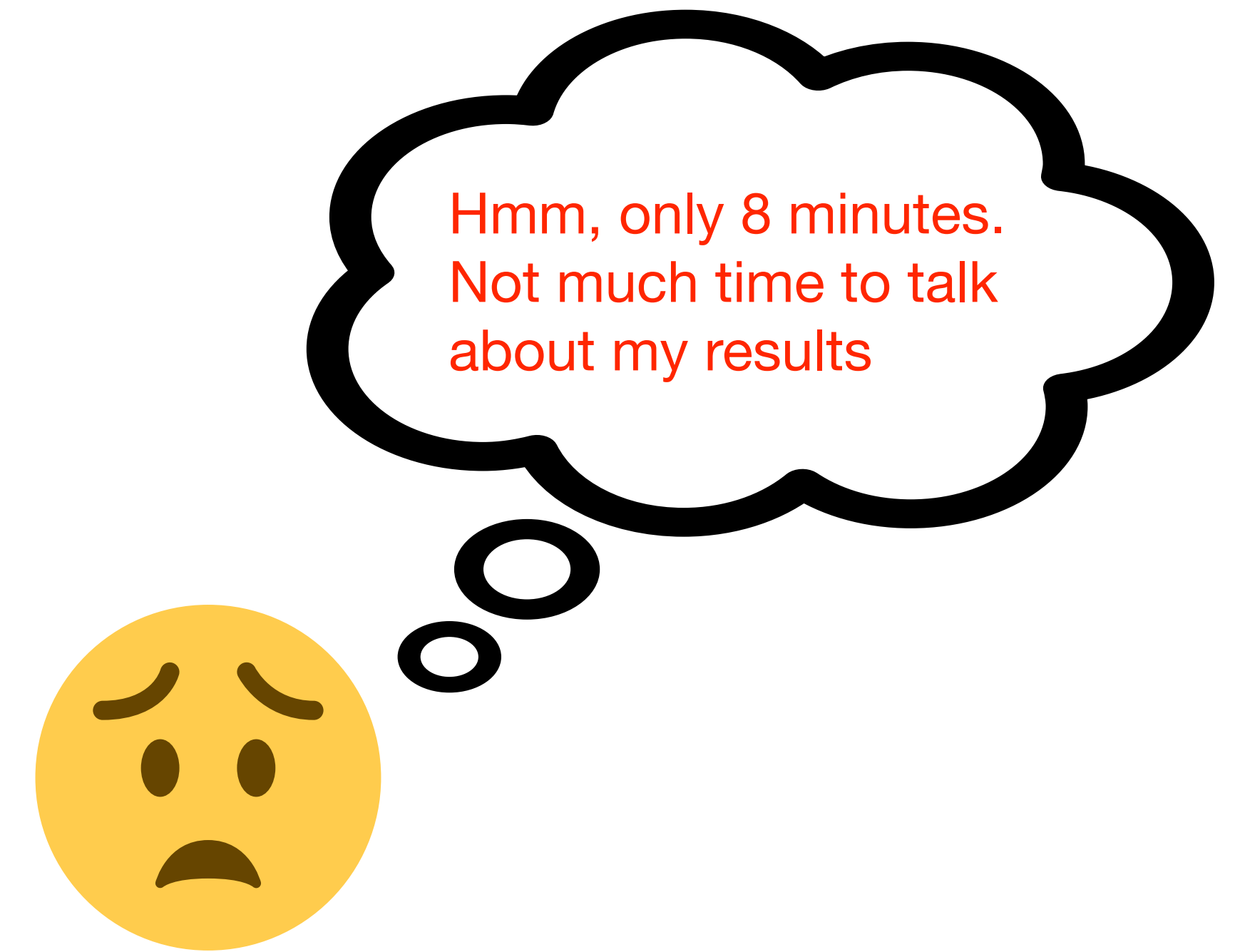
Consider Your Audience

Typical audience:

- Doesn't know who you are... so make a great first impression!
- Doesn't have the expertise you have... so cover technical parts at the level of intuition
- Is tired or sleepy... so overwhelm them with your enthusiasm!

High-Level Structure

- Typical conference talks these days:
from 10 to 18 minutes (+ 1 to 2 minutes for questions)
- Let's consider a 15 minute talk
- Main sections of a talk:
 - Intro/Motivation: 2 to 3 minutes
 - Describe the problem: 3 minutes
 - Contributions (Solutions/Results): 8 minutes
 - Conclusion: 1 minute



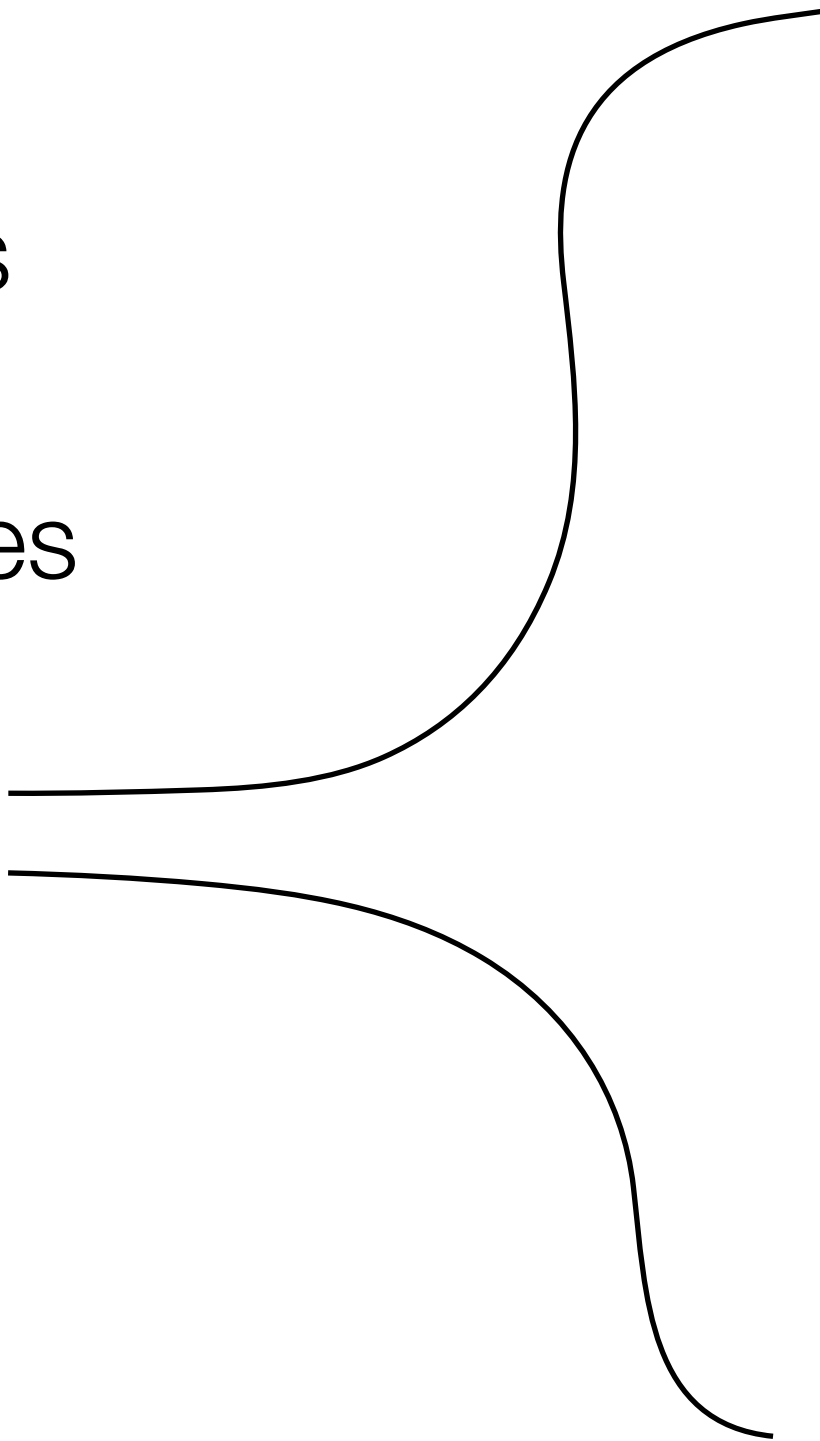
Yup, but a hard reality:

Spend ~1/3 of time on setup so audience knows enough to appreciate problem.

Otherwise, audience won't or can't care about your solutions and results.

Those 5–6 minutes are well spent.

High-Level Structure

- Let's consider a 15 minute talk
 - Main sections of a talk:
 - Intro/Motivation: 2 to 3 minutes
 - Describe the problem: 3 minutes
 - Contributions: 8 minutes
 - Conclusion: 1 minute
 - Roadmap (20–30 seconds)
 - High level of solution - 2-3 minutes
 - Expert-level stuff - 2 minutes
("Intimidation slides")
 - Results - 3 minutes
 - Conclusion - 1 minutes
- 

Planning for Your Audience

- Know your audience, reduce level of talk to match audience's expertise
- This may require “killing your darlings”
 - Among your results, show the ones the audience needs rather than ones you love

Intro/Motivation

- One of the most important parts of the talk
- Without this, people don't have a reason to pay attention to rest of your talk
- Start with an exciting opener (the “hook”)
 - Interesting problem, maybe one that relates to majority of audience or involves a few specific members of audience
 - Recent news topic with interest to the audience
 - Keep it simple and fun. People are just settling in. Avoid math

Describe the Problem

- Try to do this using minimum level of detail
- Try to connect to working example (example used throughout the talk)
- If the work is mathematical, try using visuals to convey necessary mathematical components

Contributions

- Decide on most important take-home messages
Based on messages, decide which contributions to present
- Advice:
 - For 10 minute talk, at most two contributions (if two, probably no time to explain the *how*, i.e., high-level of your solution strategy)
 - For 15 minute talk, at most two contributions so you have time for expert-level stuff

Contributions

- Make clear what your novel contributions are
- Ways to clearly announce novel contributions:
 - Use something like 
 - Cite your own paper on the slide
- Also give credit where credit is due: cite other people's work
 - Be generous when talking about others' works. People notice that, and it's a good habit.

High-Level Overview of Solution

- Describe solution (experiment/study design, technology/algorithm/proof idea) at high level
 - Choose a level that most of the audience should be able to follow
- Use visuals as much as possible to convey key ideas
- Give audience a take-home message: the key idea behind your solution
- Be sure to TELL THEM that it's the key idea

Contributions - Expert-Level Stuff

- “Intimidation slides” (2 to 3 minutes max):
 - Purpose: convince absolute experts in the room that you know your stuff (especially important for job talks)
 - OK if everyone else tunes out (because 2 to 3 minutes max)
- Don’t actually intimidate though... Experts appreciate conveying difficult concepts simply. And mathematicians love simplicity, not complexity!
So:
 - Present ideas at the level of intuition
 - For math, use proof sketches, with visuals doing as much of the work as possible

Contributions - Controlling Level of Detail

- Common issue in preparing a talk (especially when covering Contributions):
 - Too many details (hard for audience to follow)
 - Too long
- A single solution (“one arrow, two kills”):
 - Reduce detail! This reduces detail 🤔 and saves time :-)

Specific Advice When Presenting Algorithms

- Don't put formal algorithm in all its glory (especially not via a low-res screenshot)
- So, avoid slides like the below

Our Main Algorithm

Algorithm 2: Hedge-Perm-Known (HPK)

```
 $\forall i \in [K] \ c_{i,1} := 1, h_{i,1} := \lceil 2^{K-i-1} \rceil$   
 $E_a := \{e_1, e_2, \dots, e_K\}$   
for  $t = 1, 2, \dots, T$  do  
    play  $\mathbf{p}_t = \left[ \mathbf{1}[e_i \in E_a] \cdot \frac{h_{i,t} \cdot c_{i,t}}{\sum_{j=1}^K h_{j,t} \cdot c_{j,t}} \right]_{i \in [K]}$   
    receive  $(\ell_{1,t}, \dots, \ell_{K,t})$   
    for  $e_i \in E_a$  do  
         $c_{i,t+1} := c_{i,t} \cdot e^{-\eta \ell_{i,t}}$   
         $h_{i,t+1} := h_{i,t}$   
    if expert  $j$  dies then  
         $E_a := E_a \setminus \{e_j\}$   
        for each  $i = j + 1$  to  $K$  do  
             $h_{i,t+1} := h_{i,t+1} \cdot c_{i,t+1}$   
             $+ (h_{j,t+1} \cdot c_{j,t+1}) (\lceil 2^{i-2} \rceil / 2^{K-1-j})$   
             $c_{i,t+1} := 1$ 
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       $+ (h_{j,t+1} \cdot c_{j,t+1}) (\lceil 2^{i-2} \rceil / 2^{K-1-j})$   
       $c_{i,t+1} := 1$ 
```

Instead, prefer:

- Minimalist, informal description of algorithm
- OK to use words instead of notation

If possible, use diagram
INSTEAD OF pseudocode

Results

- Results are important. They are evidence of progress on the problem
- Results can be in different forms:
 - Experimental results
 - Theoretical results
- Make sure audience can clearly understand, and remember, your results
 - Each result should have a clear message
 - Don't show too many results (keep number of messages small)

Specific Advice When Presenting Experimental Results

- Avoid large tables of results. Present results via plots when possible
- For figures, include text to offer interpretation
- Never grab screenshots of figures from papers.
If you *must* take figure from paper:
 - 1) Save PDF of paper
 - 2) Use [pdfjam](#) or [pdftk](#) to get PDF of just the page with the figure
 - 3) Put one-page PDF into Keynote/Powerpoint/LaTeX and crop to get high-quality, vector graphics version of figure

Specific Advice When Presenting Mathematical Results

- Don't put formal theorem statements in the slides (and NO low-res screenshots from paper!)
- Show informal theorem, with use of colors to keep audience awake

Good Idea

With probability at least $1 - \delta$,
per-action regret of SB-EXP3 is

$$O \left(\sqrt{\log(G_T/\delta) \sum_{t=1}^T |A_t|} \right)$$

Total number of arms
that were ever active

Bad Idea

Theorem 3. For any $\gamma \geq \frac{\eta}{2} > 0$, Algorithm 1 guarantees

$$\max_{a \in [K]} R(a) \leq \frac{\ln G_T}{\eta} + \frac{\ln(2G_T/\delta)}{\gamma} + \left(\frac{\eta}{2} + \gamma \right) \sum_{t=1}^T A_t$$

with probability at least $1 - \delta$. Tuning η and γ leads to an $O \left(\sqrt{\ln(G_T/\delta) \sum_{t=1}^T A_t} \right)$ bound.

Conclusion

- Put take-home messages here
- Great place to put (or remind audience of) open problems. An invitation to the audience
- Ideal if this is last slide (shown during question period). Helps audience think of questions

Backup Slides

- Create backup slides that have extra technical details
- Use these if the audience asks certain questions
- Also helpful emotionally since the talk could not include everything you wanted to include

How Can I Give a Talk?



Rookie Mistakes OR Ways to Give a Bad Talk

- Give the talk like a robot:
 - Don't memorize what to say
Practice until easy to talk “on the fly”
 - Don't be monotone
Use intonation to keep audience's attention
 - Don't stay still
Move around. If mic is fixed to a spot, move hands/head
 - Avoid being boring
Use humor



Caveat about jokes: Careful with job talks. If you don't know the local culture, test jokes on friends that do know what kind of jokes are OK

Connecting with the Audience

- Before the talk: try and chat with some audience members
 - Helps connect with audience
 - Helps you loosen up (now you know some people in the room)

Energy and Enthusiasm

- Among everyone in the room, you should be the most excited about your talk
- Show your enthusiasm. Let the audience be carried by it
 - So, speak LOUDLY
 - Use intonation
- During your talk:
 - Smile
 - Maintain eye contact with the audience
 - No need to look at specific person, but avoid frequently looking at laptop and projector screen
 - Never use a script or notes. These kill your energy and suggest incompetence

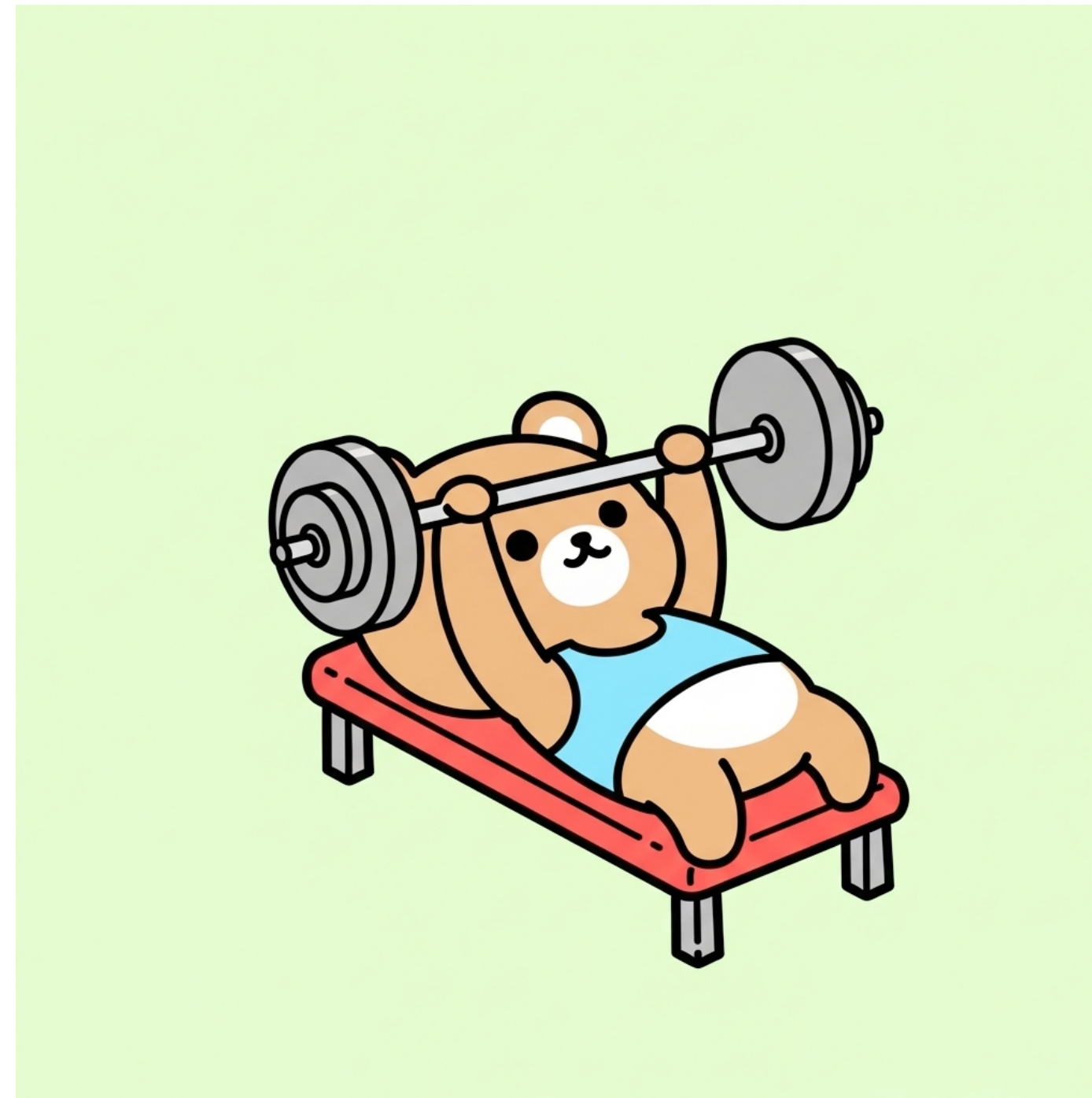
Pauses

- Pauses are better than filler words (avoid “uh, um, ok, ...”)
- Use pauses for emphasis.
- If there is time to ask audience a question, follow question with a large pause
 - Uncomfortable silence often coaxes someone to ask a question (“uh oh, looks like the speaker is going to wait forever unless someone asks something...”)

Handling Questions

- Treat every question, even ones that seem nasty, as good-natured
- Always stay calm. Don't lose your composure
- If you don't understand the question, it's OK to ask speaker to clarify.
 - Another strategy make your best attempt to understand it and repeat your understanding of what they are asking
- If you don't know the answer to a question, OK to say you don't know (better than giving a likely incorrect answer)
 - Can follow up with question-asker after your talk

How Can I Practice a Talk?



Getting the Time Right

- At first, practice solo
- How to practice with yourself:
 - Don't just say words inside your head. Talk out loud!
(if awkward, do this while music is playing)
 - Helps ensure you know what you will say
 - Helps ensure what you are saying makes sense

Getting the Time Right

- First practice run is usually way too long. But don't panic yet!
- Time will drastically reduce as you practice what you want to say
- First practice run might be 30 minutes... after practice, could go down to 20 minutes

Getting the Time Right

- Two problems with a single solution:
 - **Problem 1:** Difficult to get timing of whole talk right if you don't measure time of each segment
 - **Problem 2:** Especially for long talks, difficult to motivate yourself to practice entire talk and get timing right
- **Solution:** Split talk into segments (each being 3 to 10 minutes, depending on overall talk length). Practice each segment separately and measure time.

Practice with an Audience

- OK to give MULTIPLE practice talks
- What types of audiences to practice with?
 - Technical talks at a conference in your area: your lab
 - Talks for smart people with different expertise: try to get general CS friend not in your area

Some Final Things

- Expect to make MAJOR changes after getting feedback from others
- Being full of enthusiasm, having a happy (smiley) mood, and high energy does not come naturally to everyone. Do things that help you get into this high energy, positive zone:
 - Consider intensive cardio exercise the day before
 - Consider what you eat the day before, or just before, the talk
 - Sleep well! Poor sleep can be the biggest saboteur of a talk