How to give a great research talk

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Research is communication

The greatest ideas are worthless if you keep them to yourself

Your papers and talks
- Crystalize your ideas
- Communicate them to others
- Get feedback
- Build relationships and increase your visibility
This presentation is about how to give a great research talk

- What your talk is for
- What to (and not to) put in it, and how
- How to present it
What your talk is for

Your paper = The beef

Your talk = The beef advertisement

Do not confuse the two
The purpose of your talk...

...is not:

- To present all the technical details
- To impress your audience with your brainpower
- To tell them all you know about your topic
The purpose of your talk...

..but is:

- To give your audience an intuitive feel for your idea
- To make them foam at the mouth with eagerness to read your paper
- To engage, excite, inspire them
A great talk will...

Leave the audience thinking:

- “That is a great idea. I wish I have thought about that.”
- “I wonder if I can use this idea in my research...”
- “I need to read this paper and learn how they did X...”
Your audience ...

The audience you would like

- Have read all your earlier papers
- Thoroughly understand all the relevant theory in your area
- Are all eager to hear about the latest developments in your work
- Are fresh, alert, and ready for action
Your actual audience...

The audience you get

- Have never heard of you
- Know some theories, but wish they hadn’t
- Have just had lunch and are ready for a doze

Your mission is to

WAKE THEM UP

And make them glad they did
What to put in
What to put in

1. Motivation (20%)
2. Your key idea (80%)
3. There is no 3
Motivation

You have 2 minutes to engage your audience before they start to doze.

So, cut to the chase!
Motivation

- What is the problem?
- Why should anyone care about it?
- How does your work make a difference?

Example: Realistic rendering of a 3D scene is crucial in movies and games, but current methods take too long to compute. I will present a new rendering algorithm that achieves 100x speed-up while giving visually comparable results.
Your key idea

The audience at best remembers only one thing from your talk.

You must pick one key idea to focus on. “What I did this summer” is No Good.
Your key idea

- Spell it out. Don’t leave your audience to figure it out for themselves.

Example: “The key idea is to approximate a complex geometry using a simpler proxy that allows much faster computation of ray intersection.”

- Repeat it!
  - “This is the key idea …”
  - (after elaborating details of your work) “Again, the main idea is…”
  - (at the end of the talk) “If you remember nothing else, remember this.”
Your key idea

- Be focused. Organize your talk around this specific idea. Ruthlessly prune material that is irrelevant to this goal.
- Explain it in depth so that everyone gets it.

Narrow, deep beats shallow, wide!
Know your audience

Adjust the depth of materials to the audience:

- **CS grad students (e.g., DSS talk)**
  - Never heard of computer graphics
- **CS faculty (e.g., academic job talk)**
  - Heard about graphics
- **Experts in related areas (e.g., thesis defense)**
  - Knows basics about graphics but none in rendering
- **Experts in your field (e.g., conference talk)**
  - Knows a lot about graphics but only the basics about rendering
Examples

Examples are your main weapon!

- To motivate the work
- To convey the intuition of your idea
- To illustrate the idea in action (baby problems)
- To show extreme or failure cases
- When time is short, omit the general case, not the example
What to leave out
Outline of my talk

- Motivation
- Related works
- The key idea
- Algorithm details
- Results and comparison
- Conclusion and future work
No outline!

“Outline of my talk”: conveys near zero information at the start of your talk.

But, if your idea has several steps or pieces, use a short running outline when you explain them, so that the audience won’t get lost.

1. Proxy generation
2. Ray-Proxy intersection
3. GPU acceleration
Related work

[PMW83] The seminal paper

[SPZ88] First use of epimorphisms

[PN93] Application of epimorphisms to wibblification

[BXX98] Lacks full abstraction

[XXB99] Only runs on Sparc, no integration with GUI
Minimize related work

- You absolutely must know the related work; respond readily to questions
- But mention only the few that are immediately related to yours
- Keep it short, and make your points clear:
  - why don’t they solve the problem?
  - what have you done that is better?
Technical detail

\[
\begin{align*}
\Gamma \vdash k : \tau_k & \quad \Gamma \cup \{ x : \tau \} \vdash e : \tau' \\
\Gamma \vdash \lambda x. e : \tau \rightarrow \tau' & \quad \Gamma \vdash e_1 : \text{ST} \tau^o \tau \\
& \quad \Gamma \vdash e_2 : \tau \rightarrow \text{ST} \tau^o \tau' \\
& \quad \Gamma \vdash e_1 >> e_2 : \text{ST} \tau^o \tau'
\end{align*}
\]

\[\Gamma \vdash e : \tau \quad \Gamma \vdash \text{returnST} \ e : \text{ST} \ \tau^o \tau \]

\[\Gamma \vdash e : \tau \quad \Gamma \vdash \text{newVar} \ e : \text{ST} \ \tau^o \ (\text{MutVar} \ \tau^o \ \tau) \]

\[\Gamma \vdash e : \text{MutVar} \ \tau^o \ \tau \quad \Gamma \vdash \text{readVar} \ e : \text{ST} \ \tau^o \ \tau\]

\[\Gamma \vdash e_1 : \text{MutVar} \ \tau^o \ \tau \\
\Gamma \vdash e_2 : \tau \]

\[\Gamma \vdash \text{writeVar} \ e_1 \ e_2 : \text{ST} \ \tau^o \ \text{Unit}\]

\[\Gamma \vdash e : \tau' \rightarrow \tau \\
\Gamma \vdash e' : \tau'\]

\[\Gamma \vdash e : e' : \tau\]

\[\Gamma \vdash \text{runST} \ e : \tau\]

\[\forall j. \Gamma \cup \{ x_i : \tau_i \}_i \vdash e_j : \tau_j\]

\[\Gamma \cup \{ x_i : \forall \alpha_{j_i} \cdot \tau_i \}_i \vdash e' : \tau'\]

\[\alpha_{j_i} \notin \text{FV}(\Gamma, \tau)\]

\[\alpha_{j_i} \in \text{FV}(\tau_i) - \text{FV}(\Gamma)\]

\[\Gamma \vdash \text{let} \ \{ x_i = e_i \}_i \ \text{in} \ e' : \tau'\]

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**Figure 1. Typing Rules**
Prune technical details

- Even though every line is *drenched* in your *blood* and *sweat*, dense clouds of notation will send your audience to sleep.

- Present specific aspects that are necessary to explain the key idea; omit the rest.

- By all means have backup slides to use in response to questions.
Prune technical details

When presenting:

- **Use easy-to-understand English**
  - Not via math derivations or pseudo-code

- **Avoid jargons, symbols, acronyms at all costs**
  - If you have to use one or two, explain before you do.
Tighten loose-ends

You have the responsibility to explain each and everything on a slide, as small as things like colors in the drawings or symbols in a formula.

If you are not prepared to talk about them, don’t put them in.
Tips for making slides
A picture is worth 1000 words

- Use diagrams instead of texts
- Use graph instead of tables
- Show pictures instead of just talking about them

Always title your graph/pictures!
A picture is worth 1000 words

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Balls</td>
<td>20.4</td>
<td>27.4</td>
<td>90</td>
<td>20.4</td>
</tr>
<tr>
<td>Red Balls</td>
<td>30.6</td>
<td>38.6</td>
<td>34.6</td>
<td>31.6</td>
</tr>
</tbody>
</table>

Bad!

Items Sold in First Quarter of 2002

Good!
Less is more

Do not attempt to get across many points on one slide. You will be overwhelming the audience...

Make **one point** per slide, and make it clear.
Less is more

Restrain yourself from “stuffing” the slide

- The bullets are for the highlights; fill the rest by your narration
- Focus the slide on either text or picture, but not both

The audience comes to LISTEN to you, not to READ yet another paper!
Less is more

Bad!  Good!  Good!
Styling Tips: Font (good)

- Use a decent font size
- Use a different size font for sub-bullets
  - This font is 24-point
  - The main point font is 32-point
- Use a standard font
  - Times New Roman
  - Arial
  - Calibri
Styling Tips: Font (bad)

- If you use a small font, your audience won’t be able to read what you have written.

- **CAPITALIZE ONLY WHEN NECESSARY. IT IS DIFFICULT TO READ.**

- Don’t use a complicated font.
Styling Tips: Color (good)

- Use a font color that contrasts sharply with the background
- **Highlight** keywords using a color that contrasts sharply with both the background and the main font color
  - But do so only occasionally, and stick to one color
Styling Tips: Color (bad)

- Using light (dark) font color on a light (dark) background will be hard to read
- Never use green and red together
  - This applies to pictures too
- Over-using or using multiple highlighting colors is annoying and loses emphasis
Presenting your talk
How to Prepare

Practice!

is the single most effective way of becoming a great presenter.
How to Prepare

Why do I need to practice?

- To be familiar with the materials
- To improve the slides
- So that you will feel more relaxed
- And most importantly, to get feedback (as negative as it might be, it’s far better to hear it early than later)

Leave at least a week to practice your talk!
How to Prepare

How do I practice?

- **By yourself (>5 times)**
  - Speak out, time it
  - Best with a mirror or video camera.

- **Present to your lab and advisor (>1 times)**
  - Do so early enough so you have chance to do an overhaul of the slides, if needed

- **Present to your room mate or friend**
  - Make sure they don’t fall asleep
When you are talking...

The most important thing is to be enthusiastic
Enthusiasm

- If you do not seem excited by your idea, why should the audience be?
- It wakes 'em up
- Enthusiasm makes people dramatically more receptive
- It gets you loosened up, breathing, moving around
You are not recording in a studio; you are communicating.
Communication

Being seen, being heard:

- Speak UP, as if to someone at the back of the room, even if you have a microphone on.
- Speak at a comfortable pace.
- Point at the projected screen, not at your laptop monitor.
- Make eye contact; identify a *nodder*, and speak to him or her (better still, more than one).
Communication

Interact with the audience:

- Make sure you can see their eyes
- Welcome questions
  - Questions are a golden opportunity to connect with your audience
  - Invite questions during your talk: pause briefly now and then, ask for questions
  - Answer relevant questions that you have definite answers for, settle others later.
Other Tips: How to Relax

I am nervous... what should I do?

- You are not a wimp. Everyone feels this way.
- Deep breathing during previous talk
- *Script your first few sentences precisely* (*=> no brain required*)
- Move around a lot, use large gestures, wave your arms, stand on chairs
- *Go to the loo first*
Other Tips: Finishing

Absolutely without fail, finish on time

- Audiences get restive and essentially stop listening when your time is up. Continuing is very counter productive
- Simply truncate and conclude
- Do not say “would you like me to go on?” (it’s hard to say “no thanks”)
Other Tips: Using Powerpoint

- To get cursor to show on the screen, press “A”

- How to jump to a slide:
  - Type the slide #, then Enter.
  - Right-mouse click, “Go to slide”
  - Do not go back slide one-by-one; it’s annoying

- Avoid switching between the slides and other programs too often
  - Close all programs except Powerpoint and the ones you need to switch to
  - Embed all your videos
Summary

Your talk is a *sales pitch* for your paper

- Sell one key idea, and sell it well
- Know your audience
- Practice, be enthusiastic, and communicate
There is hope

The general standard is so low that you don’t have to be outstanding to stand out

You will attend 50x as many talks as you give. Watch other people’s talks intelligently, and pick up ideas for what to do and what to avoid.