

How to give a good talk

Adapted from a talk by Simon Peyton Jones/Microsoft and notes by
Tamara Kolda & Virginia Torczon/SIAM News

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Why you should listen to this talk

Research is communication

- ▶ Everyone has to give talks, but how often do you **enjoy** talks by others? Your own?
- ▶ Some **simple, actionable ideas** that can make your talks much better
- ▶ You will have **more fun**
- ▶ A talk gives you **access to the world's most priceless commodity**: the time and attention of other people. **Don't waste it!**

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As seen here \rightsquigarrow start with a motivation!

Overview

The setting

Purpose of a talk

The key idea, the audience, & you

Structure

1: Motivation (20%)

2: Your key idea (70%-80%)

3: Conclusions or bust (0%-10%)

Preparing your slides

Presenting your talk

Beyond the talk: publication

Overview (possibly omit the overview!)

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- ▶ To **impress** your audience **with your brainpower**
- ▶ To tell them **everything** you know about the topic
- ▶ To present all the **technical details**

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- ▶ 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, provoke** them
- ▶ To make them **glad they came**

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Your paper: **the beef**, your talk: **the beef advertisement**

~> **do not confuse the two!**

Your key idea

If the audience remembers only one thing from your talk, what should it be?

- ▶ You **must** identify a key idea.
“My supervisor wanted me to give a talk” is No Good.
- ▶ Be **specific**.
Don't leave your audience to figure it out for themselves. Spoiler: They won't.
- ▶ Be absolutely **specific**.
Say: “If you remember nothing else, remember this.”
- ▶ Organise your talk around this **specific** goal.
Ruthlessly prune all material that is irrelevant to this goal.

The audience

The audience you **would like**

- ▶ Have read all your earlier papers
- ▶ Thoroughly understand all the relevant theory of antiderivations of degree 1 on the exterior algebra of differential forms in local coordinates
- ▶ Are all agog to hear about the latest developments in your work
- ▶ Are fresh, alert and ready for action

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- ▶ Have just had lunch and are ready for a doze

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Your mission is to **WAKE THEM UP** and make them glad they did

You

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Enthusiasm! Your most potent weapon:

- ▶ If you do not seem excited by your idea, why should the audience be?
- ▶ Enthusiasm makes people dramatically more receptive
- ▶ It gets you loosened up, breathing, moving around

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No apologies.

- ▶ “I didn’t have time to prepare this talk properly”
- ▶ “My computer broke down, so I don’t have the results I expected”
- ▶ “I don’t have time to tell you about this”
- ▶ “The dog ate my homework”

You

You will most probably experience severe **pre-talk symptoms**:

- ▶ Inability to breathe
- ▶ Inability to stand up (legs give way)
- ▶ Inability to operate brain
- ▶ Inability to make eye-contact

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Countermeasures:

- ▶ 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
- ▶ Look at a friendly person in the first row/a point 20 cm above the heads

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Motivate your audience

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

They are thinking . . .

- ▶ Why should I tune into this talk?
- ▶ What is the problem? (Hopefully not the talk.)
- ▶ Why is it an interesting problem?
- ▶ Does this talk describe a worthwhile advance?

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Don't waste your two minutes!

Example: Solving linear systems is a building block in the inner loop of every optimization routine. By solving them faster you can increase the speed of your topological optimization by a factor of 10–30, as I will show you.

{Narrow, deep} beats {wide, shallow}

- ▶ Avoid shallow overviews at all costs
- ▶ Cut to the chase: the technical “meat”
- ▶ It's ok to cover only part of your paper/work

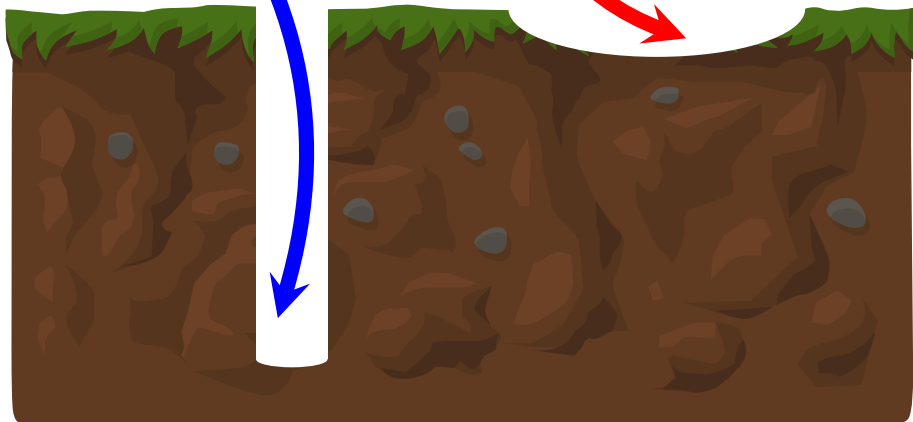


Pixabay/OpenClipart-Vectors

{Narrow, deep} beats {wide, shallow}

Good!

Bad.



Pixabay/OpenClipart-Vectors

Examples are your main weapon

Omit rather the general case, not the example.

Examples

- ▶ To motivate the work
- ▶ To convey the basis intuition
- ▶ To illustrate Your Idea in action
- ▶ To show extreme cases
- ▶ To highlight shortcomings

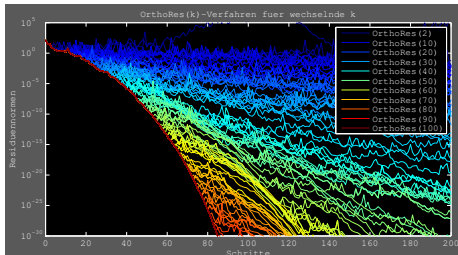
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Convergence **graphs** carry much more information than **tables** with values!



$k \setminus m$	120	140	160
10	★	★	★
20	★	★	★
30	★	★	★
40	★	★	★
50	★	★	★
60	★	★	★

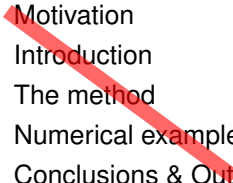
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Outline of my talk:

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- ▶ The method
- ▶ Numerical examples
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 - ▶ The PAMDD system
 - ▶ Shortcomings of PAMDD
 - ▶ Overview of real-harmonic polynomials
 - ▶ The Betti numbers of the weak-^{*} transitive co-diffable Sherkovski ideal in PAMDD
 - ▶ Benchmarks
 - ▶ Related work
 - ▶ Conclusions and further work
 - ▶ References

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A motivation is better than

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But: The outline can be the motivation.

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What to leave out

Concerning the **outline**:

- Conveys near zero information at the start of your talk
- Since your audience only gives you 2 minutes before dozing, you've just lost them
- + Maybe put up an outline for orientation after your motivation
- + ... and signposts at pause points during the talk

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Leave out **related work**, but:

- ▶ You absolutely must **know the related work**, respond readily to questions
- ▶ **Acknowledge co-authors** (title slide) and pre-cursors
- ▶ “X’s very interesting work does Y; I have extended it to Z”

What to leave out

Leave out **technical detail/detailed formulas**:

$$\mathbf{T}_5 = \begin{pmatrix} \frac{11}{10} & \frac{\sqrt{193} \sqrt{200}}{200} & 0 & 0 & 0 \\ \frac{\sqrt{193} \sqrt{200}}{200} & \frac{4517}{1930} & \frac{\sqrt{199955}}{772} & 0 & 0 \\ 0 & \frac{\sqrt{199955}}{772} & \frac{1688137}{2205218} & \frac{\sqrt{48641211} \sqrt{913874332}}{913874332} & 0 \\ 0 & 0 & \frac{\sqrt{48641211} \sqrt{913874332}}{913874332} & \frac{103198117}{159981139} & \frac{\sqrt{155536425} \sqrt{5489176063}}{5489176063} \\ 0 & 0 & 0 & \frac{\sqrt{155536425} \sqrt{5489176063}}{5489176063} & \frac{\sqrt{155536425} \sqrt{5489176063}}{5489176063} \end{pmatrix}$$

Better: \mathbf{T}_5 is unreduced symmetric tridiagonal.

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- ▶ Even though every line is drenched in your blood and sweat, **dense clouds of notation will send your audience immediatly to sleep**
- ▶ Present specific aspects only; **refer to the paper** for details
- ▶ By all means have backup slides to use in response to questions

Do we need conclusions?

Simon Peyton Jones: **There is no 3.**

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Use the **conclusions as last slide**, no “Thank you!”

- ▶ Sketch main message on last slide
- ▶ Summarize most important aspects
- ▶ Good basis for discussion/questions
- ▶ Try to fit **everything on one slide**

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Write your slides . . .

Simon Peyton Jones: the night before (or at least, polish it then)

Tamara Kolda & Virginia Torczon: An m -minute talk to n people will consume mn person-minutes. It's only courteous to put at least that much time into preparing the talk!

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But:

- ▶ Your talk absolutely must be fresh on your mind!
- ▶ Ideas will occur to you during the conference, as you obsess on your talk during other people's presentations
- ▶ You may learn that some of your assumptions are outdated or obsolete

Best to finalize/polish the slides the night/minute before the talk

Don't limit your color scheme unnecessarily

- ▶ Mathematical talks **have evolved** from white on black/black on white
- ▶ The use of **colors** always makes slides **more interesting**
- ▶ Introduced thoughtfully, color clearly **emphasizes** key ideas and **establishes connections** between related concepts

(#9 in “Top Ten Ways to Lose an Audience” by Tamara Kolda/Virginia Torczon)

Balance your layout

- ▶ Choose fonts of **sufficient size** and in a **clean, simple typeface**
- ▶ Don't use complete sentences from your paper, rewrite into short, **crispy notes**
- ▶ Don't simply copy graphics from your paper, **increase font size** of labels, legend and **thickness of lines**
- ▶ Just **refrain from yellow and (light) green on white**, especially in graphs
- ▶ Test your talk in a room of similar size than the one your are speaking in from the background for readability, invisible colors and lines that are too thin, **go back and fix them!**

(#8, #7 in “Top Ten Ways to Lose an Audience” by Tamara Kolda/Virginia Torczon)

Minimize acronyms and math symbols

- ▶ Listeners will only remember a few new-to-them concepts across slides
- ▶ A talk is not a paper where you can add a section on notation
- ▶ You do get “standard” notation for free, but be careful: numerical linear algebra: $\mathbf{Ax} = \mathbf{b}$, mechanics: $\mathbf{Ku} = \mathbf{f}$, stochastics: $\mathbf{X}\beta = \mathbf{y}$.
- ▶ Repeat important formulae/definitions where needed!

(#6 in “Top Ten Ways to Lose an Audience” by Tamara Kolda/Virginia Torczon)

Context / Background

- ▶ **Put your work into context!** The audience (typically) does not comprise the experts in the field.
- ▶ Work out the **importance of your contribution**: What has changed?
- ▶ For the experts in the audience: stress **how your work fits in the broader context** of the field
- ▶ Give **enough background to be understandable**, yet leave room for your contribution
- ▶ Few things are more boring than sitting through a review of material you've seen a dozen times before

(#5, #4 in “Top Ten Ways to Lose an Audience” by Tamara Kolda/Virginia Torczon)

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Being ...

Being seen:

- ▶ Face the audience, not the screen
- ▶ Know your material
- ▶ Put your laptop in front of you, screen towards you
- ▶ Don't point much, but when you do, point at the projection, not at your laptop
- ▶ When pointing with a laser pointer, circle to hide trembling hands

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Being heard:

- ▶ Speak to someone at the back of the room, even if you have a microphone on
- ▶ Make eye contact; identify a nodder and speak to her or him (better still, more than one)
- ▶ Watch audience for questions ...

Questions/Finishing

Questions?

- ▶ Questions are **not a problem**
- ▶ Questions are **a golden³ opportunity** to connect with your audience
- ▶ Specifically **encourage questions** during your talk: pause briefly now and then, ask for questions

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Finishing.

- ▶ Absolutely without fail, **finish on time**
- ▶ Audiences get restive and **essentially stop listening** when your time is up
- ▶ **Simply truncate and conclude**
- ▶ Do not say “would you like me to go on?” (it’s hard to say “no thanks”)
- ▶ Finish on time **even** when all other speakers in your session failed to
- ▶ „Sie können über alles reden, nur nicht über 30 Minuten.“

Presenting your slides

- ▶ Use a [wireless presenter gizmo](#)
- ▶ **Test** that the laptop works with the projector, in advance
- ▶ Laptops break: leave a [backup copy](#) on the web; bring a [backup copy](#) on USB flash
- ▶ A very annoying technique

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- ▶ by one, unless ...
- ▶ there is a **punch line**

Presenting your slides

Use animation effects

very

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Good papers and talks are a **fundamental part of research excellence**

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Research is communication, your papers and talks

- ▶ **Crystalise your ideas**
- ▶ **Communicate** them to others
- ▶ Get **feedback**
- ▶ Build **relationships**

Helping and learning from others

Being a good audience member:

- ▶ Eye contact with speaker
- ▶ Nod frequently
- ▶ Ask questions:
 - ▶ Start asking questions when you lose contact with the talk. The rest of the audience will thank you for it.
 - ▶ Stop when you sense that you are beginning to de-rail the entire talk.

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You will attend 20-50 times as many talks as you give. Watch others people's talks intelligently and **pick up ideas** for what to do and what to avoid.

The general standard is often low. **You don't have to be outstanding to stand out.**

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In the mathematical community a paper

- ▶ is sent to the **editor-in-chief** of a journal w/ **accompanying letter**

All this is mostly based on **voluntary work!**

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- ▶ the **referees** write referee reports
- ▶ the **editor** makes a decision based on the reports

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References



Tamara Kolda & Virginia Torczon

Top Ten Ways to Lose an Audience.

SIAM News, Volume 44, Number 3, April 2011.

<https://www.siam.org/pdf/news/1876.pdf>



Simon Peyton Jones, Microsoft Research Cambridge

How to give a great research talk

PDF file of a talk, 2016

<https://www.microsoft.com/en-us/research/wp-content/uploads/2016/07/How-to-give-a-great-research-talk.pdf>

<https://www.microsoft.com/en-us/research/academic-program/give-great-research-talk/>