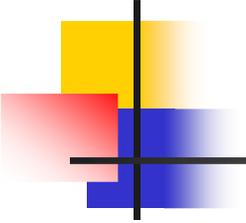# How to give a good research talk

Simon Peyton Jones
Microsoft Research, Cambridge

1993 paper joint with
John Hughes (Chalmers),
John Launchbury (Oregon Graduate Institute)

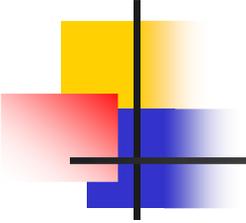# Research is communication

The greatest ideas are worthless if you keep them to yourself

Your papers and talks

- Crystalise your ideas

- Communicate them to others

- Get feedback

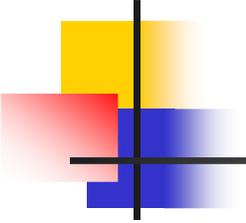- Build relationships

- (And garner research brownie points)

Do it! Do it! Do it!

Good papers and talks are a fundamental part of research excellence

- Invest time
- Learn skills
- Practice

Write a paper, and give a talk, about
any idea,
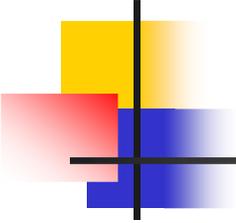no matter how weedy and insignificant it may seem to you

Giving a good talk

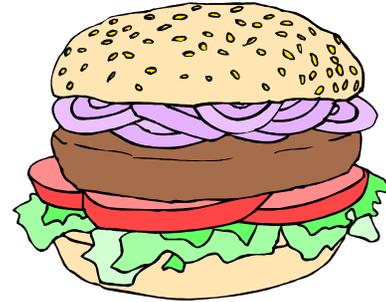This presentation is about how to give a good research talk

- What your talk is for

- What to put in it (and what not to)

- How to present it
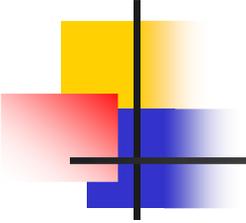
What your talk is for

Your paper = **The beef**

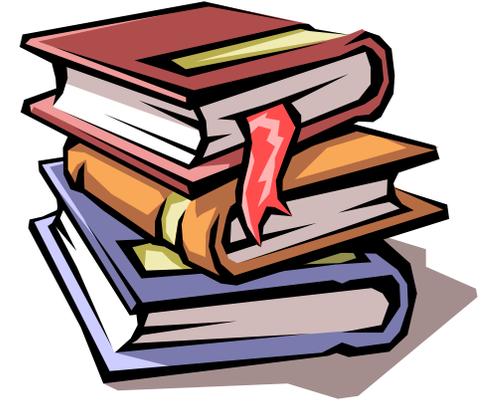Your talk = **The beef advertisment**

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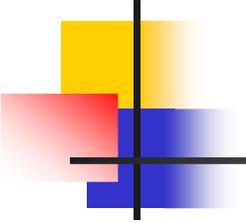
The purpose of your talk...

..is not:

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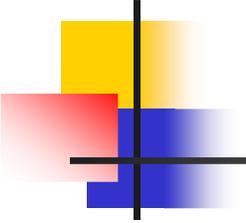- To present all the technical details

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
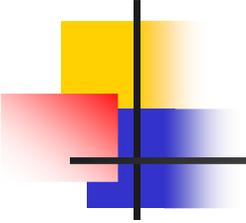
- To engage, excite, provoke them

Your audience...

The audience you would like

- Have read all your earlier papers

- Thoroughly understand all the relevant theory of cartesian closed endomorphic bifunctors

- Are all agog to hear about the latest developments in your work

- Are fresh, alert, and ready for action
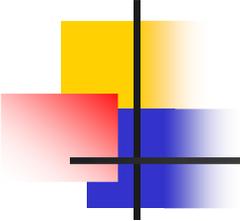
Your actual audience...

The audience you get

- Have never heard of you

- Have heard of bifunctors, but wish they hadn't

- Have just had lunch and are ready for a doze

Your mission is to

WAKE THEM UP
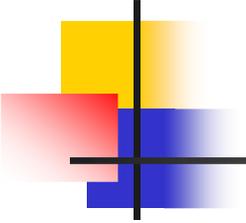
And make them glad they did

What to put in

What to put in

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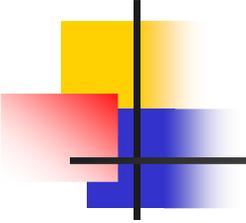
Motivation

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

- Why should I tune into this talk?

- What is the problem?

- Why is it an interesting problem?

Example: Java class files are large (brief figures), and get sent over the network. Can we use language-aware compression to shrink them?

Example: synchronisation errors in concurrent programs are a nightmare to find. I'm going to show you a type system that finds many such errors at compile time.
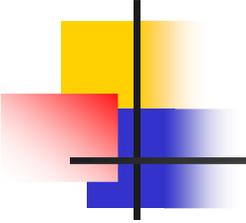
Your key idea

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

- **You must identify a key idea**. "What I did this summer" is No Good.

- Be specific. Don't leave your audience to figure it out for themselves.

- Be absolutely specific. Say "If you remember nothing else, remember this."

- Organise your talk around this specific goal. Ruthlessly prune material that is irrelevant to this goal.

Narrow, deep beats wide, shallow

No

Yes
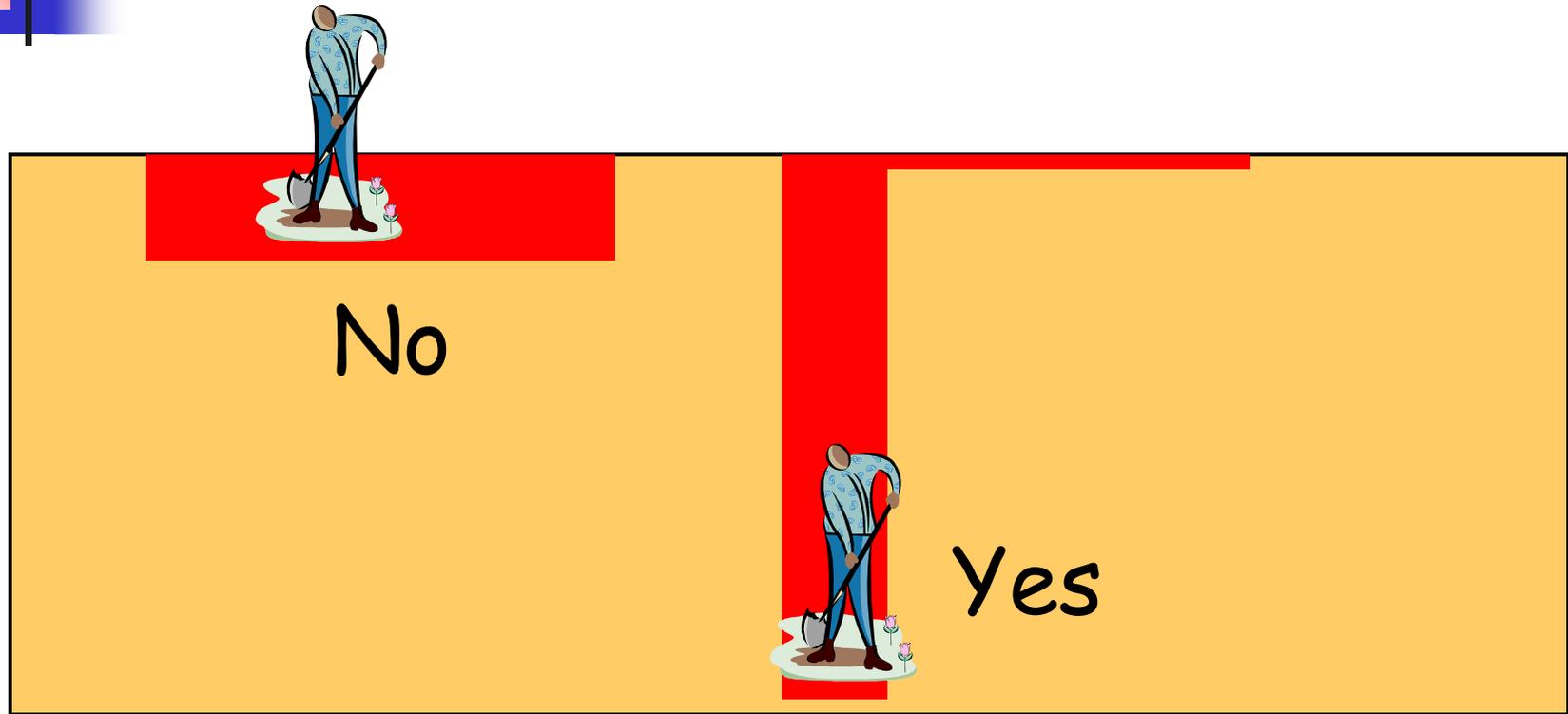
Avoid shallow overviews at all costs

Cut to the chase: the technical "meat"

Your main weapon

Examples are your main weapon

- To motivate the work
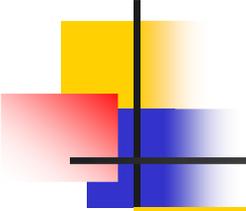- To convey the basic intuition
- To illustrate The Idea in action
- To show extreme cases
- To highlight shortcomings

When time is short, omit the general case, not the example
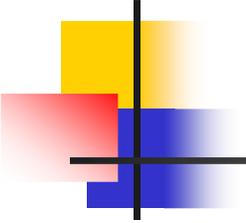
Exceptions in Haskell?

Exceptions are to do with control flow
There is no control flow in a lazy functional program

Solution 1: use data values to carry exceptions

```
data Maybe a = Nothing
             | Just a


lookup :: Name -> Dictionary -> Maybe Address
```

Often this is Just The Right Thing
[Spivey 1990, Wadler "list of successes"]
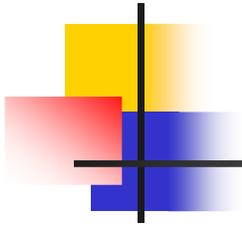
What to leave out

Outline of my talk

- Background

- The FLUGOL system

- Shortcomings of FLUGOL

- Overview of synthetic epimorphisms

- π-reducible decidability of the pseudo-curried fragment under the Snezkovwski invariant in FLUGOL

- Benchmark results

- Related work

- Conclusions and further work
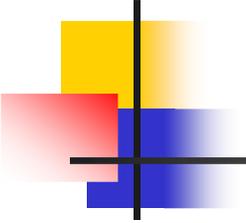
No outline!

"Outline of my talk": conveys near zero information at the start of your talk

- But maybe put up an outline for orientation after your motivation

- ...and signposts at pause points during the talk
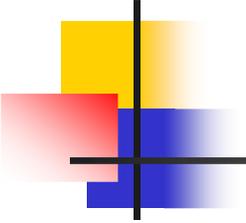
Related work

[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
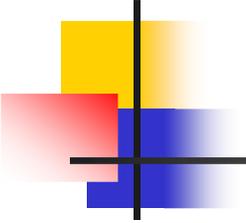
Do not present related work

But

- You absolutely must know the related work; respond readily to questions

- Acknowledge co-authors (title slide), and pre-cursors (as you go along)

- Do not disparage the opposition

    - X's very interesting work does Y; I have extended it to do Z

Technical detail

$$\frac{}{\Gamma \vdash k : \tau_k} \qquad \frac{\Gamma \cup \{x : \tau\} \vdash e : \tau'}{\Gamma \vdash \lambda x.e : \tau \to \tau'} \qquad \frac{\Gamma \vdash e_1 : \mathtt{ST}\ \tau^\circ\ \tau \qquad \Gamma \vdash e_2 : \tau \to \mathtt{ST}\ \tau^\circ\ \tau'}{\Gamma \vdash e_1 \mathtt{>>=} e_2 : \mathtt{ST}\ \tau^\circ\ \tau'}$$

$$\frac{\Gamma \vdash e : \tau}{\Gamma \vdash \mathtt{returnST}\ e : \mathtt{ST}\ \tau^\circ\ \tau} \qquad \frac{\Gamma \vdash e : \tau}{\Gamma \vdash \mathtt{newVar}\ e : \mathtt{ST}\ \tau^\circ\ (\mathtt{MutVar}\ \tau^\circ\ \tau)} \qquad \frac{\Gamma \vdash e : \mathtt{MutVar}\ \tau^\circ\ \tau}{\Gamma \vdash \mathtt{readVar}\ e : \mathtt{ST}\ \tau^\circ\ \tau}$$

$$\frac{\Gamma \vdash e_1 : \mathtt{MutVar}\ \tau^\circ\ \tau \qquad \Gamma \vdash e_2 : \tau}{\Gamma \vdash \mathtt{writeVar}\ e_1\ e_2 : \mathtt{ST}\ \tau^\circ\ \mathtt{Unit}} \qquad \frac{}{\Gamma \cup \{x : \forall \alpha_i.\tau\} \vdash x : \tau[\tau_i/\alpha_i]}$$

$$\frac{\Gamma \vdash e : \tau' \to \tau \qquad \Gamma \vdash e' : \tau'}{\Gamma \vdash e\ e' : \tau} \qquad \frac{\Gamma \vdash e : \mathtt{ST}\ \alpha^\circ\ \tau}{\Gamma \vdash \mathtt{runST}\ e : \tau}\ \alpha^\circ \notin FV(\Gamma, \tau)$$

$$\frac{\forall j.\Gamma \cup \{x_i : \tau_i\}_i \vdash e_j : \tau_j \qquad \Gamma \cup \{x_i : \forall \alpha_{j_i}.\tau_i\}_i \vdash e' : \tau'}{\Gamma \vdash \mathtt{let}\ \{x_i = e_i\}_i\ \mathtt{in}\ e' : \tau'}\ \alpha_{j_i} \in FV(\tau_i) - FV(\Gamma)$$

Figure 1. Typing Rules

Omit 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 only; refer to the paper for the details

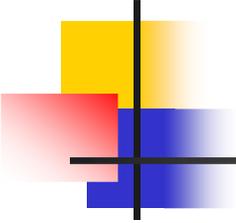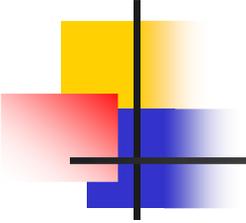- By all means have backup slides to use in response to questions
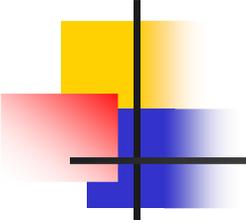
Do not apologise

- "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"

- "I don't feel qualified to address this audience"

Presenting your talk

Write your slides the night before

(…or at least, polish it then)

Your talk absolutely must be fresh in your mind

- Ideas will occur to you during the conference, as you obsess on your talk during other people's presentations

- Do not use typeset slides, unless you have a laptop too

- Handwritten slides are fine

  - Use permanent ink

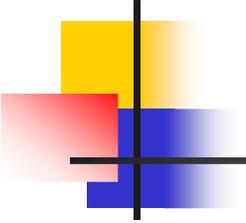 - Get an eraser: toothpaste does not work
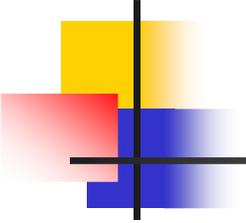
How to present your talk
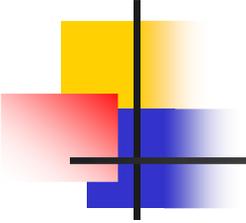
By far the most important thing is to

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

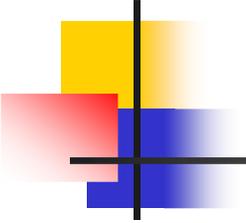- It gets you loosened up, breathing, moving around

The jelly effect

If you are anything like me, you will experience apparently-severe pre-talk symptoms

- Inability to breathe
- Inability to stand up (legs give way)
- Inability to operate brain

What to do about it

- 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

- You are not a wimp. Everyone feels this way.
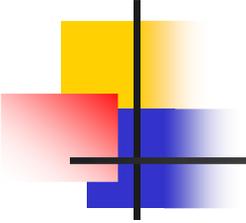
Being seen, being heard

- Point at the screen, not at the overhead projector

- 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 him or her (better still, more than one)

- Watch audience for questions…
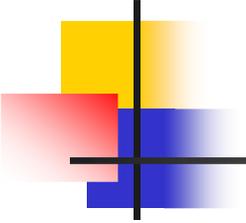
Questions

- Questions are not a problem

- Questions are a golden golden golden opportunity to connect with your audience

- Specifically encourage questions during your talk: pause briefly now and then, ask for questions

- Be prepared to truncate your talk if you run out of time. Better to connect, and not to present all your material

Presenting your slides

A very annoying technique

- is to reveal
- your points
- one
- by one
- by one, unless…
- there is a punch line
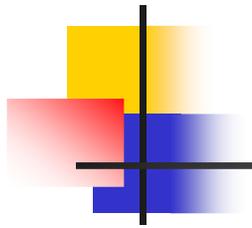
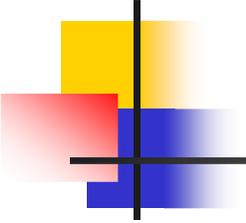# Presenting your slides

Use animation effects

very   very

very   very

very   very

very
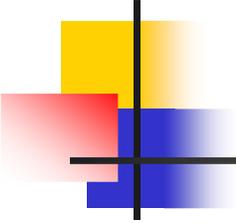
sparingly

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")

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.