Dear all,

in our Master Seminar this week, I will give a presentation on how to give a good research talk. The presentation features Steve Jobs, Don McMillan, Lawrence Lessig, Mickey Mouse, as well as researchers from the University of Washington. The most frequent word is "chicken".

See you on Wednesday at 16:15 in Room 328 (our seminar room),

Andreas
--
Andreas Zeller  Saarland University
http://www.st.cs.uni-sb.de/zeller/

Goals of the Seminar

• Find your way into scientific challenges
• Structure and present scientific material
• Train your social and communication skills

The Purpose of your Talk

You may wish to
* impress people with your brainpower
* tell them you know all and everything
* tell them how you went in there and back
All this is wrong.
The Purpose of your Talk

• Make the audience read your paper (and talk about it)
• Give them an intuitive feel for your idea
• Engage, excite, provoke them
• Make them glad they came

Preparation

• Check the material
• Identify central topics and claims
• Outline the talk
• Make a detailed sketch

From Simon Peyton Jones, “How to give a great research talk”
Ask Yourself

• Do the claims hold?
• Are the examples illustrative?
• Can I do better in presenting?
• What are the central claims, anyway?
• And how are they supported?

Ask Yourself

• If someone remembers one thing from my research talk, what should it be?

The Perfect Talk
Your Audience

- Have read all your earlier papers
- Thoroughly understand Computational Complexity of Bio-inspired Computation in Combinatorial Optimization
- Are eagerly awaiting your latest and greatest
- Are fresh, alert, and ready for action

Organizing Your Talk

- Motivation
- Solution (including failures)
- Results
- Conclusion

Wake up!
Motivation

- Present the general topic
  A village in the woods

- Show a concrete problem.
  (and make it the audience's problem.)
  Wicked dragon attacks the peasants

- Show that the state of the art is not enough
  Peasants' forks can not pierce dragon armor

Solution + Results

- Show new approach and its advantages
  Hero comes with vorpal blade and fights dragon.

- Show how approach solves concrete problem
  Vorpal blade goes snicker-snick; dragon is slayed

- Does the approach generalize?
  Would this work for other dragons, too? Why?
Examples: Your main Weapon

• Motivate work
• Convey basic intuition
• Illustrate idea in action
• Use examples first, generalize afterwards

Outline

• Tell a story
• Make slides invisible
• Use examples, lots of examples
• Connect to the audience
• Hope for questions and feedback

Outlines

• Don’t use talk outlines at the beginning
• Don’t use talk outlines in between.
• Actually, don’t use talk outlines at all
• Better: Use a diagram after 5 minutes
• Think of this diagram as a memorizable image
Detecting Anomalies

Usage Models

Iter.hasNext () iter.next ()

Temporal Properties

hasNext ≺ next
hasNext ≺ hasNext
next ≺ hasNext
next ≺ next

Anomalies

✓ hasNext ≺ next
✓ hasNext ≺ hasNext
✗ hasNext ≺ next

Patterns

hasNext ≺ next
hasNext ≺ hasNext

Daikon

Run get trace Trace
filter invariants
report results Invariant

Postcondition

b[] = orig(b[])
return == sum(b)

Slide Contents

• Concentrate on the bare necessities (e.g. at most 5 bullets per slide)

• Do not present full sentences on a slide, because these are far too long and hard to read; also, they may tempt you in reading them loud.

Read full sentence aloud
Death by Powerpoint

Mutation Testing with Javalanche

1. Learn invariants from test suite
2. Insert invariant checkers into code
3. Detect impact of mutations
4. Select mutations with the most invariants violated (= the highest impact)

Make Slides Invisible

- Focus on clarity
- Avoid all that distracts from the message
- Slides should support your (spoken) word
- Always prefer diagrams over text
- Avoid bullet lists (like this one)

Source: http://www.youtube.com/watch?v=cagxPlVqrtM
Bugs • Fixes • Changes

counts

count id="pre" value="16" avg="0.609" points="43" max="5"

count id="post" value="1" avg="0.022" points="43" max="1"

Compilation unit name="Plugin.java"

counts

count id="pre" value="5"

count id="post" value="1"

Plugin.java had 5 failures before and one failure after release ("post"). The package contains 43 files ("points") and encountered 16 failures before and one failure after release; on average each file in this package had 0.609 failures before and 0.022 failures after release ("avg").

Maths

\[
f_{h, \varepsilon}(x, y) = \varepsilon E_{x, y} \int_0^{t_\varepsilon} L_{x, y}(u) \varphi(x) \, du \\
= \varepsilon \int L_{x, y}(x) \rho_x (dz) \\
+ \frac{1}{t_\varepsilon} \left[ E_{x, y} \int_0^{t_\varepsilon} L_{x, y}(s) \varphi(x) \, ds - \varepsilon \right] \\
+ \frac{1}{t_\varepsilon} \left[ E_{x, y} \int_0^{t_\varepsilon} L_{x, y}(s) \varphi(x) \, ds - E_{x, y} \int_0^{t_\varepsilon} L_{x, y}(s) \varphi(x) \, ds \right] \\
= \varepsilon \widehat{L}_x \varphi(x) + \varepsilon \theta_x (x, y)
\]

Formal Background

Concrete state \( v \in V \) with \( v = (x_1, x_2, \ldots, x_n) \)

- \( x_i \) – Return value of an inspector

Trace \( t = [(v_1, m_1, v_1'), (v_2, m_2, v_2'), \ldots] \)

with \( v_i \in V \) and \( m_i \) – name of a mutator

State abstraction \( \text{abs}: V \rightarrow S \)

Model with transitions \( s \xrightarrow{m} s' \) and states \( s, s' \in S \)

Transition condition \( s \xrightarrow{m} s' \) with \( s, s' \in S \) iff

\[ \exists (v, m, v') \in t \cdot \text{abs}(v) = s \land \text{abs}(v') = s' \]
Maths

• Avoid maths.
  • Formulae are for papers, not slides
  • Few people can read + understand complex formulae in 30 seconds
  • Demonstrate that the formal foundation can be presented on demand

Examples

• Examples are more important than maths
• Have one example throughout your talk to illustrate the key idea
• Use additional examples for specifics
• Your audience will get excited by the example – and read your paper for the full foundations

Bug 173602

```java
public void resolve(ClassScope upperScope) {
    // Fix from source repository
    if (binding == null)
        ignoreFurtherInvestigation = true;
    // Fix generated by PACHIKA
    if (binding == null)
        return;
    if (munger == null)
        ignoreFurtherInvestigation = true;
    if (ignoreFurtherInvestigation) return;
    ...
}
```
Diagrams

- Use simple, clear diagrams
- Convey exactly one message per diagram

Model Sizes

Detection Rates
Visuals and Animation

• Visuals and animations are ok in *diagrams*
• Every other use should be well motivated
• Do not use them as decorations
• Do not use them as distractions
• Avoid overused graphic clichés

What’s Wrong?

http://www.indezine.com/articles/slidesfromhell2.html

Death by Powerpoint

http://www.youtube.com/watch?v=Rp8dugDbf4w
Strive for Simplicity

- Simple messages get across easier
- Simple examples fit on one slide
- Simple slides make the audience listen
- Simple claims tend to be general, too
- Simple = Hard!

The Talk

- Do not read your slides (from paper or slides)
- Speak slowly, loudly and clearly
- Speak personally (Use “I”, not “one”)
- Change your tone – and use pauses

The Jelly Factor

- Every presenter is nervous (and so am I)
  - Legs start shaking
  - Need for air
  - Brain goes into stand-by mode
- ... but nobody will notice, let alone worry
The Jelly Factor

Before the talk:

• Wash your hands
• Sit down
• Go through your slides
• Memorize the first sentences (no brain required)

Your Impression

- Body language: 7%
- Voice: 38%
- Content: 55%

Connect to the Audience

• Tell a *story*
• Talk *directly* to the audience
• Ask *rhetorical questions* (“What should the poor peasants do?”)
• Search *eye contact* to audience (not to slides, not to professor)
• Convey your own *enthusiasm and excitement!*
Some Great Presenters

Steve Jobs

Everything is precisely choreographed in here. Note the slide design, focusing on the very essential.
Source: Apple

Lawrence Lessig

Look how Lessig’s words are in sync with his talk.
Source: http://www.presentationzen.com/presentationzen/2008/03/larry-lessigs-l.html
Concluding the Talk

- Refer to the beginning
  ...and they lived in peace henceforth

- Summarize
  ...and the key point is:

- Open issues
  ...but there are more dragons that loom in the dark

- Consequences
  If you ever see a dragon, ...

Any Questions?

- Good research raises lots of questions!

- Questions are great to connect to the audience and to direct and shape own work

- The worst embarrassment is to have no questions at all
Dealing with Hard Questions

- Repeat question (helpful for audience + gives time for preparing an answer)
- In doubt: “I don’t know, but I’ll look into it”
- Or: “Let’s just take this offline”
- Be respectful to the audience – no punching in the lecture room

Summary

The Purpose of your Talk
- Make the audience read your paper (and talk about it)
- Give them an intuitive feel for your idea
- Engage, excite, persuade them
- Make them glad they came

Make Slides Invisible
- Focus on clarity
- Avoid all the distractions from the message
- Slides should support your (spoken) word
- Always portray diagrams over text
- Avoid bullet lists (like this one)

Examples
- Examples are more important than maths
- Have one example throughout your talk to illustrate the key idea
- Use additional examples for specifics
- Your audience will get excited by the example—and read your paper for the full foundations

Connect to the Audience
- Tell a story
- Talk directly to the audience
- Ask rhetorical questions
  (“What should I do now?”)
- Search for contact, not distance
  (face to slides, not to podium)
- Convey your own enthusiasm and excitement!
Summary

The Purpose of your Talk

- Make the audience read your paper (and talk about it)
- Give them an instant feel for your idea
- Engage, excite, persuade them
- Make them glad they came

Make Slides Invisible

- Frame on clarity
- Avoid all that obscures from the message
- Slides should support your (spoken) word
- Always prefer diagrams over text
- Avoid bullet lists (like this one)

Examples

- Examples are more important than facts
- Have one example throughout your talk to discuss the key idea
- Use additional examples for specifics
- Your audience will get excited by the example—read your paper for the full foundations

Connect to the Audience

- Tell a story
- Talk directly to the audience
- Ask rhetorical questions
  ("What should your parents do?")
- Seek you contact to audience
  (not to slides, not to professor)
- Convey your own enthusiasm and excitement