How To Do Scientific Presentations

Speaker
Thomas Kühn
We learn ... by ...

painting  examining paintings
writing  reading articles
presenting  watching presentations

The rest is experience

At School  France in XXI Century 19 Jhd., Wikimedia Commons, (Public Domain)
Outline

Beginners Guide
Scientific Presentations
Learning by Doing
Learning by Watching
What is the goal of the presentation?
Why are you giving the presentation?
When will your presentation be held?
How will you support your statements?
Where will your presentation be held?
Who will be your audience?

– Rudyard Kipling, *I Keep Six Honest Serving Men* ...
Every Presentation tells a story
Continuous use of one running example
Conclude by summarizing core statements
Prefer a linear narrative

Rough Outline
- Introduction (outline, motivation, example)
- Background (context, problems, history)
- Core statement (idea, solution, results)
- End (conclusion, outlook)
“Story Grammar” [Piesk1997]

1. Problem / Importance
   • Hero has unsolvable problem
2. Needs:
   • Hero lacks a “slice of heaven”
3. Wish:
   • Hero has a goal to strive for
4. Antagonist:
   • Antagonists pursue the same goal
5. Plan / weapon / tool:
   • Hero uses it to reach the goal
6. Battle:
   • Battle between hero and antagonists
7. Insight:
   • Insight is gained after battle is won
DO NOT
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
Status of Standard Model
Higgs searches in ATLAS

Using the full datasets recorded in 2011 at \( \sqrt{s} = 7 \text{ TeV} \)
and 2012 at \( \sqrt{s} = 8 \text{ TeV} \): up to 10.7 fb\(^{-1} \)

Fabiola Gianotti (CERN), representing the ATLAS Collaboration

Never use fancy fonts, unless you are a theoretical physicist
presenting the Higgs-Boson \[ \text{[Gianotti2012]} \]
DO
• Short lists (max. 7 words)
• Use short, precise formulations
• Use clean templates (without decorations)
• Commit to one (sans serif) font
• Use (few) colors consistently
• Sharp (high-resolution) images
• Use **bold**, *italic*, _underline_ for highlighting
• Use figures to illustrate complex processes
• Use *animations/transition effects* only to explain complex relationships
• Present only significant information
• Practice, practice, practice
• Conceive precise formulations, metaphors, examples
• Especially, practice slide transitions
• Train self-control
  \textit{(facial expression, gestures, intonation, \ldots)}
• Avoid useless filler words (ehm, so, also, yes\ldots)
• Avoid long anecdotes, stick to the point
• Find ways to calm yourself
• In which context will you give your presentation?
  • Knowledge of your audience
  • Type of event
  • Goals of the event / your presentation

• What is the core statement of your presentation?

• What story do you tell?

• Which example do you use?

• Which illustrations will you choose?
Beginners Guide

Scientific Presentations

Learning by Doing

Learning by Watching
Scientific Presentations

High Standards for Scientific Presentations

- Complex topics
- Fixed structure (outline)
- More information in less time
- Requires correct citations
- Depiction of
  - Tables,
  - Statistics, and
  - Mathematical formulae
- Professional audience

Figure 1: Alexander von Humboldt, Wikimedia Commons (Public Domain)
Scientific Presentations

Structure

- Introduction
  *Motivation, scientific scope*

- Problem Definition
  *Problems, goals, success criteria*

- Concept
  *Idea, hypothesis, core statement, method*

- Evaluation
  *Qualitative or quantitative evaluation*

- Related work

- Conclusion
  *Scientific contributions, future work*
Scientific Presentations
Use Templates

- Use a *Corporate Design*\(^1\) templates, if available
  - *Predefined slide backgrounds*
  - *Predefined slide layout (may customize)*
  - *Predefined color scheme*

- Create your **own** prototypes
  - Refine the templates towards
    - Space-saving layout
    - Modified background (watermark)
  - Reuse of typical slides
    - *Title, author information, references, ...*

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1) http://tu-dresden.de/service/publizieren/cd/
Scientific Presentations
Correct Referencing

• List referenced literature at presentation's end
• Quotation:
  "Software is getting slower more rapidly than hardware becomes faster." – Niklaus Wirth [Wirth1995]
• Citation:
  Role-Object-Pattern [Bäumer1998]
• Footnote for web links:
  Eclipse\(^1\) is a widely used Development Environment
    1) www.eclipse.org
• Subtitle for figures, tables, diagrams:
  • Pay attention to copyright licenses (Creative Commons)

Figure 2: Programming of ENIAC [U. S. Army Photo]
Scientific Presentations
Statistics and Charts

Qualitative Evaluation
- Tables unsuitable
- Focus on interesting details
- Derivation of analysis diagrams
  - Pie charts
  - Radar charts
  - ...

Quantitative Evaluation
- Tables for small analyses
- Plots for larger analyses
  - Line chart
  - Box plots
  - ...

Figure 3: Radar chart \[Kühn2013\]

Figure 4: Example box plot
Few Mathematical Formulae

- Simply use special characters
  
  \textit{card:} \textit{(R \rightarrow N \times N) \cup (Rel \rightarrow N \times N \times N \times N)}

- Integrated formal editor

\[
\sum_{m=3}^{n/2} \frac{1}{\ln m} \frac{1}{\ln (n-m)} \approx \frac{n}{2 \ln^2 n}
\]

Many Mathematical Formulae and Definitions

- Better use \textit{LaTeX/Beamer} instead
Scientific Presentations

Summary

- Take knowledge of audience/type of event into account
- A good story and example is crucial
- Avoid overloading your presentation
- Focus only on important information/facts
- Every slide must answer a question
  (Who?, What?, Why?, How?, …)
- Follow scientific practices and standards
  (Citations, Bibliography, List of references)
- Use suitable illustrations for complex statements
Learning by Doing
PowerPoint™ Karaoke

**Task:**
- Present 2-3 *unknown* slides
- Convince your audience
- Cope with the stress

*Death-by-Presentation* from Frits Ahlefeldt-Laurvig (http://www.flickr.com/photos/hikingartist/3515471358/)
Learning by Doing
Task:

- Why is a certain presenter good/bad?
- Who tells a story?
- Who designed the best slides?
Lernen durch Betrachten
The Good, the Bad, and the Ugly

http://www.youtube.com/watch?v=xWFsdbP71ZA
https://www.youtube.com/watch?v=ucBssR7RFJc (My 2nd worst presentation)
http://cdn.media.ccc.de/congress/2013/mp4/30c3-5304-en-CounterStrike_h264-hq.mp4
http://cdn.media.ccc.de/congress/2013/mp4/30c3-5537-en-Glass_Hacks_h264-hq.mp4

Toyogeki Movie in Toyooka, Wikimedia Commons (GNU Free Documentation License)
This presentation is based on:

- **Academic Skills in Computer Science (AsiCS)**
  *Bertram Fronhöfer, Christoph Wernhard, und Uwe Aßmann*
  *Lecture in winter semester (2013)*

- **Wissenschaftliches Arbeiten und Lerntechniken. Erfolgreich studieren – gewusst wie!**
  *Christine Stickel-Wolf und Joachim Wolf*
  *Updated and revised edition (2009)*
How To Do Scientific Presentations

End
[Bäumer1998] The Role Object Pattern
Dirk Bäumer, et al.
Washington University Dept. of Computer Science (1998)

Fabiola Gianotti
Representing the ATLAS Collaboration, CERN (2012)

Thomas Kühn
Diplomarbeit, TU Dresden (2013)

Jens Piesk
Diplomarbeit, Köln (1997)

[Wirth1995] A Plea for Lean Software
Niklaus Wirth