



TECHNISCHE
UNIVERSITÄT
DRESDEN

Fakulty of Computer Science Institute for Software and Multimedia Technology, Software Technology Group

How To Do **Scientific** Presentations

Speaker
Thomas Kühn

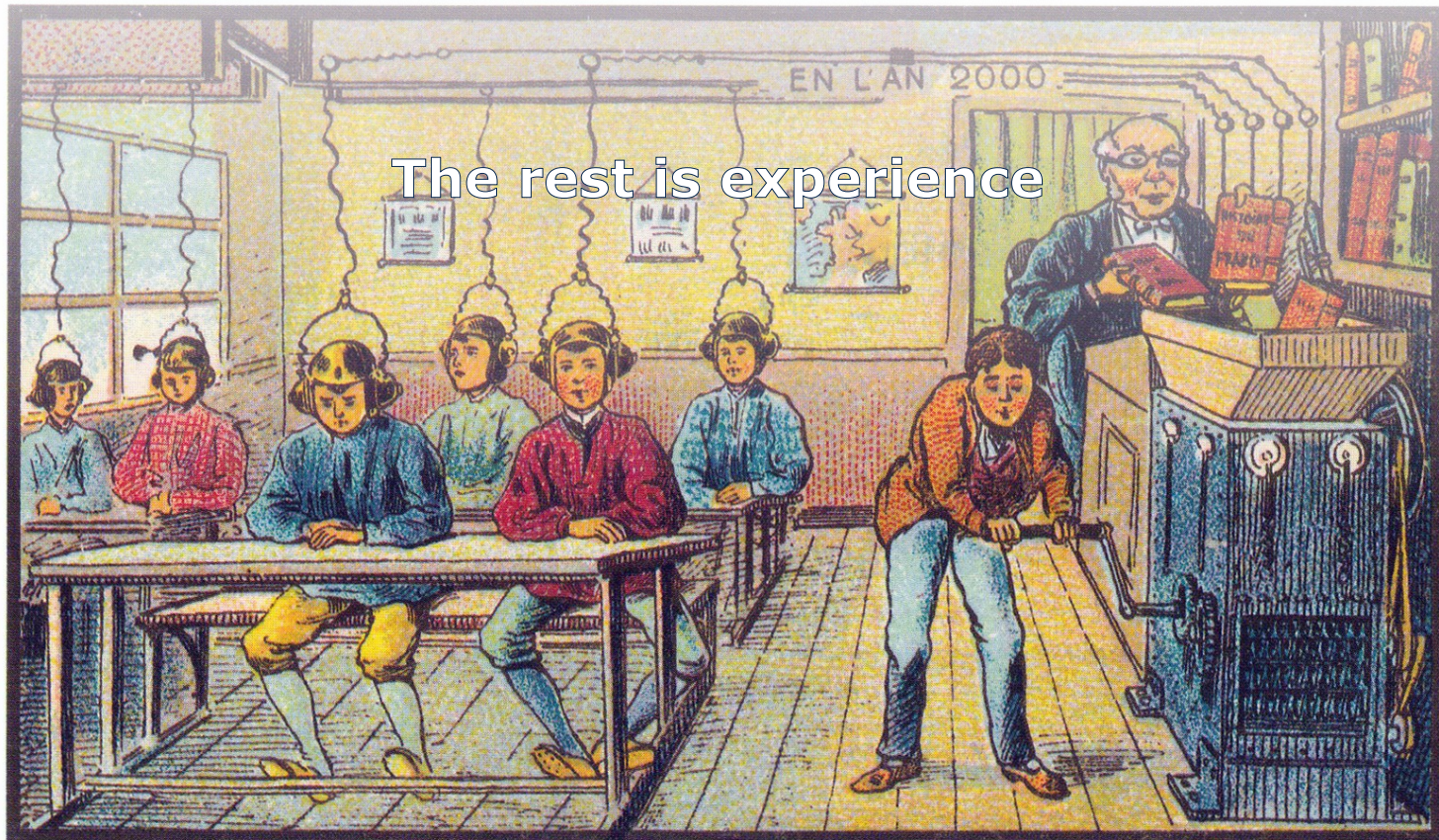


DRESDEN
concept
Exzellenz aus
Wissenschaft
und Kultur

We learn ... by ...

painting
writing
presenting

examining paintings
reading articles
watching presentations

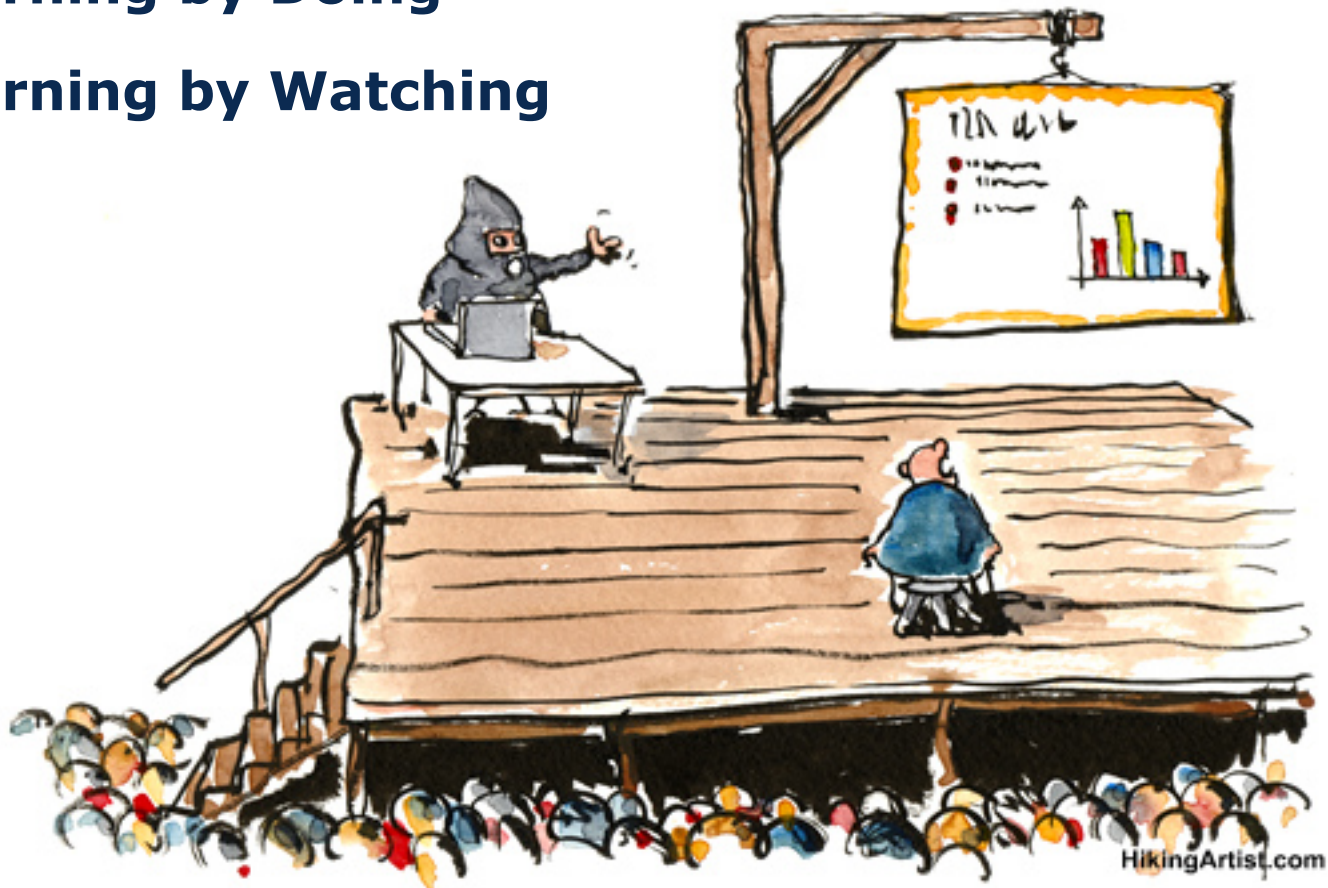


Beginners Guide

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 ...*

20%
Motivation

80%
Core Statements

- 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*

Motivation

Problems

Goals

State of the Art

Solution

Evaluation

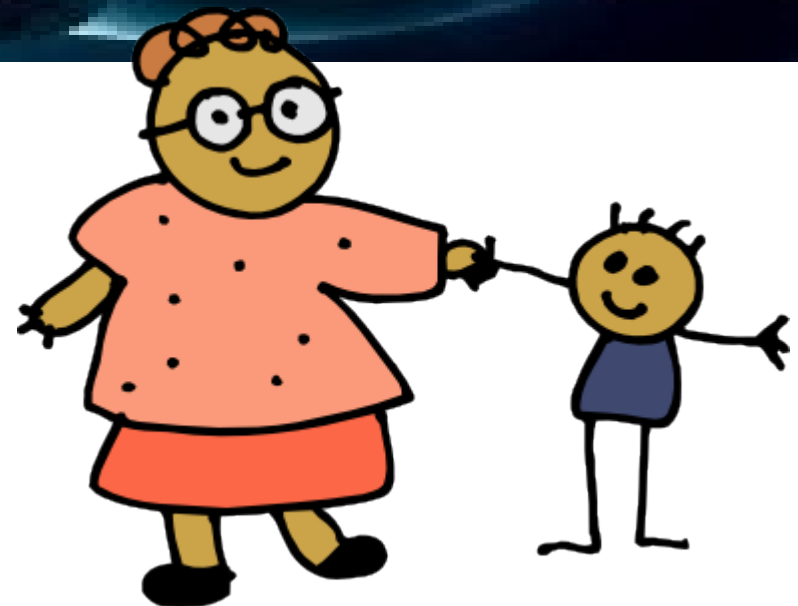
Results

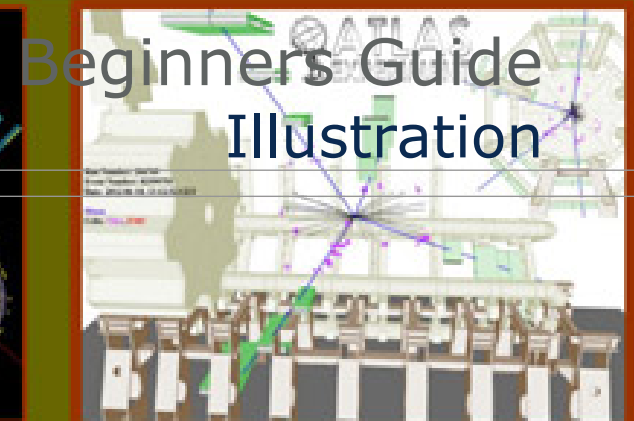
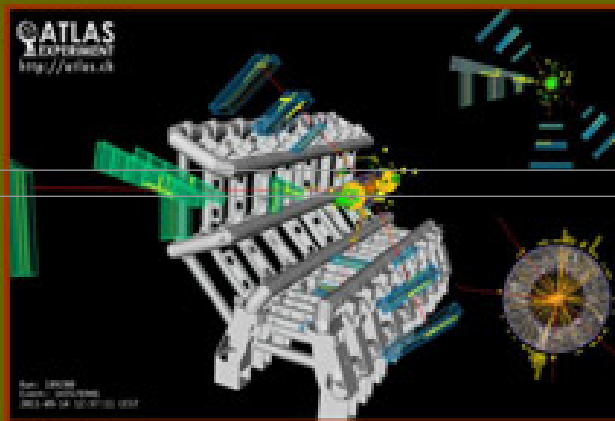
DO NOT

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Beginners Guide Illustration

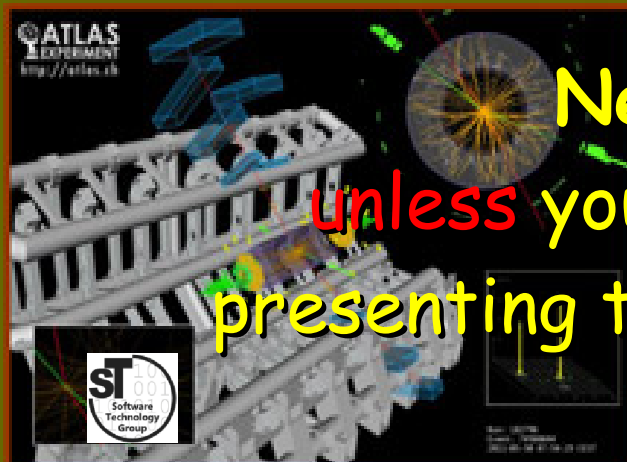
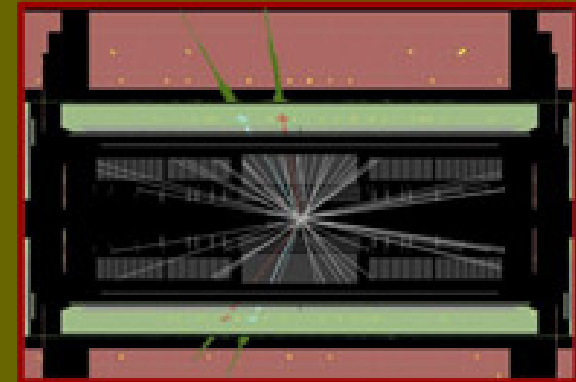




Status of Standard Model Higgs searches in ATLAS

Using the full datasets recorded in 2011 at $\sqrt{s}=7$ TeV and 2012 at $\sqrt{s}=8$ 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 [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
(*facial expression, gestures, intonation, ...*)
- Avoid useless filler words (*ehm, so, also, yes...*)
- 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

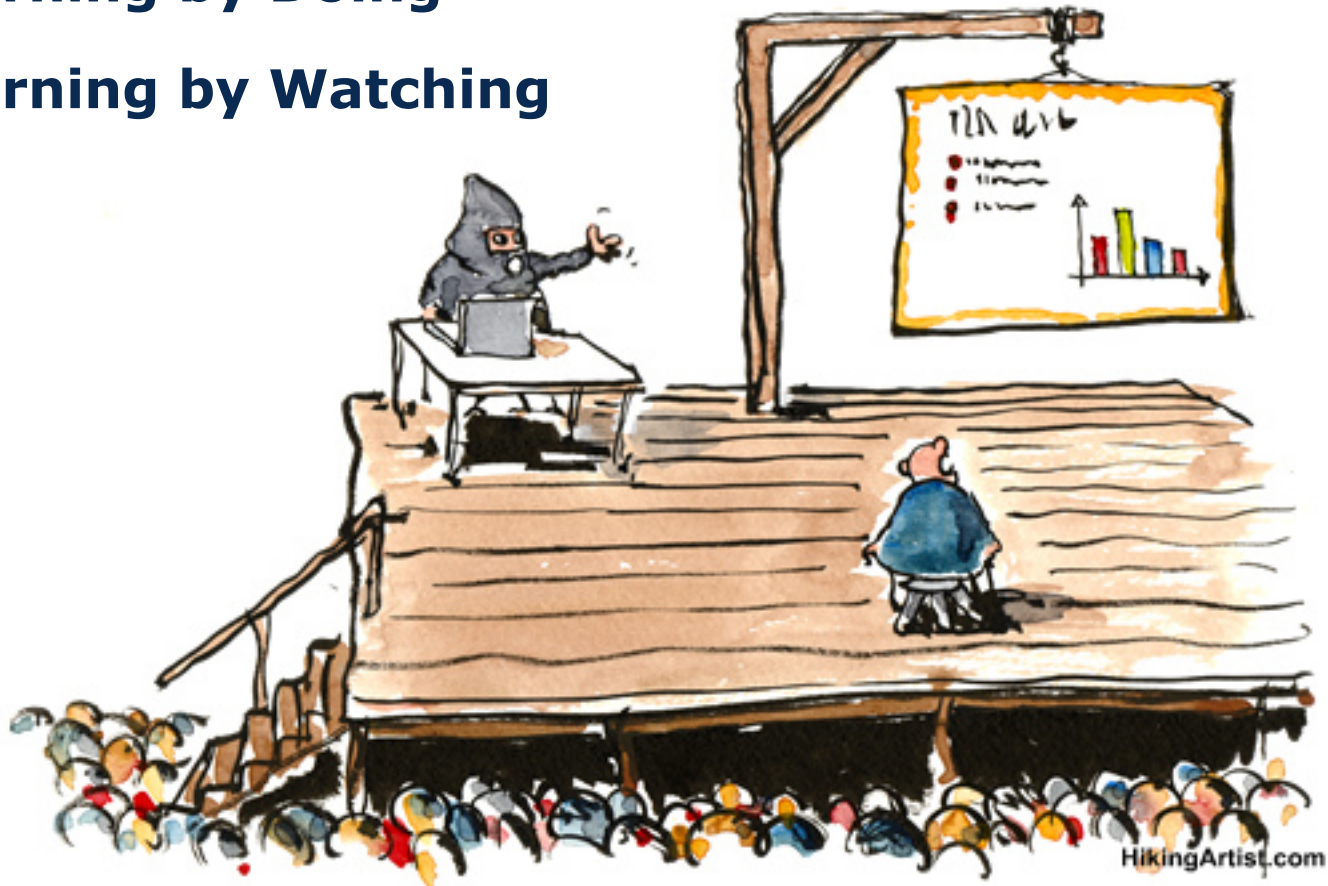




Figure 1: Alexander von Humboldt,
Wikimedia Commons (Public Domain)

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

- 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

- 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, ...*

1) <http://tu-dresden.de/service/publizieren/cd/>

- 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:
Eclipse¹ is a widely used Development Environment
1) www.eclipse.org
- Subtitle for figures, tables, diagrams:
 - Pay attention to copyright licenses (Creative Commons)

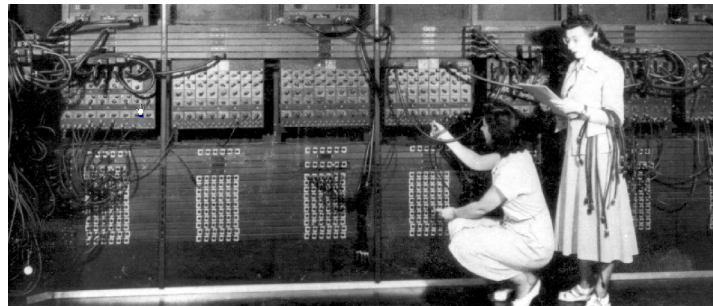


Figure 2: Programming of ENIAC [U. S. Army Photo]

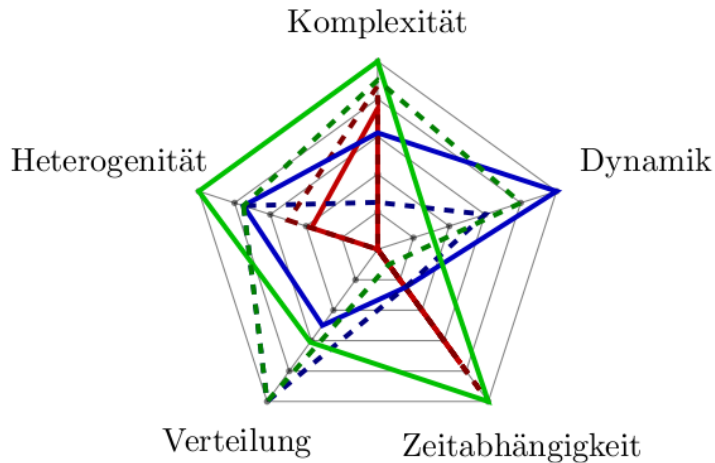


Figure 3: Radar chart [Kühn2013]

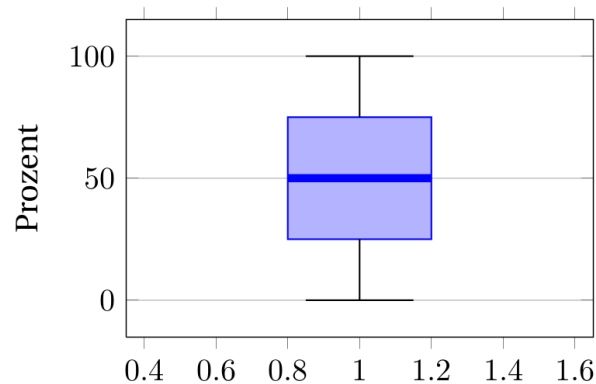


Figure 4: Example box plot

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
 - ...

Few Mathematical Formulae

- Simply use special characters

$$card: (R \rightarrow N \times N) \cup (Rel \rightarrow N \times N \times N \times N)$$

- Integrated formal editor

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

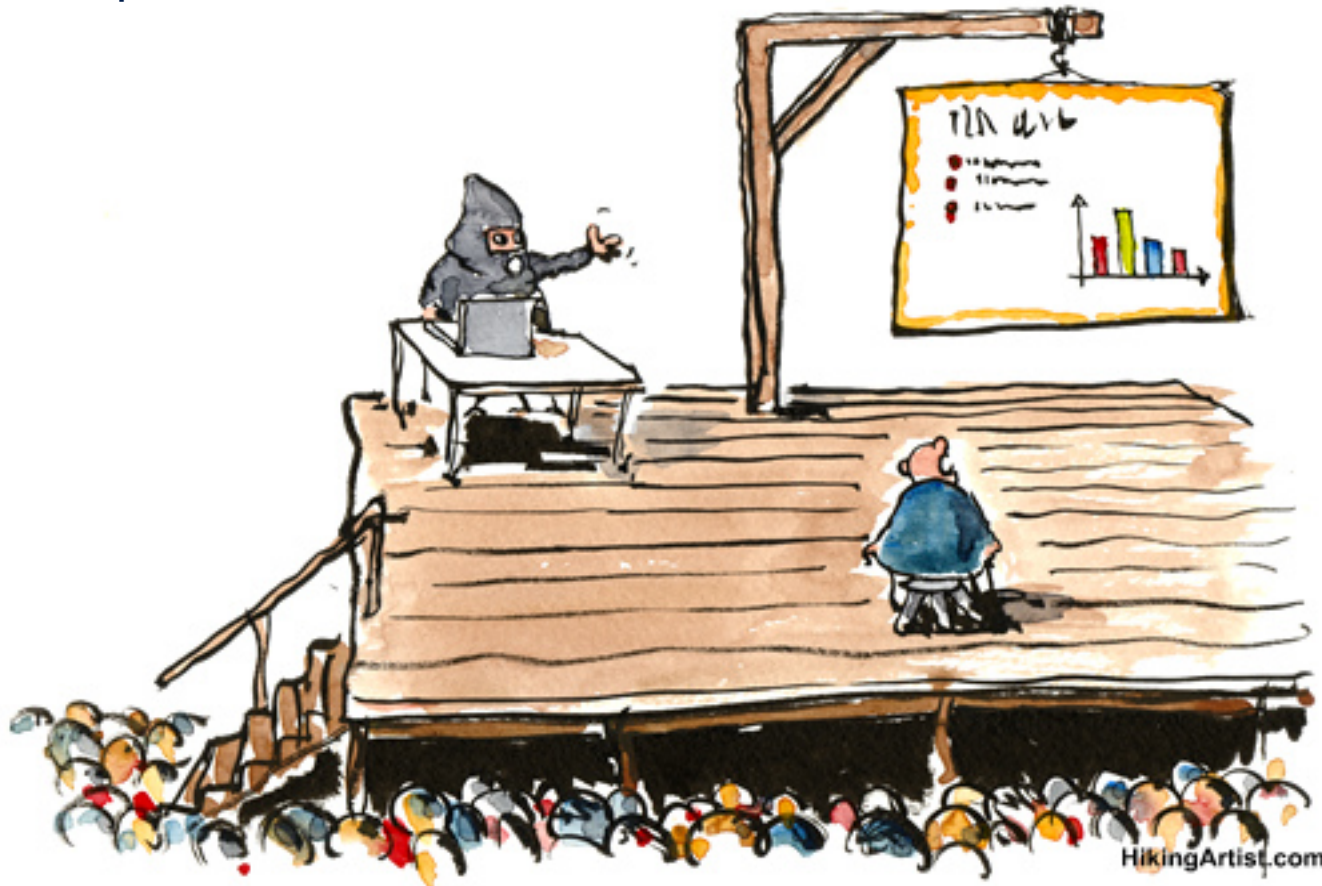
Many Mathematical Formulae and Definitions

- Better use *LaTeX/Beamer* instead

- 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

Task:

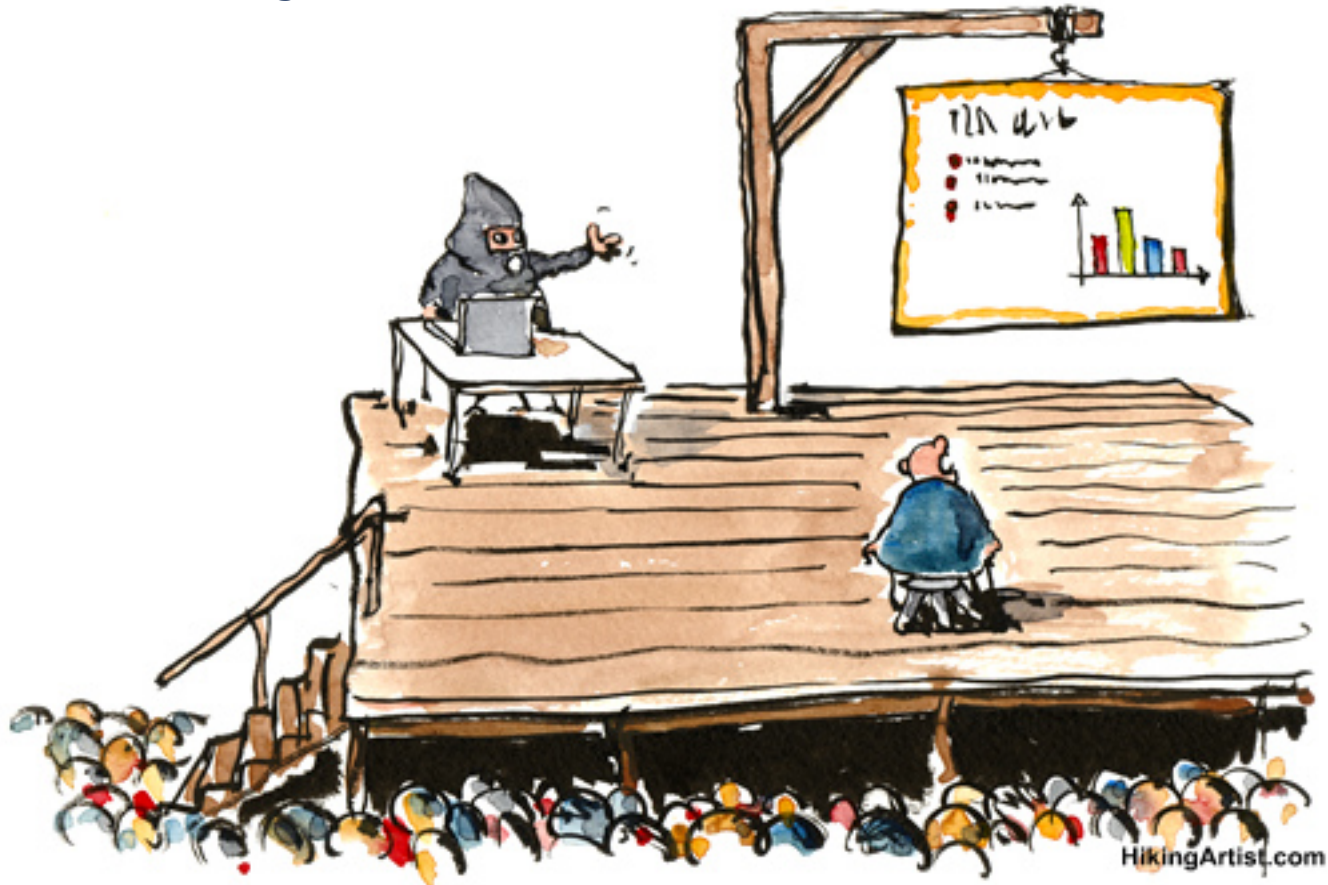
- Present 2-3 *unknown* slides
- Convince your audience
- Cope with the stress





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)

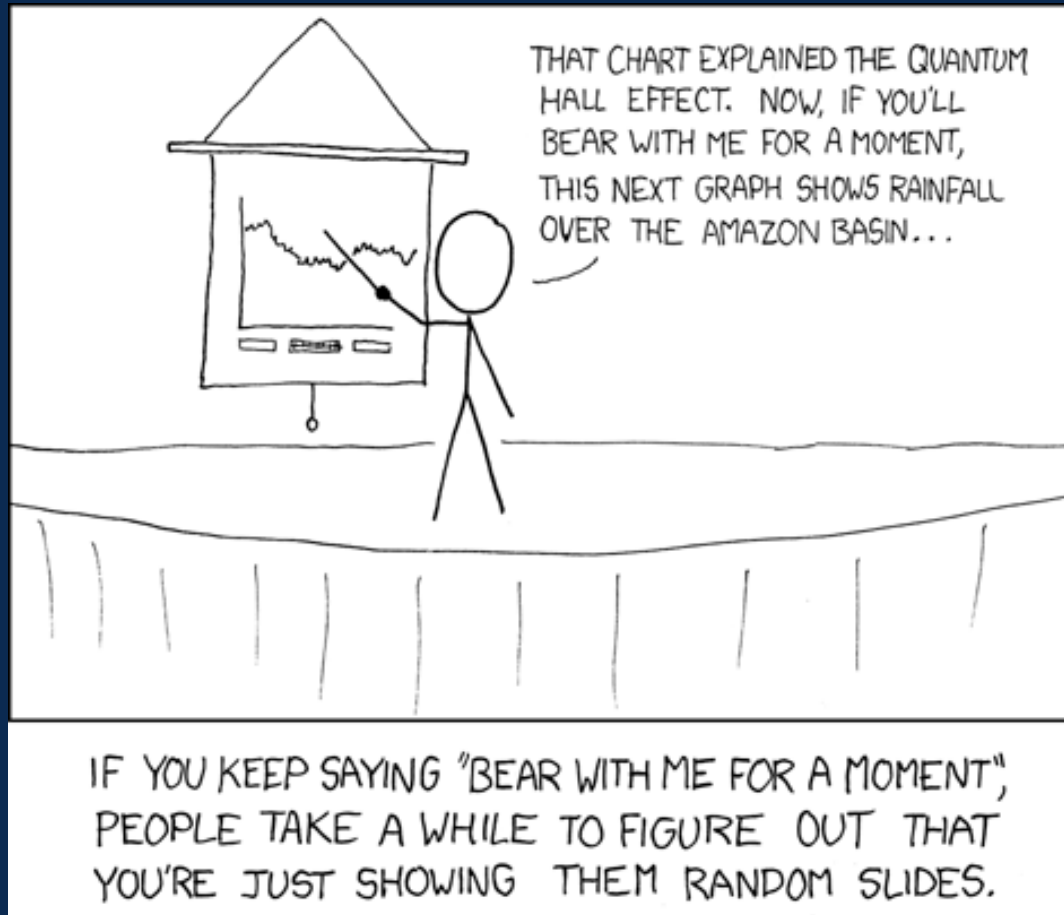
http://cdn.media.ccc.de/congress/2013/mp4/30c3-5304-en-CounterStrike_h264-hq.mp4

http://cdn.media.ccc.de/congress/2013/mp4/30c3-5537-en-Glass_Hacks_h264-hq.mp4

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)

[Gianotti2012] Status of Standard Model Higgs searches in ATLAS

Fabiola Gianotti

Representing the ATLAS Collaboration, CERN (2012)

**[Kühn2013] Tools and Materials in the Context of
Cyber-Physical Systems**

Thomas Kühn

Diplomarbeit, TU Dresden (2013)

**[Piesk1997] Natürlichsprachliche Interaktion mit autonomen 3D-
Charakteren Konzeption und Implementierung eines virtuellen
Darstellers als dialogfähigen Agenten.**

Jens Piesk

Diplomarbeit, Köln (1997)

[Wirth1995] A Plea for Lean Software

Niklaus Wirth

Computer 28.2 (1995)