



TECHNISCHE  
UNIVERSITÄT  
DRESDEN

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

# How To Do **Scientific** Presentations

Speaker

Thomas Kühn

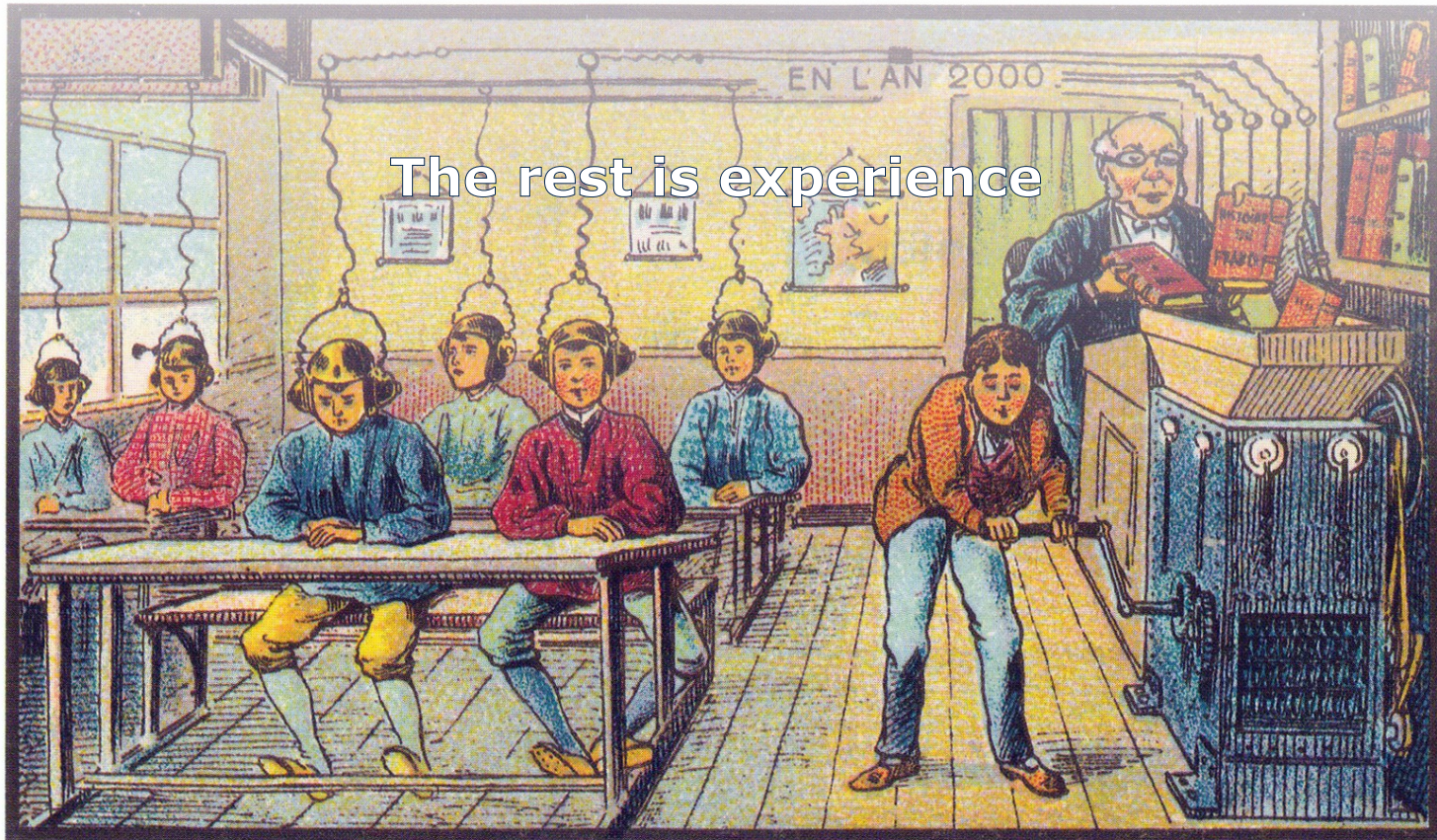


DRESDEN  
concept  
Exzellenz aus  
Wissenschaft  
und Kultur

**We learn ... by ...**

painting  
writing  
presenting

examining paintings  
reading articles  
watching presentations

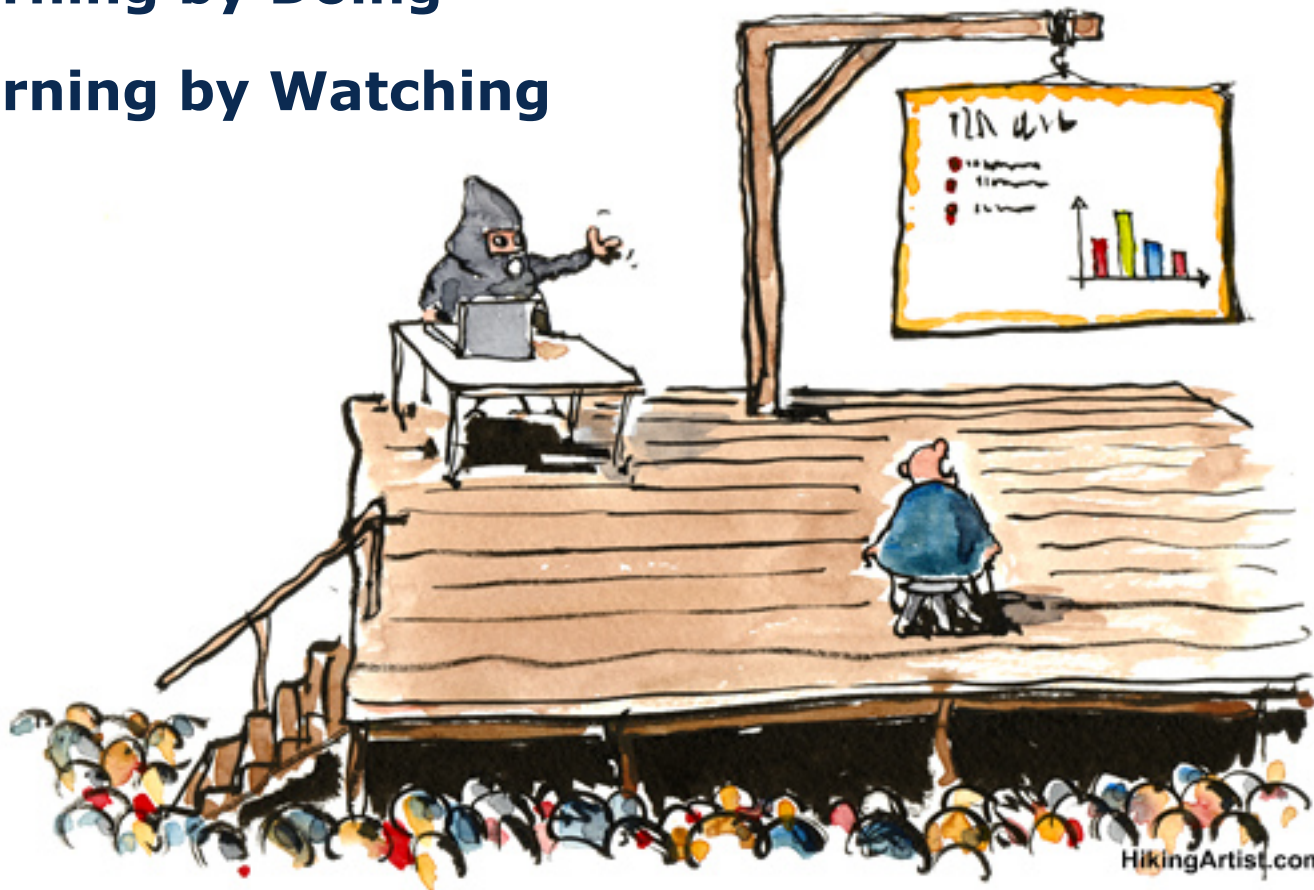


## Beginners Guide

## 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**

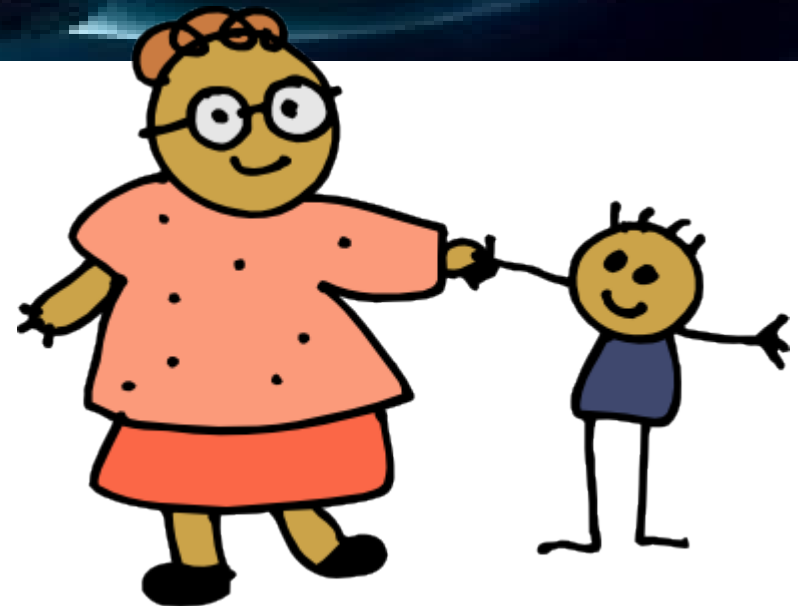
**Evaluation**

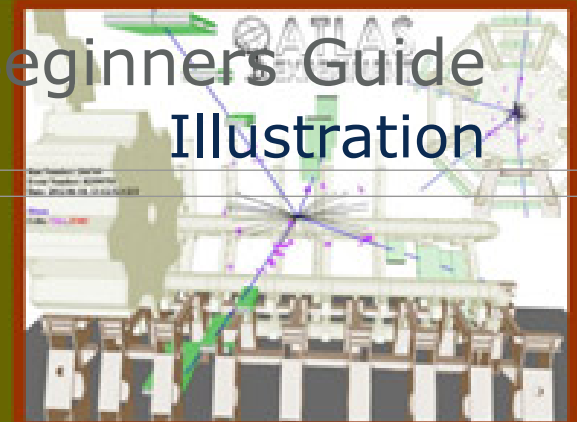
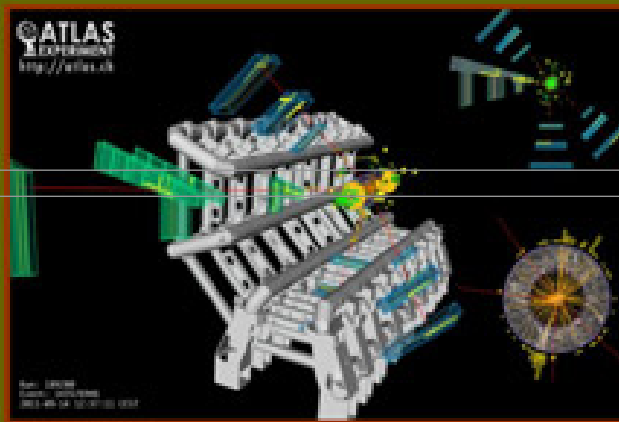
**Results**

***DO NOT***

**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.





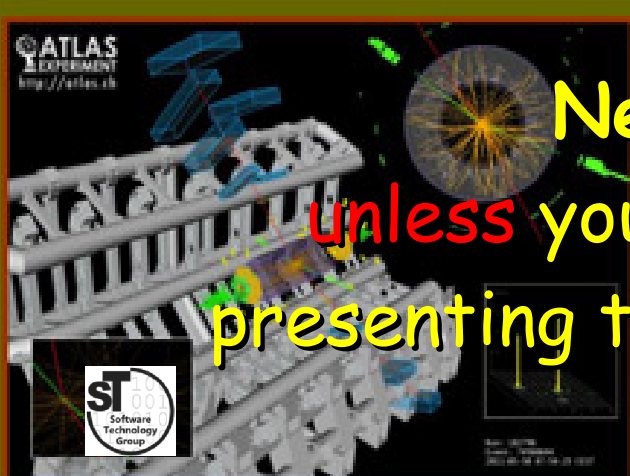
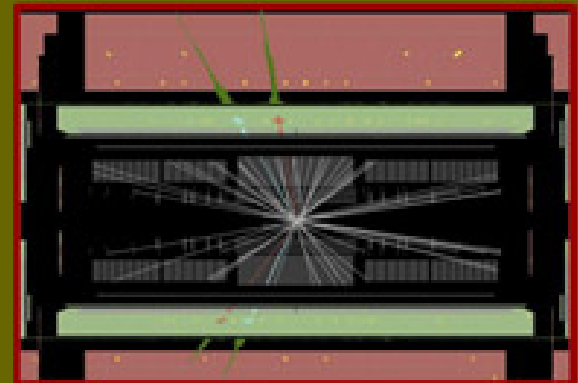


# Beginners Guide Illustration

# 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  $10.7 \text{ fb}^{-1}$

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



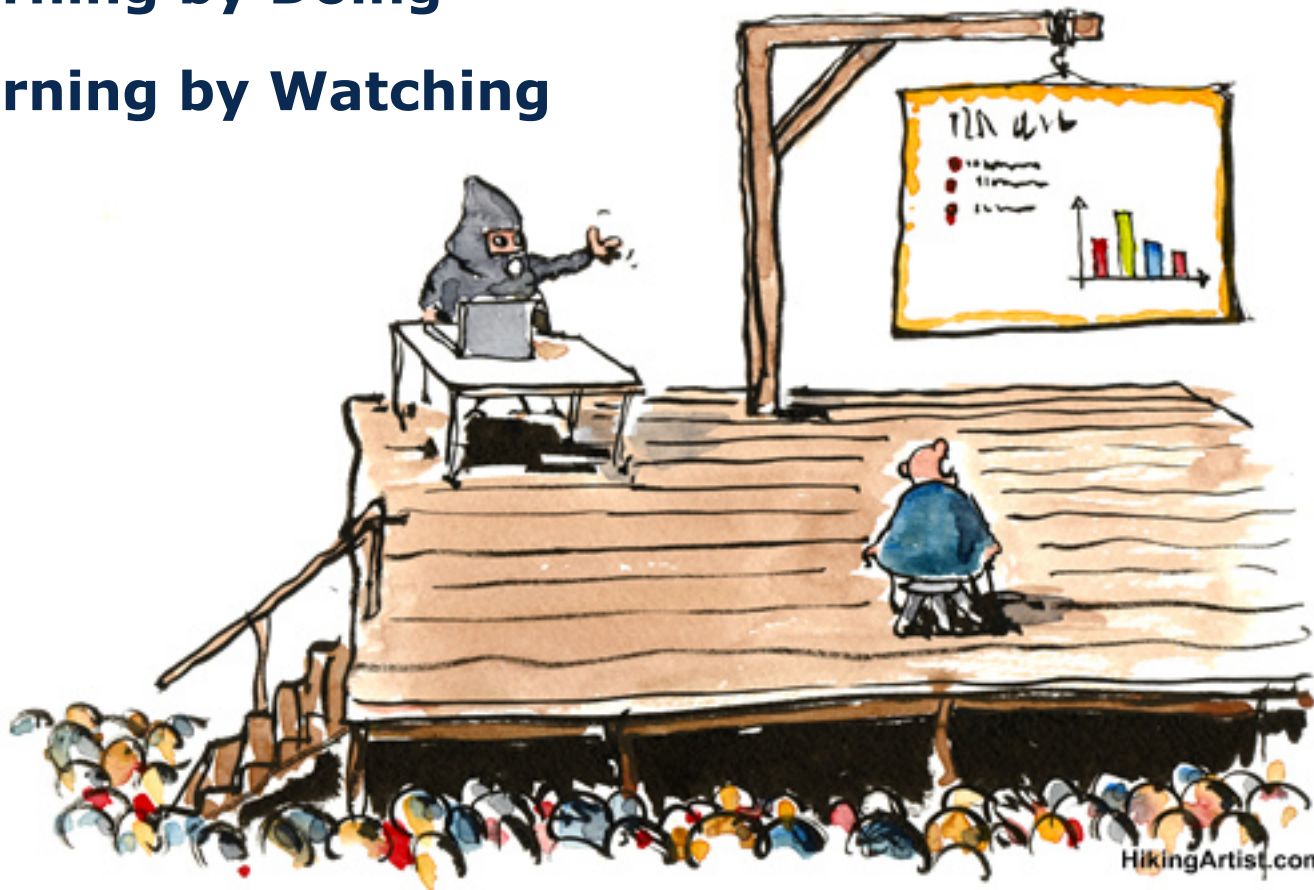
- In which context will you give your presentation?
  - Knowledge of your audience
  - Type of event
  - Goals of the event / your presentation
- What is the core statement of your presentation?
- What story do you tell?
- Which example do you use?
- Which illustrations will you choose?

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

## High Standards for Scientific Presentations

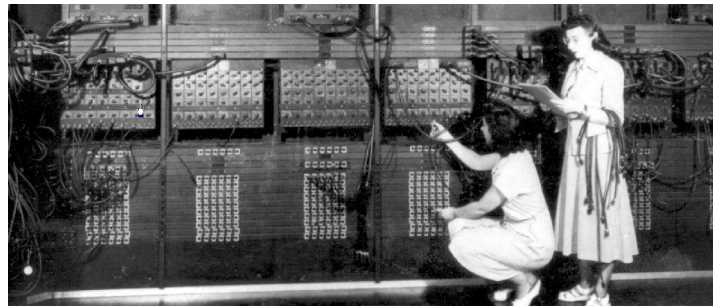
- Complex topics
- Fixed structure (outline)
- More information in less time
- Requires correct citations
- Depiction of
  - Tables,
  - Statistics, and
  - Mathematical formulae
- Professional audience

- 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*<sup>1</sup> 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, ...*

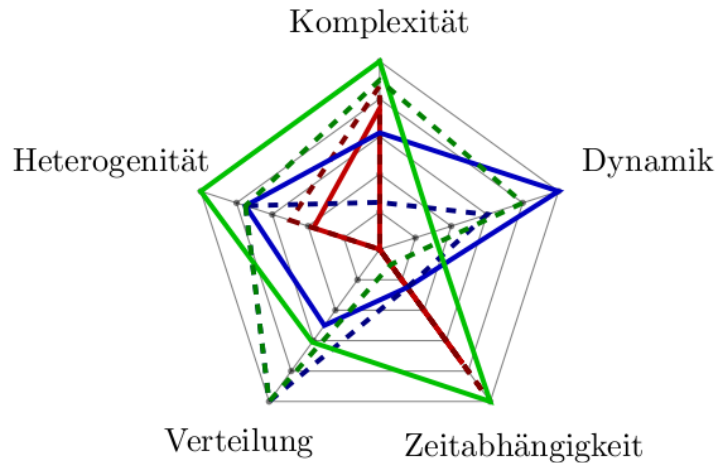
1) <http://tu-dresden.de/service/publizieren/cd/>

- 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:  
*Eclipse<sup>1</sup> is a widely used Development Environment*  
*1) [www.eclipse.org](http://www.eclipse.org)*
- Subtitle for figures, tables, diagrams:
  - Pay attention to copyright licenses (Creative Commons)

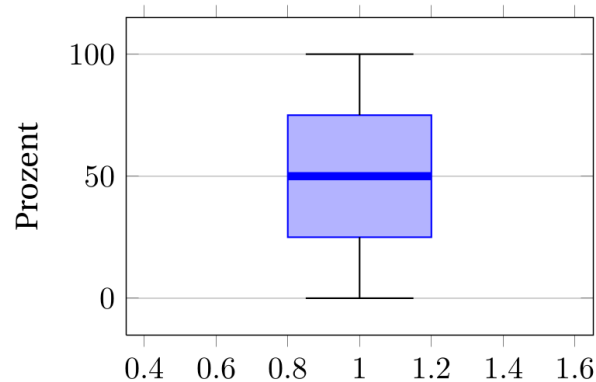


**Figure 2:** Programming of ENIAC [U. S. Army Photo]





**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

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

- Integrated formal editor

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

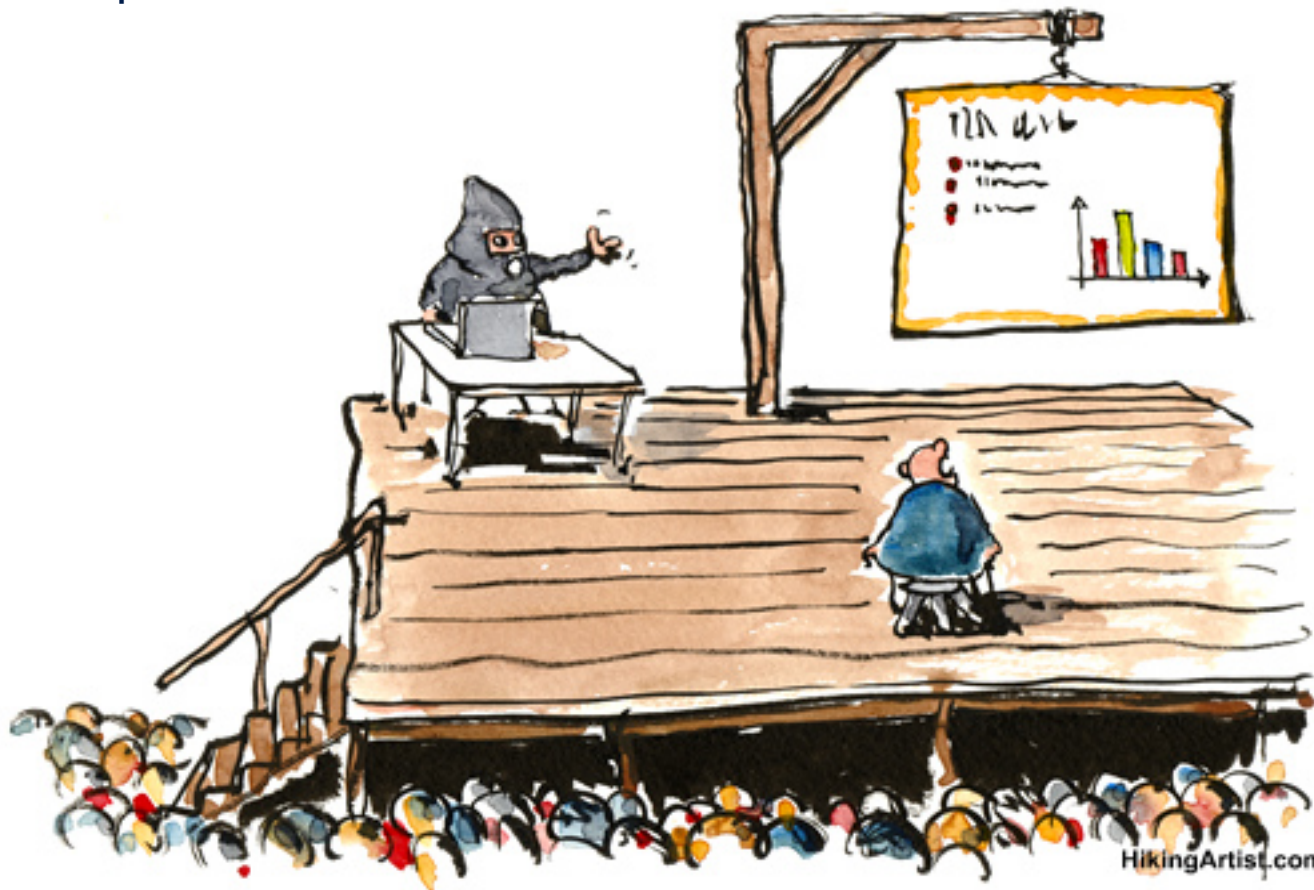
## Many Mathematical Formulae and Definitions

- 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

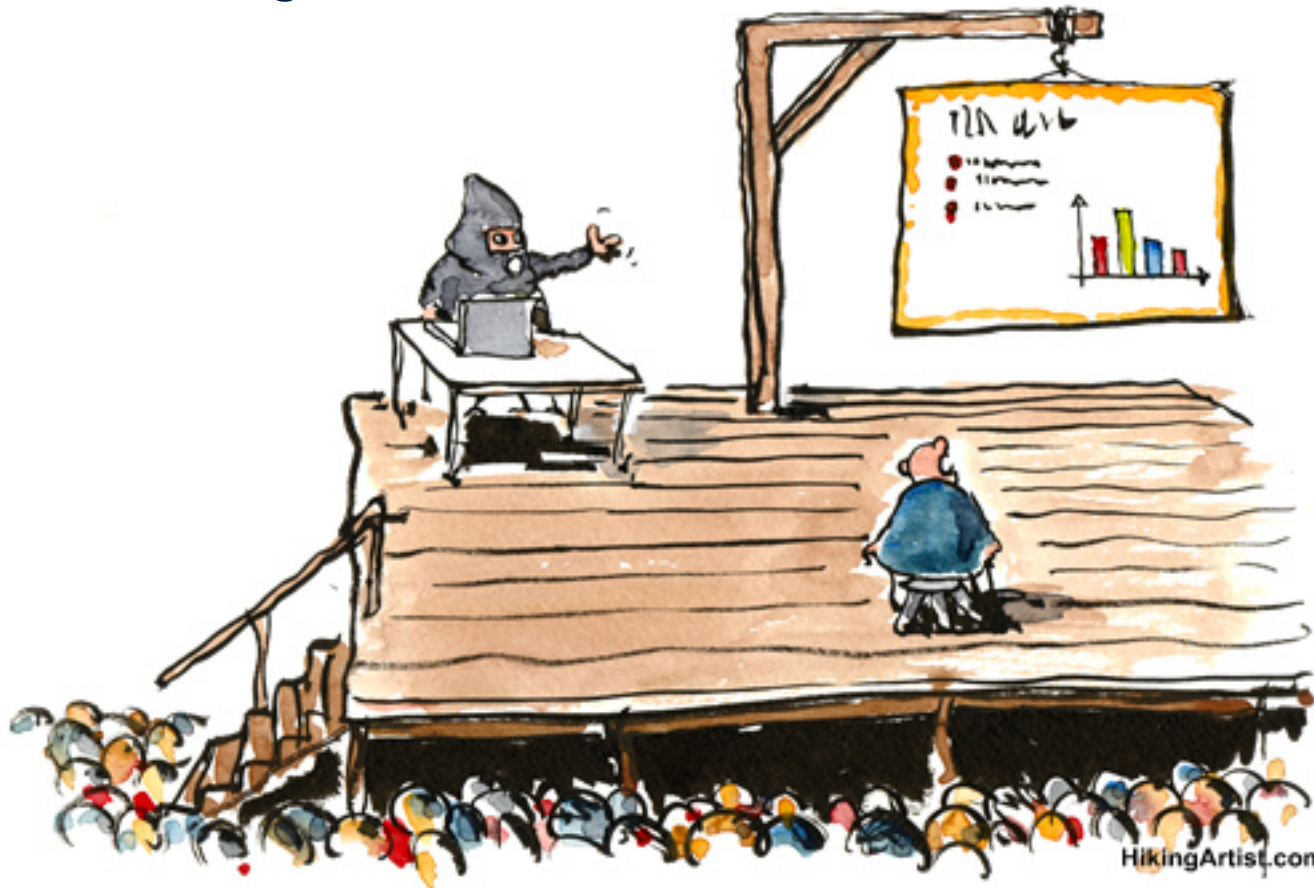






## Task:

- 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)

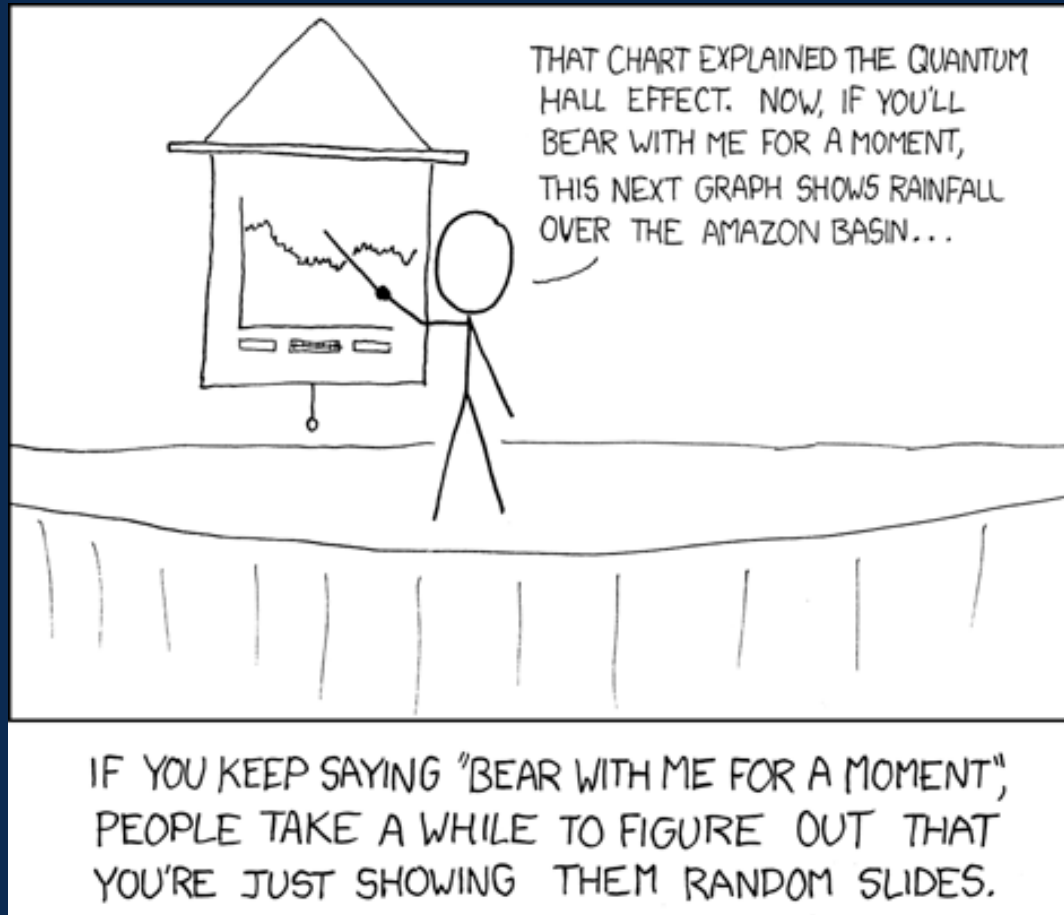
[http://cdn.media.ccc.de/congress/2013/mp4/30c3-5304-en-CounterStrike\\_h264-hq.mp4](http://cdn.media.ccc.de/congress/2013/mp4/30c3-5304-en-CounterStrike_h264-hq.mp4)

[http://cdn.media.ccc.de/congress/2013/mp4/30c3-5537-en-Glass\\_Hacks\\_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 Abmann*  
*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)*