FRANKFURT UNIVERSITY OF APPLIED SCIENCES

How to Give a Good Scientific Presentation

Human-Computer Interaction Exercise

Image from: https://pxhere.com/de/photo/234130

Agenda

- Why bothering in giving talks
- How to structure your talk
- How to make your slides
- How to give your talk
- Examples
- Infos for PhDs
- Slides are based on slides from
  - Arnaud Legout (Inria, Sophia Antipolis)
  - Niels Henze (University of Regensburg)
  - Sven Mayer (LMU Munich)

Why should you bother doing talks?

- **Presentations are a fundamental** part of research excellence and in industry
- **Everyone must learn how to sell their work** to…
  - the community: visibility, impact
  - students: attract graduate students
  - commissions: funding, promotion
  - the public: increase attraction of your field, fame
- And lectures?
  - …. aren't good presentations!

https://pxhere.com/de/photo/349010

Goals of a Presentation

- **Convey your message**
- Show that your work can have impact
  - Even when the audience is not aware of!
- Build relationsship and reputations
- Get feedback
- Show that you can make great presentations
  - Big plus in your career
    - A poor presentation can kill an application to a new position
- **Each talk is an (job) interview!**

https://pxhere.com/de/photo/1652048

Tell a Clear and Convincing Story

Define First Your Message

- **The audience will remember** at most **one single message**
  - Which message you want to audience to remember?
  - Can you express this message in less than a minute in an elevator?
- Tailor, you talk according to this message
- **Don’t sell more, but sell it well**
- Emphasize connection over content
  - Engage listeners from an emotional place rather than from the content

https://pxhere.com/de/photo/631638

Never Present Too Much!

- **Common pitfall**
  - “They must be impressed. I did a lot and I will present every single bit of my work!”
    - **Presenting too much only shows you are unable to deliver a message**
- Never ever consider **simplicity and clarity** as a proof of weakness: **this is talent**
  - Do not hesitate to **cut your presentation and focus on the message**
  - Better to present 10% the entire audience than 90% nobody understand
- **Adapt to the Audience**
  - **The entire audience must understand your talk**
    - Better to explain notions a part of the audience already knows than to lose another part during the talk
  - **Do not over- or underestimate the knowledge** of the audience in your field

Think Like Your Audience

- **Identify your audience**
  - A professor
  - Some students
  - Some experts your field?
  - Non-scientists?
- When speaking to **experts**, you should **focus** less on background and **more on data**
- When presenting to **non-scientists**, **speak more broadly** about your interests without boring anyone with highly detailed data. Tailor your talk to your audience.

Stay Focused

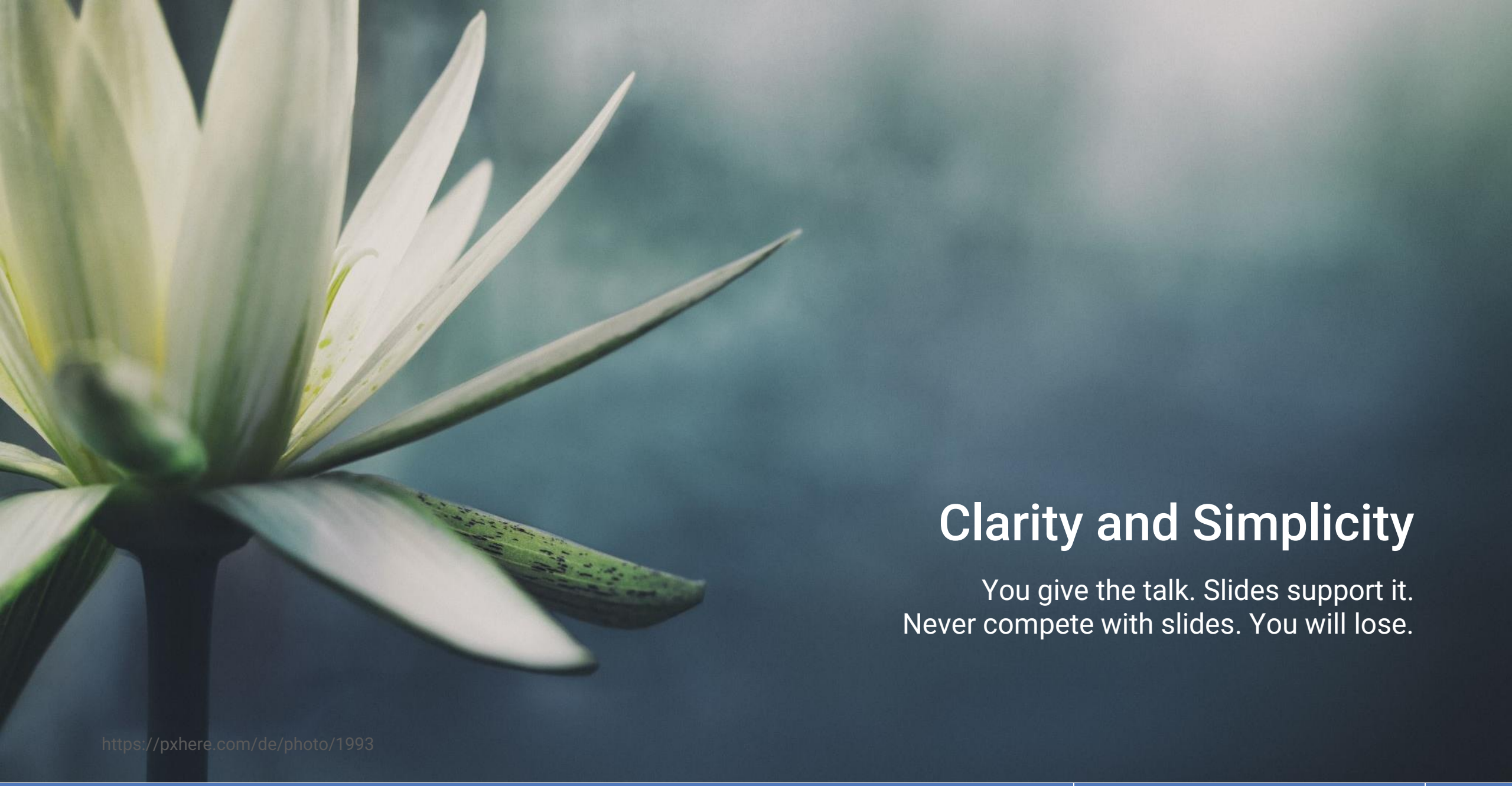
- **Give a background**
  - **Bring examples** and adapt to the audience
  - **Increase / descrease the technical granularity** of your presentation
  - **Make it fun and catchy**
- **Motivate your work**
  - Why is the subject important and interesting?
- **Focus of your work**
  - What is this presentation/work about in a single sentence?
  - What is the problem?
  - What is the research questions?
  - Why is it important?

Outlining

- **Giving an outline is very common**
  - **But not necessary when you don’t have time**
  - You can give it first before or after (better) the background
  - Repeat the outline before each new part
  - **Use color to show where you are**
- Tell a story from the background to the conclusion
  - **No need to go too deep** into related work (some examples are okay!)
    - Your contributions must be the core
  - But, **be prepared to discuss related work**
- Make clear the structure of your talk to the audience
  - No suspense

Before you start preparing slides…

- What is my **goal**?
- What is my **single message**?
- What is my **audience**?
  - Background, knowledge, size, expectations
- How much **time** do I have?
  - For the talk?
  - For the questions?
- **Room** characteristics?
  - Size, position of the screen, my position
- **Adapt your talk and material to each context**



Clarity and Simplicity

You give the talk. Slides support it.
Never compete with slides. You will lose.

https://pxhere.com/de/photo/1993

But why do you have so much text in your slides?

I am giving a lecture. There is no message.

There is just content you must learn.

The Structure

1. Say **who you are**, what are you doing (e.g., study course, PhD,…), and your project
2. Motivate your work with **a common problem**
3. Motivate through **background** and related work
4. Show the **research questions**
5. Show the **methodology** and tools
6. Show the **results**
7. Clearly highlight your **contribution**
8. Conclude with a **summary of findings** and implications

Highlight when you are done and when you are ready for questions

The Template

- **Avoid overloaded templates**
  - No animations, no progress bars, no fancy shit…
- Sometimes if you have to consider the **graphical identity**
  - Many institutions do not care about good templates but force you to use theirs anyway
- Unless you have a graphical talent, **keep it simple**
  - Make a clear **distinction between the title and the rest**
  - Do not use complex headers or footers
  - No need to use the presentation title, affiliation, full authors list, company logo, etc. on each slide
- **Use slide numbers**

Explain All Slides

- Never present a slide you do not explain in detail
- Present a slide for more than 30 seconds **or drop them**
- Spend time on
  - complex figures **or drop them**
  - on equations **or drop them**
- Talk on transition slides (e.g., outline reminders) **or drop them**
- Use transition to summarize the previous part and introduce the next one

Wall of Text

First, we analyzed the IPQ questionnaire [48] (scale: from −3 to 3) to determine whether ROLE or CORRECTION significantly influenced the presence in VR in one of the two tasks. Therefore, we conducted two univariate two-way ANOVAs. In the validation task, the analysis revealed a significant effect for ROLE ($F_{1,22} = 12.79$, $p < .001$, $\eta^2 = .334$). However, we found no significant effect for CORRECTION ($F_{1,22} = 1.614$, $p > .217$, $\eta^2 = .010$) and also no significant interaction effect ($F_{1,22} = .078$, $p > .782$, $\eta^2 < .001$). The mean IPQ score was $M = .28$ ($SD = .62$) for the Pointer and $M = -.89$ ($SD = 1.02$) for the Observer in the validation task. In the apple-picking task, the analysis revealed a significant effect for ROLE ($F_{1,22} = 6.441$, $p < .019$, $\eta^2 = .212$). However, we found no significant effect for CORRECTION ($F_{1,22} = .534$, $p > .472$, $\eta^2 = .002$) and also no significant interaction effect ($F_{1,22} = .382$, $p > .542$, $\eta^2 = .001$). The mean IPQ score was $M = .76$ ($SD = .68$) for the Pointer and $M = -.11$ ($SD = 1.$) for the Observer in the apple task.

Sven Mayer, Jens Reinhardt, Robin Schweigert, Brighten Jelke, Valentin Schwind, Katrin Wolf, and Niels Henze. 2020. Improving Humans' Ability to Interpret Deictic Gestures in Virtual Reality. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3313831.3376340

Be Concise

- Remove uncessary words that you don‘t need in sentences and only include information that is important for the reader to know

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- Remove uncessary words ~~that you don‘t need in sentences and only include information that is important for the reader to know~~

Be Concise

- Remove uncessary words ~~that you don‘t need in sentences and only include information that is important for the reader to know~~
- You can add content successively
- But write small sentences
  - **Highlight a message with bold text and/or a color**
  - Be simple in your explanations
  - One bullet at a time?
    - Perfectly fine to show the entire slide if it is concise
    - But, if you feel you compete with your slides, show some bullets
      - Rule of thumb: do not animate bullets (or block of bullets) on which you discuss less than 20 to 30s
- **Use pictures whenever possible**

All the people killed by walls of text...

The Title of Your Scientific Report

Max Mustermann, Barbara Musterfrau, John Doe

Image from: https://pxhere.com/de/photo/234130

THE BIG PICTURE

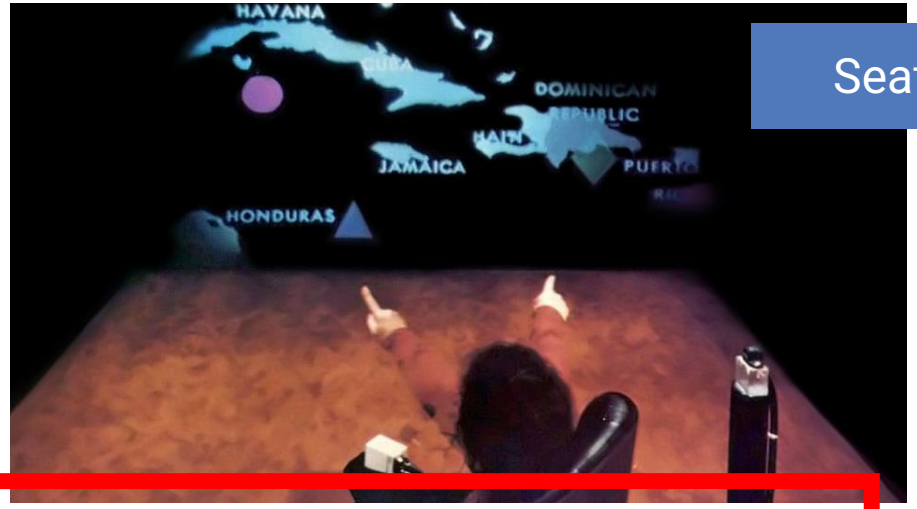
Introduction

- **Address the problem**
  - What‘s the issue?
  - For whom its revelant?
  - What are the consequences if don‘t solve it?
- **Provide background**
  - What do we know?
  - What is the gap of knowledge?
  - How do you want to address it?
  - Why will your solution work?

Related Work

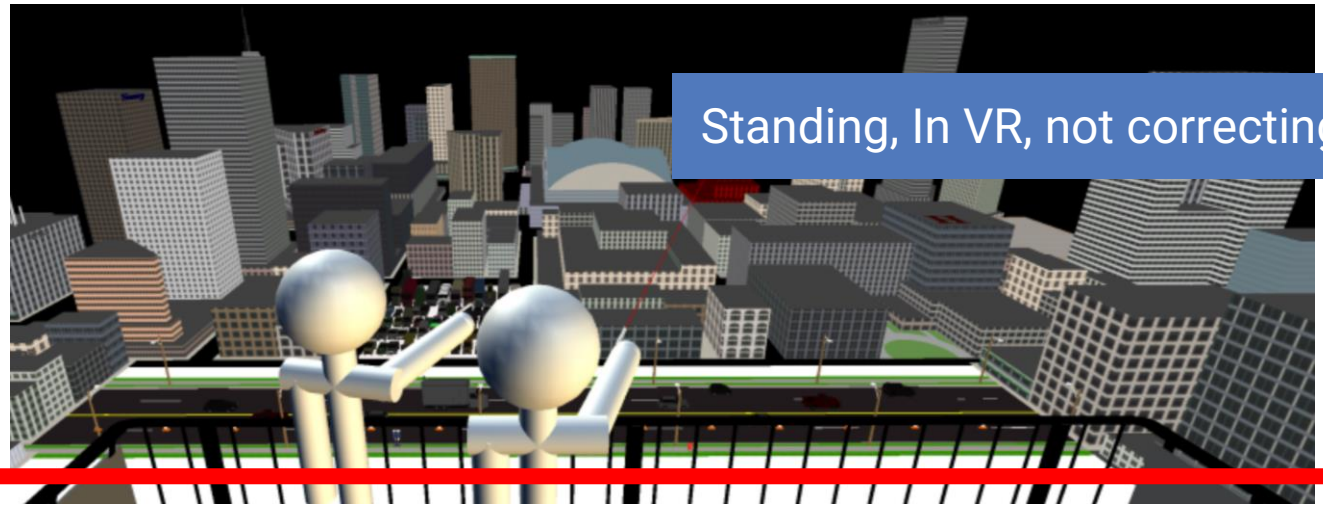
- **No need to go too deep into related work**
- Your contributions must be the core
- Show that you are familiar with it
- Show the latest findings
- **Some examples are okay!**
- Always be prepared to discuss related work

Related Work



Seated, not correcting

Richard A. Bolt. 1980. “Put-that-there”: Voice and gesture at the graphics interface. In Proc. of SIGGRAPH '80. DOI: http://dx.doi.org/10.1145/8[illegible]50.807503



Standing, In VR, not correcting

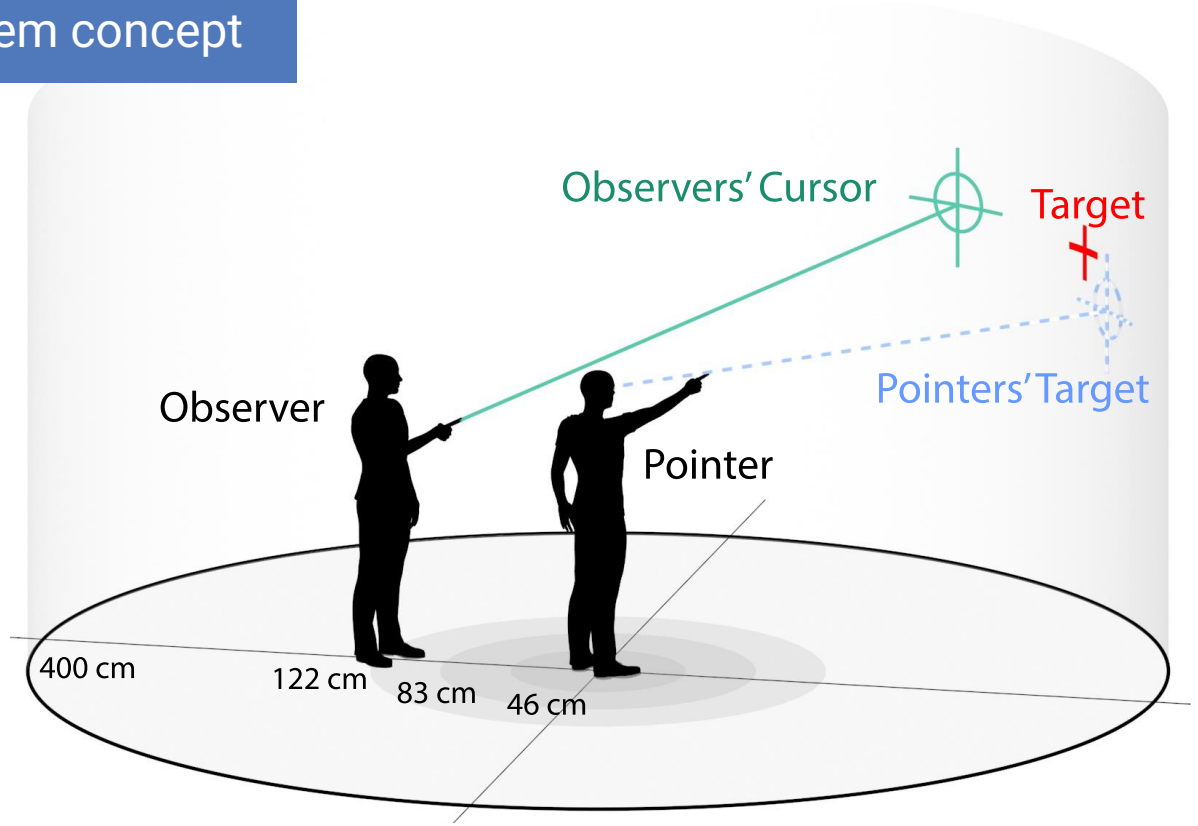
Nelson Wong and Carl Gutwin. 2014. Support for deictic pointing in CVEs: still fragmented after all these years'. In Proc. of CSCW '14. DOI: https://doi.org/10.1145/2531602.2531691

Always cite directly on the slide not at the end!!!!

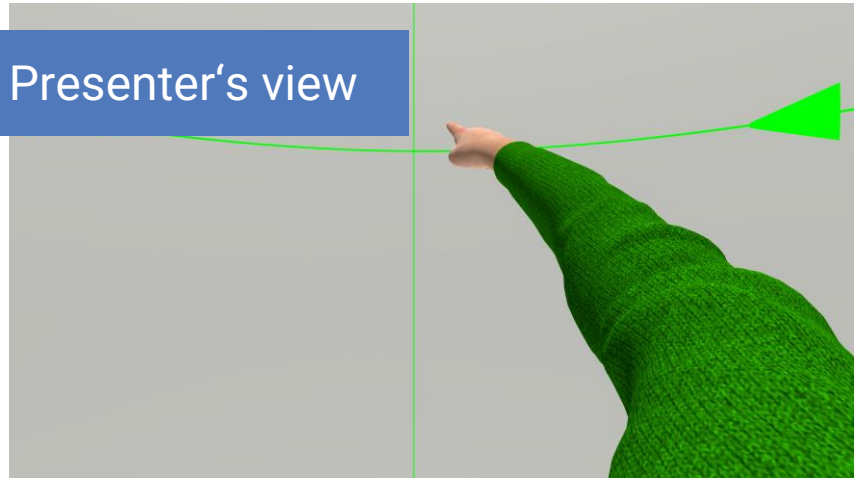
Method

- Explain the Setup

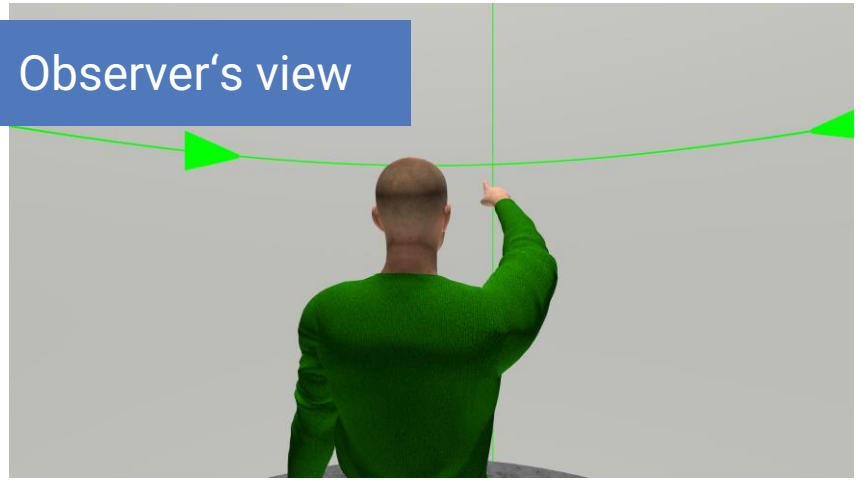
System concept



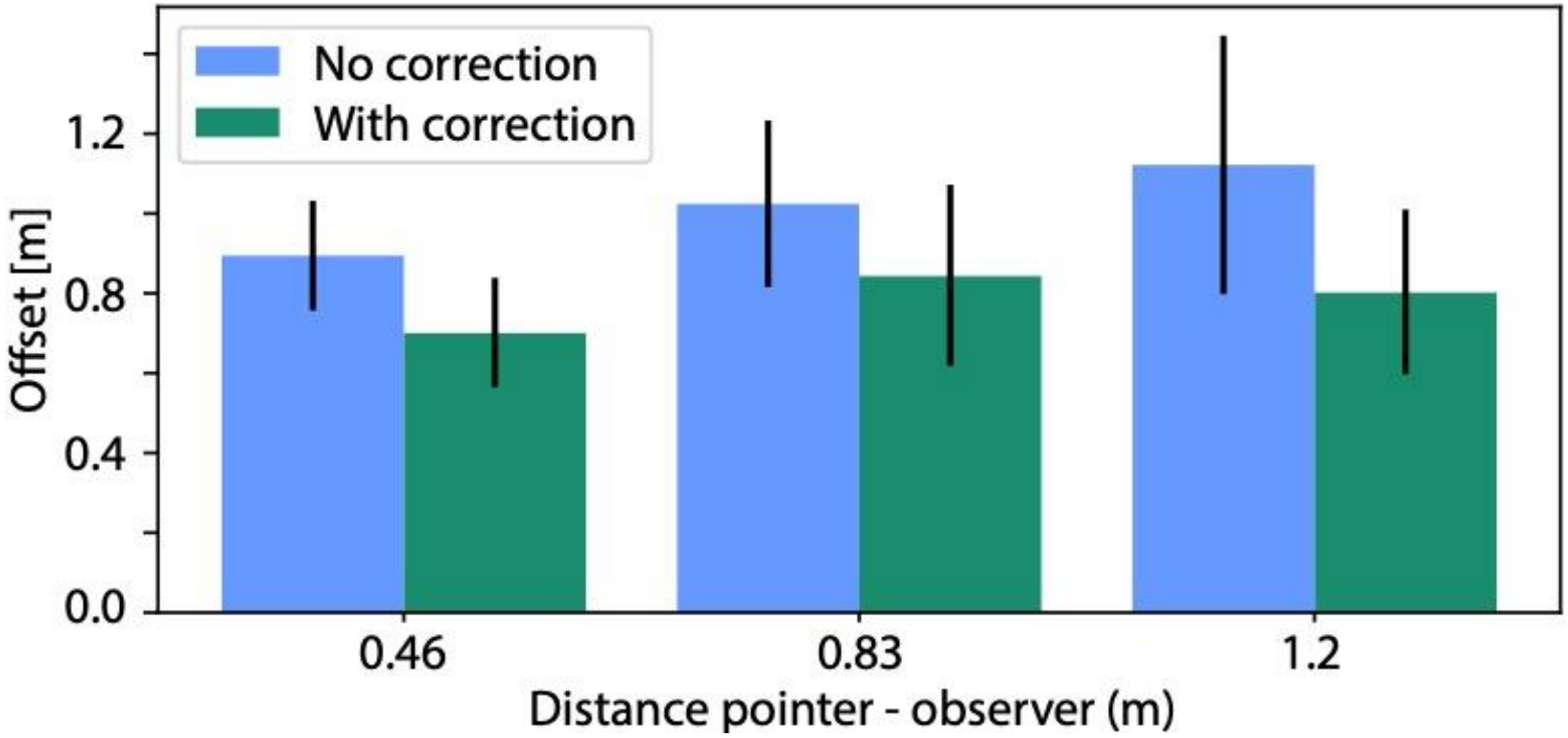
Presenter's view



Observer's view

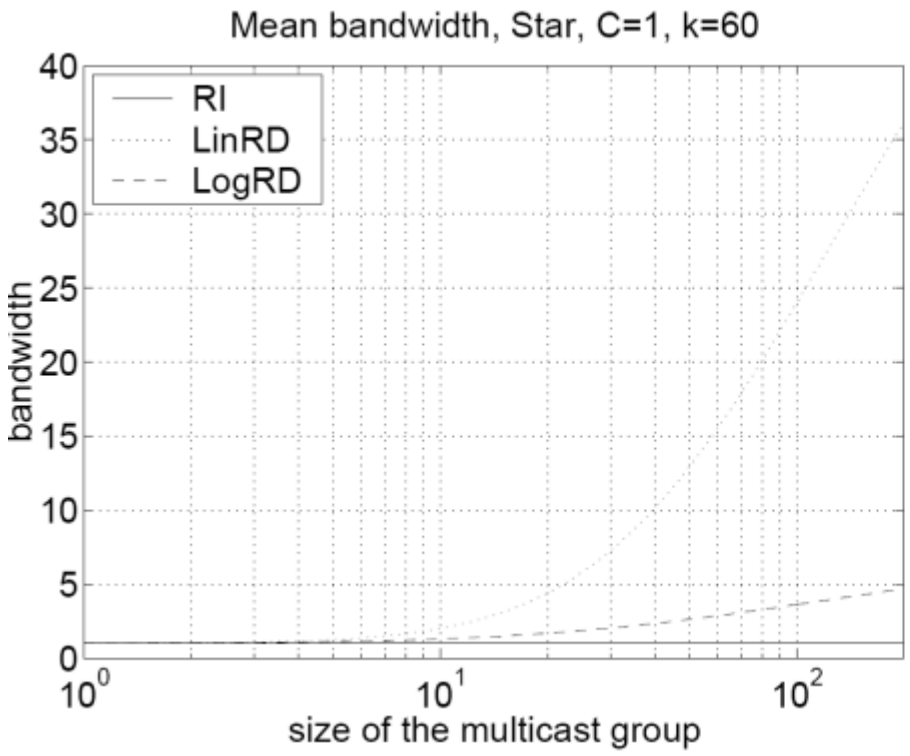


Results



significant reduction ($p < 0.001$)

Results


Mean bandwidth, Star, C=1, k=60
RI
LinRD
LogRD
bandwidth
size of the multicast group
0
5
10
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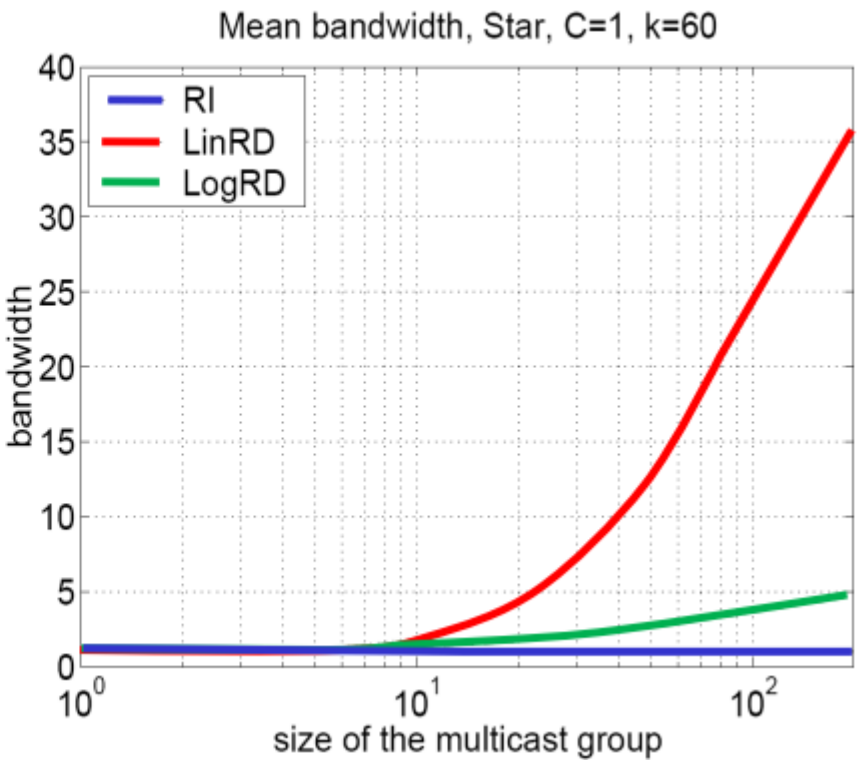
25
30
35
40
10^0
10^1
10^2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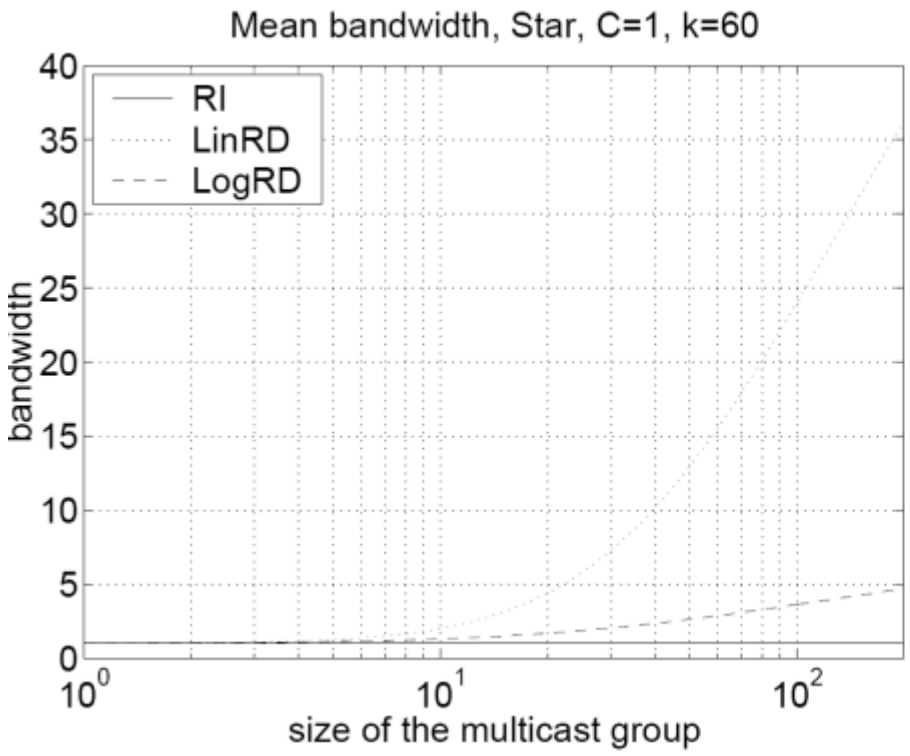
Results


Mean bandwidth, Star, C=1, k=60
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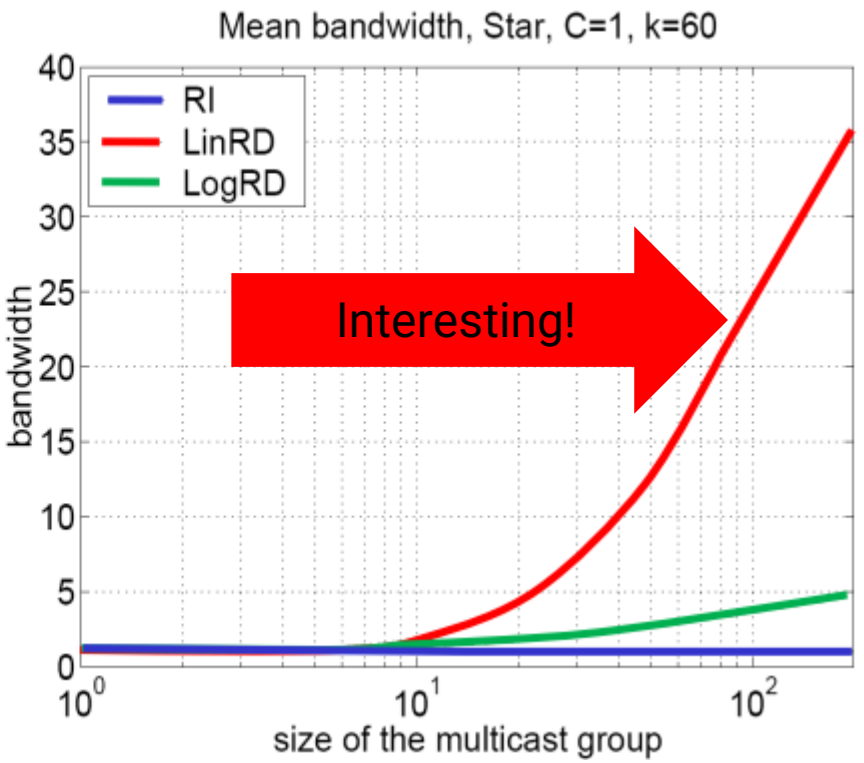
bandwidth
size of the multicast group


Mean bandwidth, Star, C=1, k=60
RI
LinRD
LogRD
Interesting!
bandwidth
size of the multicast group

Discussion and Findings

- **Deictic gestures are fundamental expressions in non-verbal communication**
- **Virtual Reality can be used to “override” one's appearance**
- **We developed a model to improve deictic gestures in VR**
- **The model cannot affect immersion (it is only being displayed for the observer)**
- **Accuracy improvement of 28% when using the model**

Q&A Part

- **Q&A are part of every talk**
  - **Never** underestimate its importance
    - In science, people in the audience are well-prepared to ask you questions
  - **Never**
    - lie, aggress, or complain
  - **Prepare backup slides** (very impressive when it works!)
    - You can put technical details or results you did not have time to address in them
- **Be prepared to answer questions**
  - Be prepared to **very hard questions**
  - Some questions might be aggressive, stupid (most of the time, such questions show you made a poor presentation), hard to answer, showing you are wrong
- **Rehearse with colleagues**

Infos for Doctoral Students

Human-Computer Interaction Exercise

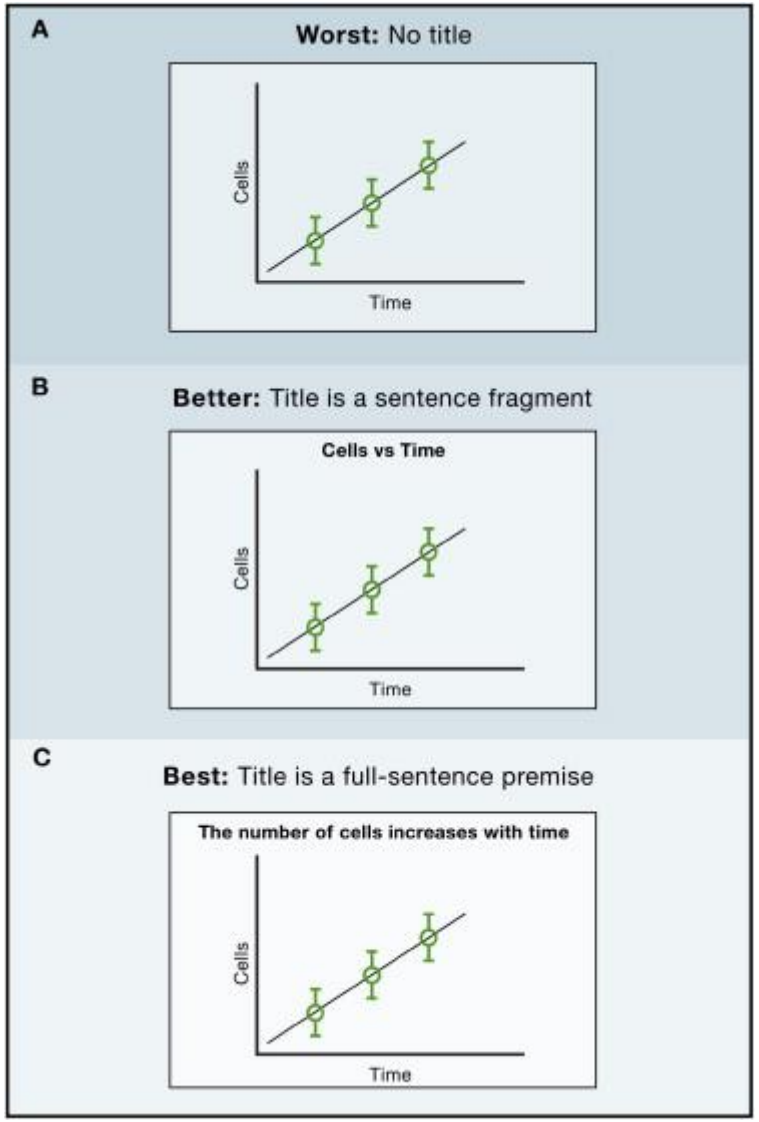
Image from: https://pxhere.com/de/photo/234130

Preparing Slides

- **Define your story** before making any slide
- You need a **clear structure**, devide that structure into message units
  - Scientific presentations **are often based exactly on the structure of the paper**
    - It has a structure
    - Not recommended to copy it 1:1 when you like to give a good talk
- Each slide has **a single message unit**
  - Explicitly state that message on the slide
- **Simple conceptual diagrams and figures**
  - No tables

Use Meaningful Titles

- **A slide with no title** is a challenge to the audience
  - Be sure when you want to do that
- **The title should summarize the slide content**
  - Do not use a same title with an increasing number
    - Introduction 1/5
    - Introduction 2/5
    - Poor variant “cont.”
- **A short full-sentence premise** helps the audience get the main idea at a glance



Limit Words on Slides; Use Visuals!

- **Avoid death by PowerPoint**
  - where the presenter reads off slide after slide after slide after slide like me in a lecture
- **Use images**
  - And a few words when you need them
- **Think about pathways**
  - If you do have slides with words: enlarge the font and aim to limit each sentence to one line
- **Describe dense information verbally** in enough detail that words on your slide are more-or-less unnecessary
- **Avoid the wall of text**

Use Slide Numbers

- **Used to ask questions**
- Helpful for the audience to make notes
- In some cases, it is useful to also add the total number of slides
  - For a defense or a short talk
    - Easy way for the jury or the audience to assess whether you are close to the conclusion and will not exceed your allocated time
  - For longer talks don’t show the total number
    - A large number of remaining slides might be discouraging

No Serif Fonts!

- Serif fonts are hard to read
  - Line width is not uniform
  - Thin lines may not render well with all projector types
  - Hard to read from the back
- Use non-serif fonts instead (Arial, Helvetica, I use Roboto [1])
  - look formal and scientific
  - very (may be too) popular
- No Comic Sans MS
  - https://linktr.ee/bancomicsans

[1] https://fonts.google.com/specimen/Roboto

No Punctuation Marks

- No punctuation mark
  - At the end of sentences
    - Period (.)
    - Colon (:)
    - Semi-colon (;)
    - Comma (,)
- Apart from
  - Question marks (?)
  - Exclamation marks (!)

Colors and Bold Text

- No more than three colors on a slide
- Here I have four
- Use colors or text to emphasize an **important word**
  - **I always use both**
- May be used to remind you to develop keypoints
- Never use light colors or low contrast They may not render well
- Never use light colors or low contrast They may not render well
- Never use light colors or low contrast They may not render well
- Never use red on blue

Black is okay

- Don’t use thin fonts against black: **They may not render well**
- Ugly with figures with a white background
- I don’t have much experience with this background
  - Seems to become more popular
  - Maybe better for the projector lamps and if you want to safe CO^2
  - Try it and make your own opinion

Be neaT

- Do YOU like
  - slides with sppell **check** erors
  - Inconsistant bullats:
    - *CAPITALISATION*
    - Bullet.
      - Random Struture,
      - **font**;
  - Ugly slides
  - poor use of symbol !!!
- Poor layout

Be Neat

- Or do you like
  - Slides with spell check errors
  - Consistent bulleting
    - Capitalization
    - Bullets
    - Structure
    - Font
  - Clear slides
  - Decent use of symbols
  - Clear layout

Be Concise

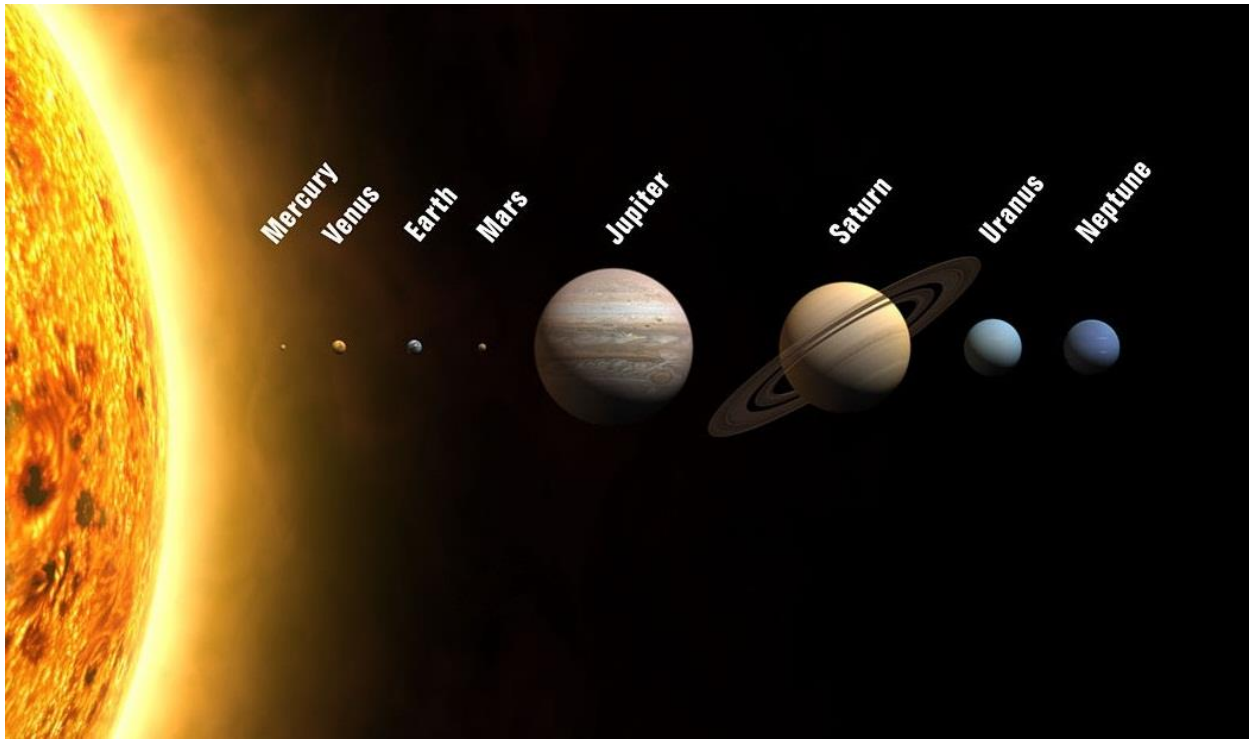
- **Do not write complete sentences when they make your message obfuscated** in long lines of text
- Never forget that **nobody can read your slides and listen to you at the same time**
  - Unless you are reading what is in your slides
  - But you must not read your slides, this is boring
- **Omit technical details**, there is no chance to explain everything in a single presentation
  - Instead, you should **make the audience eager to read your work**
- **Do not believe complexity will impress your audience**, it will simply make you look unable to express your idea

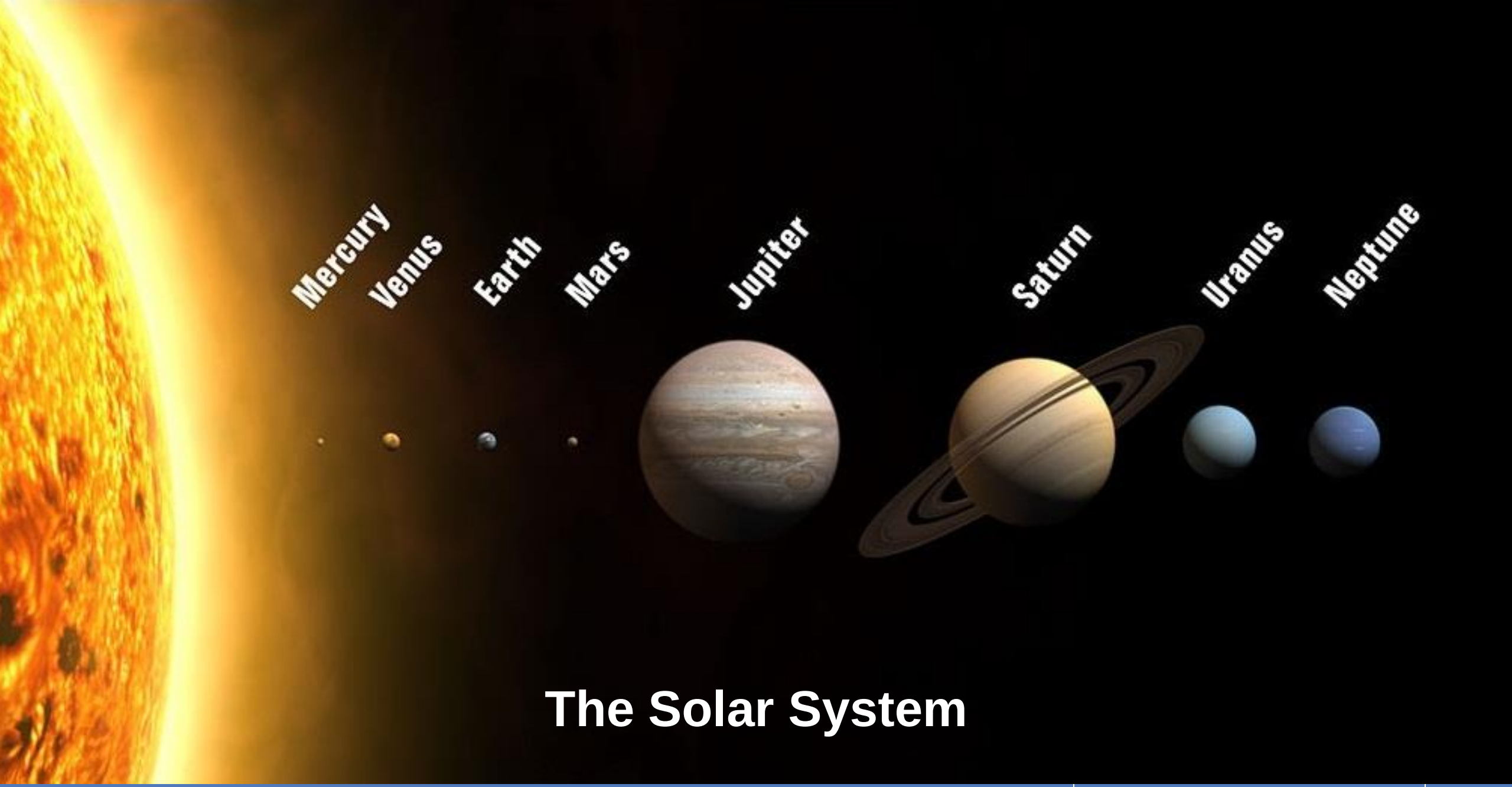
Poor Example: Solar System

- 8 planets
  - Mercury
  - Venus
  - Earth
  - Mars
  - Jupiter
  - Saturn
  - Uranus
  - Neptune

Still Poor Example: Solar System

- 8 planets
  - Mercury
  - Venus
  - Earth
  - Mars
  - Jupiter
  - Saturn
  - Uranus
  - Neptune





The Solar System

Pictures

- Insert pictures whenever possible!
  - Show the setup
  - High quality and full screen
  - Illustrate the idea
  - Always use a figure instead of a table
  - Participants interacting with your system are great
  - Show details
  - Annotate/label when possible
  - When the picture is not yours cite it [1]

[1] Image from Frankfurt University of Applied Sciences

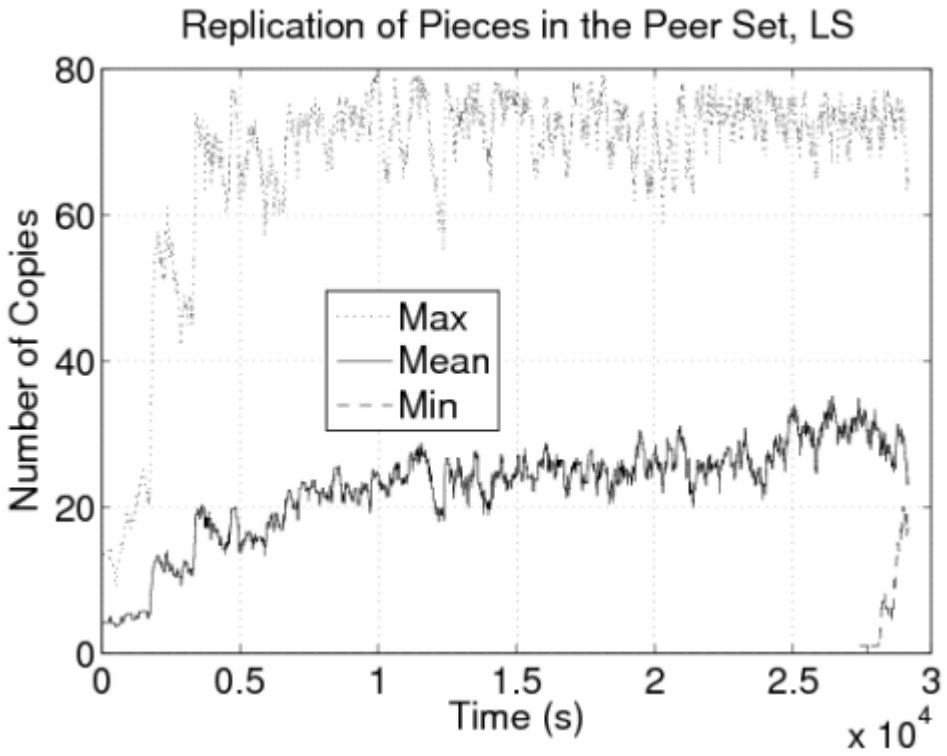
Illustrations

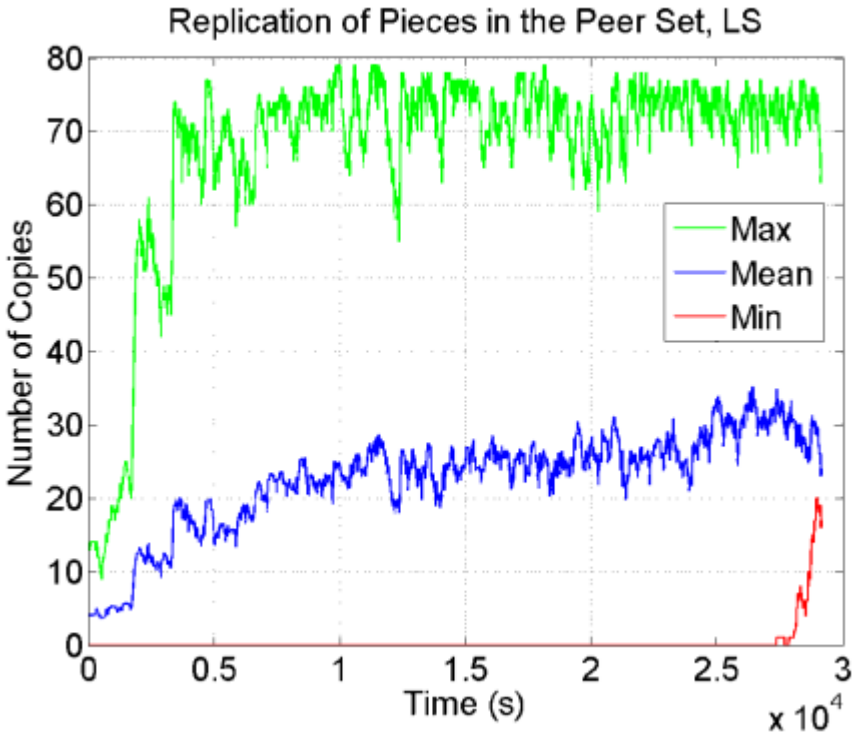
- But never use
  - Irrelevant illustrations
  - Weak metaphors
  - Semantic Animations
  - Animated images
  - Bad GIFs
  - Poor quality graphics
- Make your point clear and simple
  - Give a mental image people are more likely to remember
- Avoid redundancy with your text

Animations

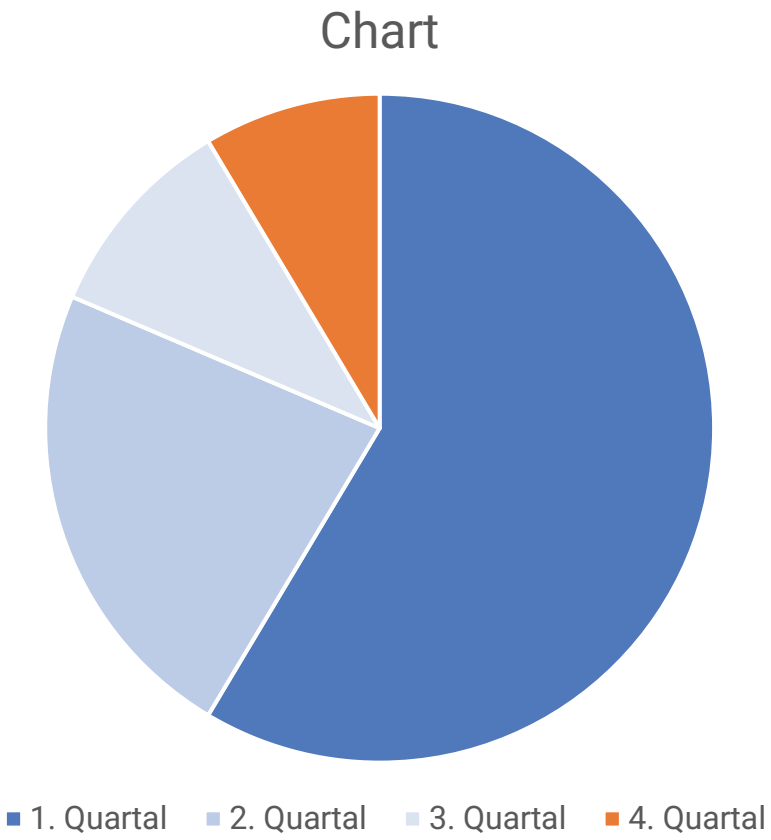
- Animations must make complex idea simple to grasp
  - No magic, it is a lot of work to make
- Think about that you want the make PDFs
  - Avoid any overlapping
- You can use neat animations
- Do Not Over Animate
  - It is disturbing
  - Annoying
  - Useless

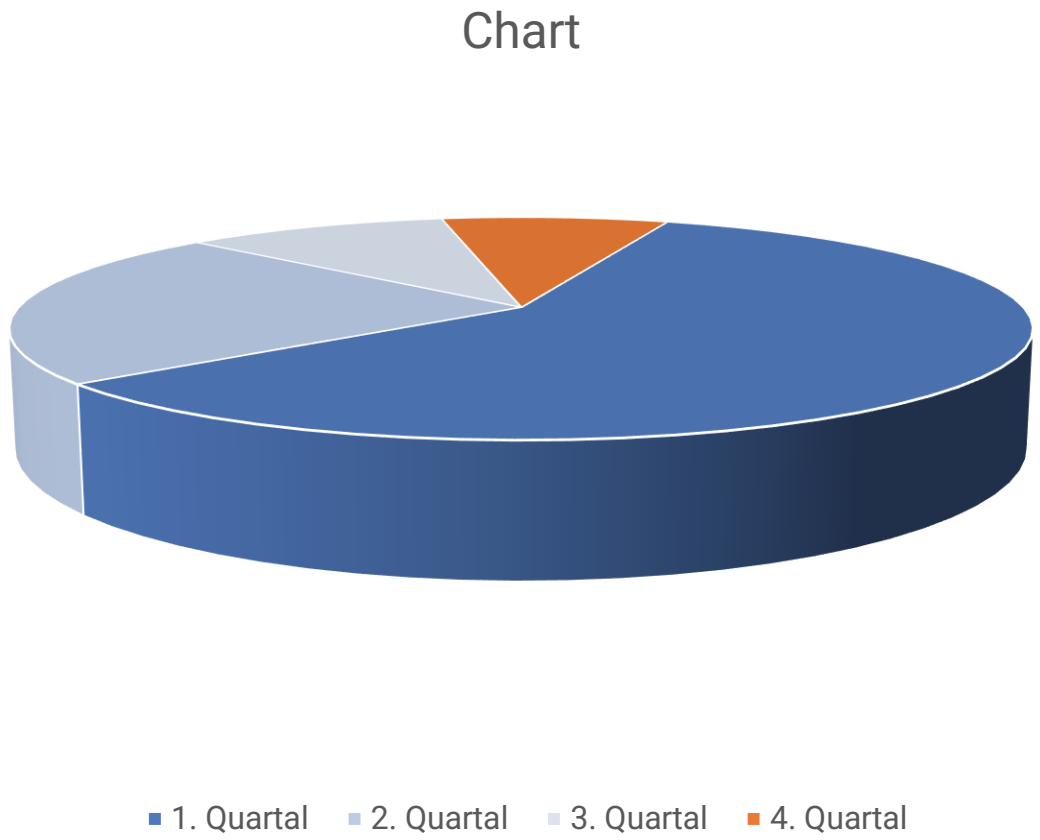
Using Plots


Replication of Pieces in the Peer Set, LS
Number of Copies
Time (s)
x 10^4
Max
Mean
Min


Replication of Pieces in the Peer Set, LS
Number of Copies
Time (s)
x 10^4
Max
Mean
Min

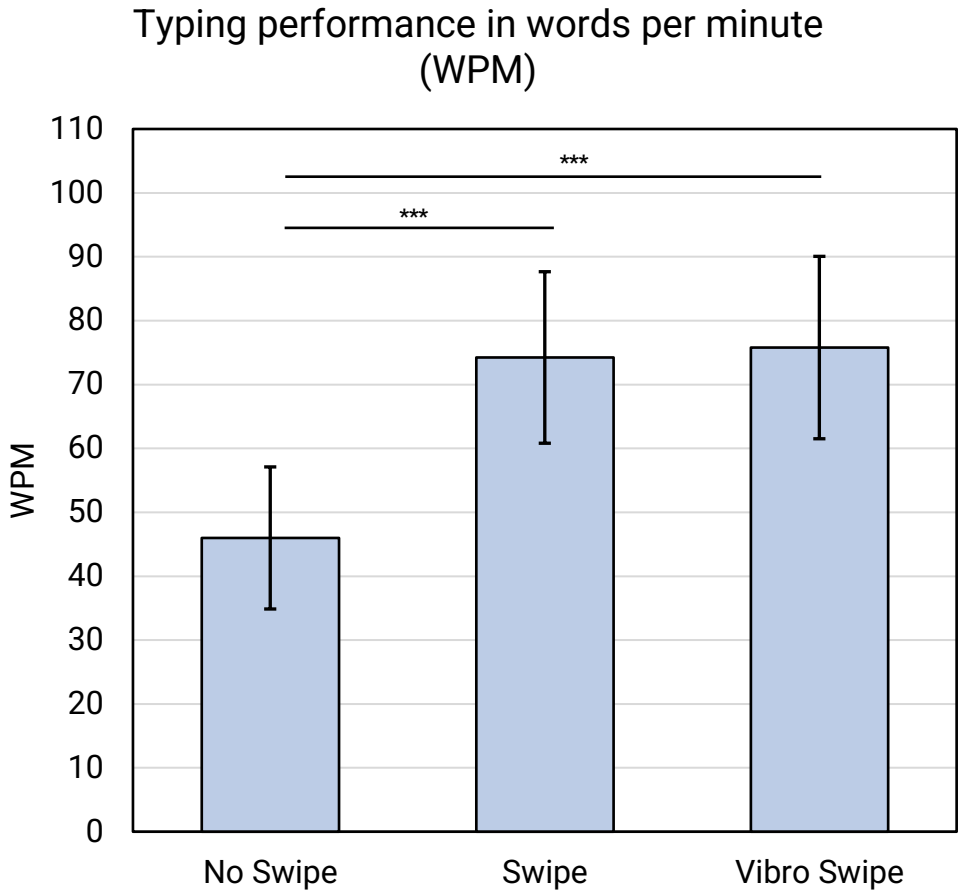
No Pie, No 3D, No 3D Pie, Never





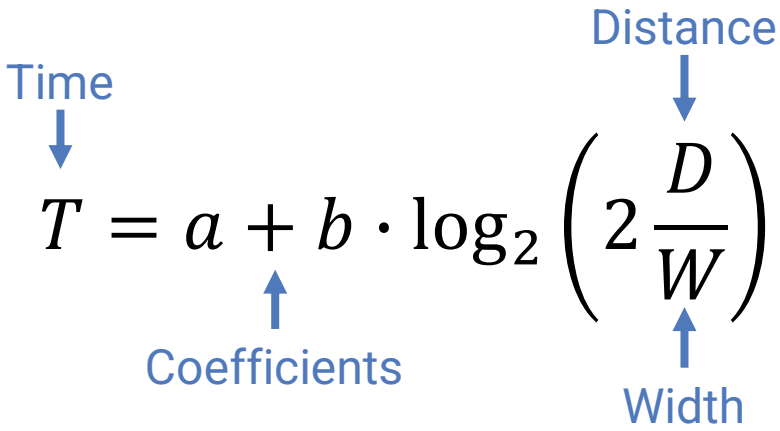
Figures

- For each figure you must
  - Give for each of the x-axis and y-axis
  - Label, unit, scale (if log scale)
  - Give the legend
  - Take an example to illustrate a specific point in the figure
    - Very useful if the figure is complex



Equations

- You can user equations
  - But explain the variables
  - Explain all symbols



Design and *Presentation Zen*

- Should you focus on the design of the slides?
  - Question of time and money
  - Address issues by order of priority
    1. A well defined and clear message
    2. A well structured (and fun) story
    3. Adapt to the audience
    4. Tell your story with passion (you are already top 1%)
    5. Make beautiful slides
- **Slides are not the talk, they just support it**

Testing

- **Test the slides** with a projector
  - Can you read it at the end of the room?
  - Are the colors correct?
  - Are the fonts readable?
- **Find a second screen**
- **Use a clicker (remote controller)**
- If you have no time for testing
  - make them black & white with one decent key color

Dress Well

- **Dress a bit better than the audience**
  - Show that you have a kind of respect towards the audience
  - If you don’t care for your presentation or of the audience, how will you dress?
    - As every day!
- But **don’t be overdressed**
  - Ask the dressing convention of your community/audience
- **Women** have more choices when it comes to dresses, but that doesn't make things any easier for them
- **Men** have fewer choices when it comes to dresses, but that doesn't make things any easier for them, too

Giving a Talk

…and how to survive a scientific conference

Introduce and Summarize Slides

- In the beginning, **introduce yourself**. Thank and name all co-authors. Do not skip the first slide.
- For each slide
  - Say a one sentence introduction
  - What you are going to discuss now
  - Say a one sentence summary
- If the audience has to remember a single sentence it is this one
- For very important results, show the take home message
- Be Redundant
  - Repeat several times: “I’m going to explain…”, “Our explanation is…“, “As I just explained…”
  - Never too much redundancy

How to Show Something on a Slide?

- **Don’t touch** the projection screen
- **Don’t shake** the hand 5 meters in front of the screen
  - Screen might be too high or too far
- Hard in online lectures
- Hard in lectures
- Try to **avoid laser pointers** (people are bad to see it)
- There is no professional solution
  - But **think about using slides to point**

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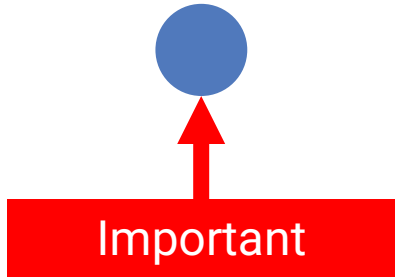


One Slide = One-Two Minutes

- 10 minutes = 5 - 10 slides
- 20 minutes = 10 - 20 slides
- You can violate this rule if
  - You have time to explain in detail all slides
  - You will not exceed your allocated time
  - You generally speak slower/faster
  - But never less than 30 seconds (really short)
  - And never more than 3 minutes (start to be boring)
- **Never go back** to a previous slide
  - If you forgot something, just tell it
  - Navigating within slides will lose your audience
  - Some will force you to go back in the Q&A. If they desire: do it

Never Exceed Your Allocated Time

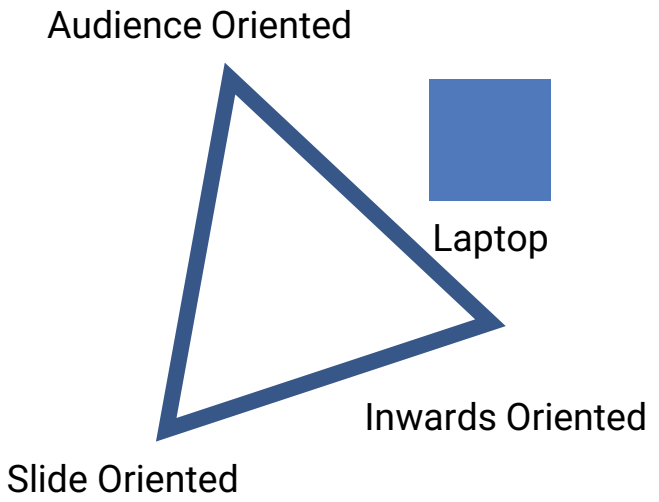
- This is a **lack of respect for the audience** and the next speakers
  - Not admissible, not professional
- **Should never happen** if you are well prepared
- **Look for a timer**
  - On a room wall, in front of you
    - So that you can see it, but not the audience
  - On your desk
    - Digital one with large enough numbers
  - On PowerPoint: **Presenter mode**
    - Very convenient, you can get comments and a few slides before and after the current one

Q&A Part

- **Reformulate questions after somebody asked**
  - Make sure you understood them
  - Make sure everybody hear them
- **Be concise in your answer**
- Do not start a larger discussion
  - “I propose to continue this interesting discussion during the break. Another question?”
- **Never bluff or lie**
  - Acknowledge when you don’t have the answer
  - “Thank you for that point, I don’t have an answer now. We will definitely look at it.”

Use Your Body And Location

- Use **eye contact**
  - Do not stare (no more than 10 seconds)
  - Do not avert or switch fast
- Use your **hands**
  - To support visually what you say
- You can **walk**, but
  - **Do not stand in front of your slides**
  - **Do not continuously walk along a line**
  - **Walk on a triangle to focus** and stop at each vertex
- **Smile**, but never laugh



Does not work in every setting

Use Your Voice

- **Make a short pause before each important message**
  - In the order of a few seconds
  - Pauses are even more effective than raising voice
  - The rhythm of the speech is what makes a big difference to catch the attention
- **Vary your voice level**
  - Speaking softly catch better the attention than speaking even louder
  - Alternating loud and soft speech catch the best the attention
  - You need to practice a lot to find the right balance
- Never **read from your slides or notes** (as long as you cite someone)

Second Screen and Remote Controller

- **Use a second screen!** Do not look at your slides on the primary screen
  - Place it appropriately
  - You must not show your back to the audience
  - Hard to keep the eye contact this way
- **Use a remote controller!** It seamlessly synchronize your talk with your slides
  - Freedom to move and most professional
  - Forward, backward, hide slides (black screen)
  - Small enough to fit well in the hand
  - Never use a wireless mouse
  - Do not shake or point-toward-the-slides the hand when you switch slides

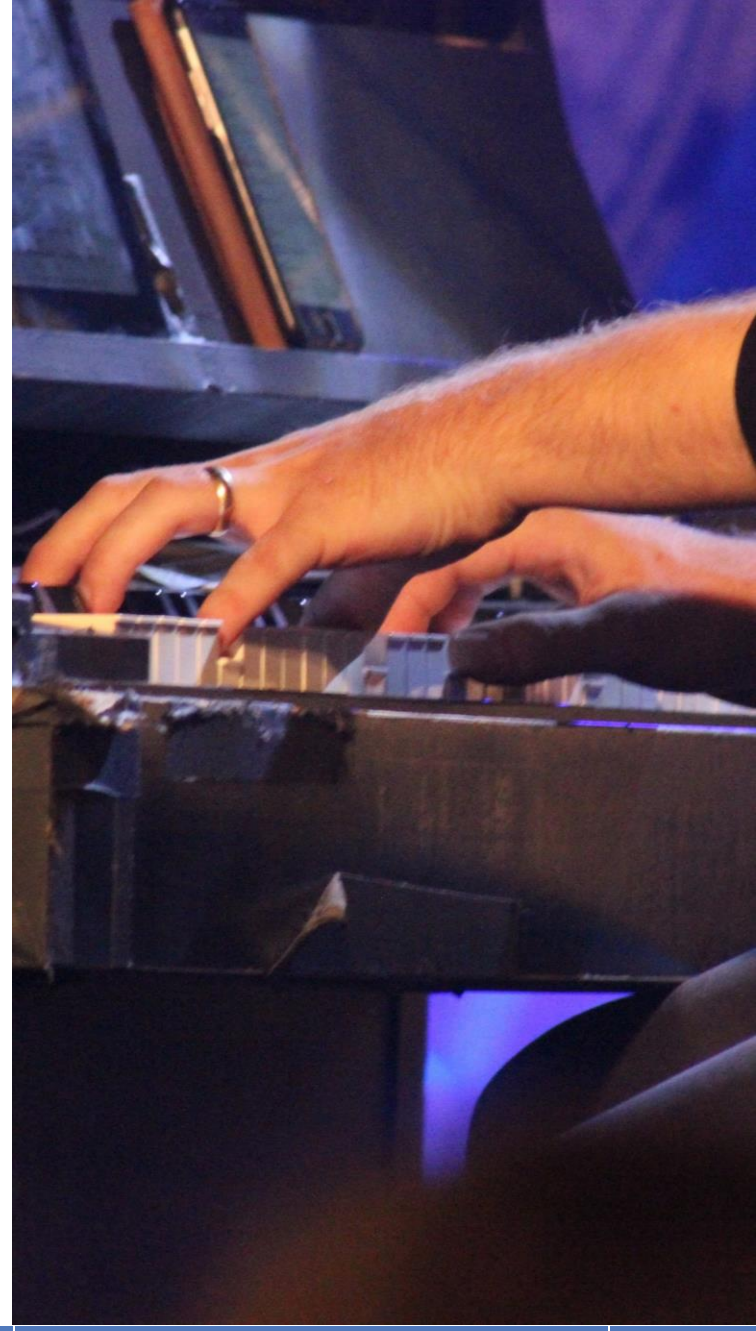
Show Enthusiasm

- If you don’t show enthusiasm presenting your own work, do you really believe that the audience will be enthusiastic about your work?
  - They are listening to you
  - They are reading your work
  - They will invite you
  - They will discuss with you
- The star of the presentation is not on your slides
  - IT’S YOU
- **Modulate voice and speed**

https://pxhere.com/de/photo/747065

Practicing

- **Record yourself**!!!
- Best speakers **practice** the most
  - No improvisation or spontaneity
  - To look spontaneous, you even need the most practice
- **Stand up and speak** with loud voice to practice
  - Practice at least once using a projector
- **Practice with colleagues** (once well trained)
- **The shorter the talk the more you have to practice**
- **Be prepared** to answer hard/aggressive questions



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Avoid Bad Surprises

- **Sleep well**
- Ask before your **talk to your session chair or organizer**
- **Make backup copies** of your slides on two different supports
  - Make your slides available on-line
  - Check that all copies are the last version of your presentation
- **Arrive early** in the conference room
  - Introduce yourself to the session chair or organizer well before your talk begins
- **Test your presentation** and laptop
  - Connections, Batteries
- **Test the remote controller**
  - Connections, Batteries

Some Facts on the Audience

- **They want to be elsewhere**
  - Early in the morning: in their bed
  - Around noon: eating
  - Early in the afternoon: sleeping at the swimming pool
  - Late in the afternoon: dinner or social event
  - In the middle: waiting for the coffee break
- **They have already ingested a lot of boring presentations**

Some Facts on the Audience

- They don’t know you
- They don’t know your work
- They don’t know your field
- They have no reason to like your work
- They have no reason to listen to you

You have to wake them up and catch their attention

- No need for a flat joke
- **Show that you are happy to be here, and people will listen!**

Losing People

- **They are laptop addicts**
  - They are reading their emails, browsing the web, reading online newspapers, skyping, etc.
  - You have to wake them up and catch their attention
- **People that are leaving**
  - You lost them, so work for the ones you haven't lost yet
  - Don't repeat what you feel the lost audience didn't get
    - You will lose the last ones that follow you
- **Nasty people** (aggressive, commenting, …)
  - Focus on other people
  - Don't give them the opportunity to disrupt you even more

BRING PEOPLE BACK TO THE BIG PICTURE

Wonderful Examples

- Scott Shenker: The Future of Networking, and the Past of Protocols, Open Networking Summit 2011
  - http://www.youtube.com/watch?v=YHeyuD89n1Y
- Hans Rosling: Stats that reshape your worldview, TED 2006.
  - http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html
  - http://www.gapminder.org/
- Elizabeth Gilbert on nurturing creativity:
  - http://www.ted.com/talks/elizabeth_gilbert_on_genius.html
- D. A. Patterson, R, Riedi, J. Ousterhout, T. Anderson: How to give a bad talk?
  - https://cel.archives-ouvertes.fr/cel-00529505v2/file/HowToGiveATalk.ppt