How to give good talks

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Very much inspired by F. Suchanek soft skills seminar
https://suchanek.name/work/teaching/topics/good-talks/index.html
What kind of talk?

- This talk focuses on academic talk, including:
  - Presenting your research work during a seminar/conference/project defense
  - Presenting someone else's work during a reading group
Overview

- Know why you talk
- Identifying the audience
- Identifying the key elements of the talk
- Talk structure
- Presenting an idea/concept
- Experiments

Not in this talk:

- Overcoming shyness/stress
- Creating beautiful slideshows
- Improving your body language

More info on these topics in Fabian Suchanek’s softskills seminar
https://suchanek.name/work/teaching/topics/good-talks/index.html
Know why you talk

- Do you want to
  - Teach or explain?
    → The audience understands the key ideas
  - Make people interested?
    → The audience wants to read the paper
  - Sell an approach?
    → The audience wants to collaborate with you
  - Show your capacities?
    → The audience wants to give you a grant/promotion
Identifying the audience

- What does the audience probably know?
  - PDS seminar: knows about distributed systems, machine learning, operating systems
    - May need to explain what MPI is
  - At a HPC conference: knows HPC
    - Everybody knows what MPI is
  - At a conference/workshop on MPI:
    - Everybody knows how MPI is implemented
Identifying the key elements of the talk

The scientific method

- A method for acquiring knowledge
  - Can be applied to CS too
- Presenting the key elements of the method is **crucial**
  - What is the problem?
  - What is the proposed solution?
  - Does the evaluation show that the solution fixes the problem?
Structure of a research presentation
The Double funnel scheme

- **Goal of this scheme**
  - Everybody gets the key ideas
  - Experts get technical details
  - Non-experts don’t get too many details
The **Double funnel** scheme: example

Fibers are not (P)Threads: The Case for Loose Coupling of Asynchronous Programming Models and MPI Through Continuations (EuroMPI'20)

- Simulation is increasingly costly
  - Need to parallelize application and distribute them
  - Computer topology requires to mix programming models

- Asynchronous programing model mess with MPI

- Proposal: introduction asynchronous tasks into MPI
  - Add a continuation feature to MPI
  - Description of the continuation API
  - Use a common task scheduler for both MPI and the application

- Evaluation:
  - Tasks don't regrade MPI performance in the worst case
  - Tasks improve MPI performance in case of high concurrence

- Conclusion:
  - Coupling MPI and tasks improves performance of asynchronous programing models
  - Rethink how programming models interact
Presenting an idea/concept

- **The Big picture approach**
  - First sketch the idea
    - A *car is a big box with wheels*
  - Then refine and add details
    - *A steering wheel allows to choose the direction. The wheels are propelled by a motor*

- **The flow approach**
  - First describe
    - *Wheels are efficient for moving things and they can be propelled by motor*
  - Then summarize
    - *Combining wheels with a large box result in a vehicle*
Running experiments
SIGPLAN Empirical Evaluation Checklist

- Evaluation is here to validate the proposed solution
  - Show that it solved the problem
- Each experiment validates one of the claims
- Adequate data analysis
  - Fair comparison with state of the art (eg. same level of optimization)
  - Repeat experiments and report variability

Example of (possible) unfair comparison: Comparing a matlab implementation with a highly tuned CUDA implementation

Accelerating leukocyte tracking using CUDA: A case study in leveraging manycore coprocessors. In IPDPS 2009
Describing experiments

SIGPLAN Empirical Evaluation Checklist

- Experimental setup
  - Hardware/software configuration
    - Dual-socket 12C Intel Haswell, ConnectX-3, OpenMPI 3.1.4
  - What data is reported?
    - mean duration over 10 runs + standard deviation (or min/max)
- Visualize data correctly
- Describe, then analyze
  - For small messages, X latency is 20% lower than Y
  - This is due to X that batches messages which reduce the number of system calls
- Experiments should be reproducible
  - Some conferences require Artifacts

Reproducible Research in Computer Science  https://hal.inria.fr/hal-0110206/
Conclusion

• Make sure the audience identifies
  – The problem you try to solve
  – The proposed solution

• As part of the reading group, you are evaluated on
  – Your understanding of the paper
  – Your ability to show the key points of the paper
  – Your communication skills

• This applies to other research presentations