SCIENTIFIC PRESENTING

HOW TO GIVE A GOOD SCIENTIFIC TALK

(version without figures!)

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Kinds of Scientific Presentations

Conference talks

- researchers
- professors
- graduate students
- students

Presentations at seminars etc.

- researchers
- professors
- graduate students
- students

Lectures

- professors
- researchers

Defend a thesis

- students
- doctor students

Apply for a grant

- researchers
- professors

Recommendations from 3 points of view

1. scientist

- **> 100 talks given at int. conferences, including plenary and invited talks**
- **lectures given, courses taught**

2. experience in Japan

- **teaching as a Prof. in Japan**
- **training colleagues and students for conferences, defending thesis**

3. editor of internat. leading sc. publisher

- **attend > 1000 conference talks/year**
- **judge about quality of sc. presentations**
- **attend many lectures to get impression of the**
- **scientific quality of a potential author**

Aims of the lecture

1. make every researcher and student aware of the importance of good scientific presenting

2. make the audience aware of often neglected but important aspects of presenting scientific results

3. enable researchers and advanced students to give good scientific presentations

How to plan a scientific presentation?

1. Who is the audience?

- specialists
- general audience
- students

→ style of presentation
level and content of explanation
discussion of the basics or of details

2. What are your main results?

3. What do you want to report in the time available?

- select the important results
- do not overload the content
- discuss the basics too (reach understanding)

4. Do you know the available state of knowledge?

- what is already known?
- what is new in your work?
- supporting or contradicting published results

5. What is the best formal structure of the presentation?

Structure and Content of a Scientific Presentation

General comment

presentation ≠ publication

- clear structure similar to a publication
- logical style
- but more explanations,
  explain understandably,
  more words necessary to explain
- ***no one will understand just reading from a scientific paper***

1. Introduction

What ? Why ?

- aims and scope
- necessity of this research
- brief survey of the state of the art
- ***make the audience interested in your talk***

2. Experimental

How ?

- describe experiment /theory briefly
- methods in general, analytical techn.
- your own new technique
- mention sample preparation /algorithms
- data processing
- ***make people understand how you got your results***

3. Results and discussion

How to explain it ?

- concentrate on main results, do not pack information to densely
- describe results in a clear way, do not omit important steps
- discuss various aspects, no isolated view
- related results of others
- what is new in your findings?
- no speculation, maybe outlook to future experiments /calculations
- *allow the audience to understand your results*

3. Conclusions

What is it good for ?

- better than just summary
- no rewording
- more general point of view, instructive formulations
- *make clear the broader importance of your results*
- *give a "take home message" (3 sentences)*

5. Acknowledgement

What was the help ?

- technical support
- discussion
- grants, funding agencies
- chief
- *What was the supportive background to obtain your results?*

Parts of a lecture

1. In part 1 the listener gets to know things which he knows already to make him recognise that he is not so ignorant.

2. In part 2 the listener gets to know things which are new to him to give him the feeling that he profits from the lecture.

3. In part 3 he hears things which completely incomprehensible to him to make him retain his respect of science.

Ways of oral presentation

How to Transport Information

- not like a political speech, not only words, visualise the content
- transport information not only through hearing but also seeing
- touching, simple experiments
- the more senses involved, the more intensively information received

Enjoy the optical presentation and not only voice and content

Technical Means

1. computer and video projector
   - best way, but everywhere possible?
   - additional visualisation, moving pictures
   - but: do not superimpose the information with impressive optics
2. slide projector

   old-fashioned way
3. transparencies
   - hand-written transparencies ?
   - black and white transp.
   - colourful transp.

Preparation of transparencies

- transparencies as guideline of the talk
- add invisible keywords for yourself
  (on paper frame)
- no hand-written transparencies
- not too much information
- not more than one topic per transparency
- no difficult mathematical derivations
- colourful, interesting transparencies
  but not too multicoloured
  colour should support structure of information
- clear structure
- readable transp.
  size of characters > font 18
- horizontal format better than upright format

Avoid typical mistakes

- no complete sentences but keywords
- do not leave transparencies in transparent envelops
- do not partly cover transparencies

- not too many transparencies, about 1-2 min/transp.
- do not have zero content transparencies

Preparing an Oral Presentation

Not only content and transparencies important but also style of presenting

- Exercise giving the talk before.
  - write the talk in detail
  - read your talk loudly to check the time
    with transparencies or beamer,
    learn to give your talk in the time allowed

- if inexperienced, learn your written talk
  never read a talk at a conference
- be ready 1 w before, exercise everyday
- revise your talk, clear flow of ideas
- give your talk to somebody before
  (wife, friends, coll., stud.)
- give your talk at the seminar of your group
  before the conference

- Exercise English pronunciation with someone who speaks English well

  The international language of science is bad English (but understandable English)

- Check overhead, beamer, projector before the talk if possible

Giving an Oral Presentation

How to present the talk or lecture

- rhetoric ?

  ♣ speek in your own way, do not copy other styles, but learn from other positive and negative examples

  ♣ simple and easily understandable language

♣ modualtion of the voice, not monotonous

♣ not too many nouns, more verbs → vital talk

- speak clearly, slowly and loudly enough
  - The audience understands less in a hectic talk.
  - You cannot transport more information by speaking faster.
  - avoid filling words as ”eh”
  - breath in the proper way (belly) → voice
- avoid searching hectic
  - have the transparencies to be used only
  - use a transparency later again?
    better have another one

- do not read a talk !
  - contact to the audience directly
    watch their interest and understanding
  - tired audience? wake them up!
    change speed, pronunciation, more variety,
    jokes, stories, personal aspects
  - afraid of forgetting something?
    skeleton: transparencies
  - additional keywords hidden on the side of transparencies

Better forget 50 % of the content and reach 100 % of the audience than presenting 100 % of your results and reach nobody

Organisation of a scientific presentation

- **give your talk in time**
  - **fixed conference schedule (talks, breaks)**
  - **not put results for 30 min in 15 min talk**
  - **ask the chairman: how many min left?**
  - **do not get hectic when you cannot present everything in time**
  - **have various options to end the talk**

    omit part of the results but not conclusions, keep the "take home message"

- stand at the proper position
  - do not block the view to transp.
  - behave and stand relaxed
- do not speak to the wall !

- do not allow disturbing interruptions
  - only brief responses
  - a presentation can be destroyed or brought to the wrong direction
  - presentation not given in time
  - say: discussion after the talk
- distinguish the various parts of the talk
  - short breaks between the parts
  - ask rhetorical questions
- use supportive illustrative means

How to point to figures?

- not finger
- pen on the screen
- Laser pointer

  do not direct pointer to people
  nervous vibration?

- when pointing to figures do not speak to the wall !

Side Aspects of scientific presenting

Seemingly unimportant mistakes may disturb much

- avoid unagreeable behaviour, strange customs
  sniffle, scratch, ...
- ask colleagues and friends for critics
  many speakers not aware of manifested mistakes
- keep the audience interested in your presentation
  - adjust the content to the level of knowledge of the audience
  - have understandable explanations
  - importance for future work of the attendees
  - present even a boring topic in an interestg. way
  - mention interesting side aspects
- emotional component
  - make the audience enjoy your presentation

- be convinced of yourself to also convince others
- get a psychological feeling for the audience, react in the proper way
- a presentation is also some kind of a talkshow

- be dressed properly

  do not be underdressed or overdressed

Body Language

The unspoken language accompanying a talk

What is body language?

- bow, embrace, nod
- speak with hands
- way to stand and walk
- hold the head, look, expression of face
- gestures, scratching

Difficult to learn but easy to reduce negative expressions

How to use body language?

- suppress expression of nervousness
  - ♣ breath from belly, not in the upper part of lungs
    → calm down effect
  - ♣ no nervous movements of hands and eyes

- use hands for explanation in a moderate way only
  - ♣ better explain with figures
  - ♣ different national cultures
  - ♣ hands higher than belt

- stand in the proper way
  - ♣ relaxed and not stressed
  - ♣ move during explanations but not hectic
  - ♣ hands in pocket? be polite to the audience
  - ♣ stand during talk, do not sit

- control the expression of your face
  - ♣ no insecure impression

♣ no arrogance
♣ be interested in the questions

- have eye contact with the audience

♣ not permanently scan the hall
♣ look to a certain area during talk

Psychological Main Reasons for the Acceptance and Success of a Presentation

American psychological studies on the success of a political speech say that the acceptance is effected by three main factors:

- *the body language to 55 %*
- *the voice to 38 %*
- *the content to 7 % only*

This is definitely different for a scientific presentation. But do not underestimate these side effects.

Discussion

The discussion often shows if you are really good
(conference talks, defend a thesis)

Control the discussion

- **be prepared to questions**
  - **check critical or doubtful aspects of your work**
  - **exercise at seminar:**
    colleagues should ask questions
    find weak points before
  - **understand questions, ask again**

- **provoke questions**
  - **→ shifting part of the talk to discussion**
    have additional transparencies
  - **→ give good impression**

→ **no unagreeable surprise**

But: never make agreements on questions prior to the presentation

How to answer to critical questions

- **Involve other colleagues to respond if necessary (performed exp., e.g.)**

- **Do not give an incompetent impression of yourself**
  - **seek for additional explanations when you do not know the direct answer**
  - **don´t understand the question?**
    answer the question with another question
  - **don´t know anything?**
    say:
    - ♣ **very techn. question, discuss in the end**
    - ♣ **very new aspect, I will think about it**
    - ♣ **discuss in the break, too long response necessary**

Discussion as a Chance to Perform

Show that you are there and have something to say

Even if you did not fully understand the content of a scientific presentation, there are simple ways to always ask questions:

- **Method of modified boundary conditions**
- **Intentional misunderstanding**
- **Autapotheose or Self-Adulation (Self-Praise)**
  - **”as I recently discussed with my friend the Nobel Prize winner ...”**
  - **self-citations**
  - **”part of my plenary talk at ...”**
- **Preparative Method**

questions prepared before

- **Method of Deviation**

  bring the discussion to a topic where the questioner is more competent than the speaker

- **Scepticisitc Method**

- **”Stupid Question”**

  kill the speaker

Giving a Lecture

most efficient way to impart knowledge

aim: understandable, enjoyable, students take profit

Didactics

- school teachers learn didactics but not professors
- get the feeling for the students
- careful preparation of lectures
- just read from a book – worst way
- develop ideas in an understandable way
- do not speak faster than students can think
- interactive and cooperative style with students, not monologue only
- not only present knowledge but teach to think, support creative and not repetitive style of learning

- problems and solutions
- discuss problems from various points of view
- give the opportunity to develop alternative ideas
- difficult derivations better at the blackboard
- relaxing phases
- attract attention and interest

Positive attitude towards teaching

- reflected by teaching style and recognised by students
- positive interaction supports teaching and learning
- do not skip lectures

Ranking of professors

- neglected in may countries (Germany, Japan): research more important than teaching
  in America prof. is primarily a teacher
- US univ.: stud. judge about quality of lectures
- make results public

Handouts

copies of transparencies

→ concentrate on content, not write everything
supplementary comments only

Promote gifted students

- special courses
- special tasks, envolvement into research projects, part time jobs in research and teaching

Aim: A student should become better than her/his professor.

Posters

Chance: more time for discussion

Content

- main scientific results
- brief description of experiment / theory
- summary and conclusions of a paper
  no detailed discussion

Style

- not like an article
- much less text, in maximum 1 page text
- readable within 1 min (500 posters in a session)
- more picture information than text information

Optical presentation

- large figures (A 4)
- colourful
- appropriate size

- prize for best poster

Organisation of a poster session

- during daytime conference programme?
- evening programme with drinks and snacks
  → good attendance
  → enough time for discussions

Chairing a meeting

Conference sessions

- know the schedule
- know the names and topics
- give reasonable introduction (speaker, topic)
- time discipline (for next speakers, breaks)
  - ♣sound 2 min before end
  - ♣interrupt if necessary, ask to come to the end
- control discussion
  - ♣sequence
  - ♣question by chairman if no question
  - ♣but no privileged asking by chairman
- cancelled talks
  - ♣better not next talk (other attendees)
  - ♣try to keep to schedule by extend discussion of previous talks
  - ♣additional discussion of other talks before

Seminars, internal meetings

- prepare an agenda

- fix time limit (do not exceed 90 min)
- request: every presenter has to be prepared
- brief and compact presentations, statements, questions
- no ”word-diluted” speaking
- cut the tail of discussions
- control the discussion

Experience makes you wise but not happy

A stupid guy learns through his own mistakes only, if at all.

A smart guy learns from the mistakes of others.

Dos and Dont´s

Taylor the presentation according to the interest of the audience

Concentrate the presentation on the important results.

Have more words for an oral presentation than for a corresponding publication.

Have one main topic per transparency only.

Have understandable material on the transparencies only.

Draw clear conclusions.
Give a take home message.

Have at least 18 point characts.

Don´t give a specialised talk to laymen.
.

Don´t dilute the content of a presentation with unimportant information.

Don´t give a talk like reading a paper. Don´t pack informat. too densely.

Don´t overload the content of a transparency.

Don´t have difficult mathematical derivations.

Avoid speculations.

Don´t have too small text or figs.

Give an oral presentation as a free speech only.

Never read a talk.

Speak clearly, loudly enough and pronounced.

Avoid hectic and monotonous speaking and filling words

Use the body language to support your presentation.

Avoid unpleasant behaviour.

Dos and Dont´s

Taylor the presentation according to the interest of the audience

Don´t give a specialised talk to laymen.
.

Concentrate the presentation on the important results.

Don´t dilute the content of a presentation with unimportant information.

Present this many results only as you can sufficiently discuss.

Don´t overload the content of a presentation

Have more words for an oral presentation than for a corresponding publication.

Don´t give a talk like reading a paper. Don´t pack informat. too densely.

Visualise the content of the presentation.

Don´t have text transparenc. only.

Plan about 2 min per transparency.

Don´t show uncommented pictures or text.

Have one main topic per transparency only.

Don´t overload the content of a transparency.

Have understandable material on the transparencies only.	Don´t have difficult mathematical derivations.
Draw clear conclusions. Give a take home message.	Avoid speculations.
Acknowledge the supportive background.	Don´t do any plagiarism.
Have the transparencies nicely coloured.	Avoid too multicoloured transparencies.
Make people enjoy the optical style of the transparencies.	Don´t have black and white transparencies only.
Have keywords only on transparencies.	Don´t write complete sentences.
Have high-quality transparenc.	Don´t leave transparencies in transparent envelops.
Have at least 18 point characts.	Don´t have too small text or figs.
Exercise a presentation. Be open to critics.	Do not keep manifested mistakes in presenting technique.
Give an oral presentation as a free speech only.	Never read a talk.
Keep the audience interested in your presentation.	Don´t speak in a monotonous way.

Divide the presentation visibly parts.	Don´t overstretch the into audience.
Speak clearly, loudly enough and pronounced.	Avoid hectic and monotonous speaking and filling words
Breath in the proper way.	Don´t breath with the upper part of the lungs only
Give the talk in proper English.	Don´t pronounce wrong.
Give your presentation in the time allowed.	Don´t exceed the presentation time.
Stand relaxed at the proper position.	Don´t block the view to the transparencies.
Be prepared to questions.	Don´t allow to destroy a presentation by questions.
Get a feeling for the audience.	Don´t speak ”over the haeds”.
Be dressed properly.	Don´t be underdressed or overdressed.
Use the body language to support your presentation.	Avoid unpleasant behaviour.
Remove critical and doubtful of your presentation.	Don´t get nervous by aspects questions.
Prepare a poster in a concise way.	Don´t have too much text In a poster.