How to Prepare a Seminar Presentation

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Goals of a Seminar

**Comprehend** a Research Paper
- Effective reading
- Distinguish main ideas from details
- Complement with referenced work
- Familiarize with world-class research
- Critical thinking

**Learn** a significant load of modern research material (as audience)

**Motivate** to pursue higher academic degrees

**Learn to Present**
- Build the story
- Prepare a presentation
- Present
Presentation Competency

• Important skill in academia
  ▪ Communicate your work, invite to adopt
  ▪ Make a positive impression on fellow colleagues
  ▪ Presentations constantly given at conferences, meetings
  ▪ A competent speaker is more likely to be invited to speak
    ○ Assuming research is appealing

• Important skill in industry
  ▪ Communicate your knowledge / work / opinion / agenda
  ▪ Your opportunity for visibility and distinguishability!

• Audience appreciates:
  ▪ Acquiring useful knowledge / insights
  ▪ Enjoying delivery (rather than waiting for it to end)
  ▪ Respect of time
Outline

• Introduction
• Selecting a paper
• Reading the paper
• Preparing the presentation
• Giving the presentation
• Conclusions
Relevant Questions on a Candidate Paper

- Do I understand the basic motivation behind the paper?
- Do I appreciate/relate to the contribution?
- Do I understand the essence of the contribution from the abstract / introduction?
- Do I like the writing style?
  - Are you comfortable with the paper’s use of special terminology?
    - “Every acyclic program terminates in finite time” vs. “Every DP in AP is also in FT”
  - Is it overly informal? Overly formal?
Examination Recipe

• Read the abstract
• Read the introduction
• Read the section/subsection titles, comprehend the paper structure
• Read the concluding remarks (if any)
• Pick 1-2 theorems (if any) and try to get a complete understanding of what they claim
• Pick 1-2 charts (if any) and try to get a complete understanding of what they show
• Estimate your ability to understand the content
• Estimate your ability to tell an interesting story
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Paper Reading ≠ Novel Reading

- You can do “relax reading” just on the introduction
  - Usually a waste on time on the technical parts, unless you want to get a general impression
- Use writing utensils: pen, marker, sheet
  - Mark important details in the paper
  - Create examples when such are missing
- Go through examples carefully
- Take a break between logical parts
- Always keep in mind that, in the end, you need a coherent story!
  - Understand what role the current reading plays in that story
Result-Driven Reading

- Read the abstract, introduction, section titles, conclusions
- Read the basic definitions
  - Read the examples up to a complete comprehension
- Find the first important theorem and gather the needed details in order to understand the theorem
- Move on to the next theorem
- Same for charts
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Ian Parberry’s Baseline Structure

• **Introduction**  **100% understand**
  - Basic terminology, problem definition, motivation, larger context, contribution of the paper, roadmap (rest of the talk)
  - “Tell them what you are going to tell them”

• **Body**  **Interested understand**
  - Key results (abstract), significance of results, sketches/stories of proofs
  - “Tell them”

• **Technicalities**  **Interested follow, specialists understand**
  - Deep dive into a few technical parts (challenges and solutions)
  - Challenging part for the audience; some get the details, some get general ideas

• **Conclusion**  **100% understand**
  - Very short summary, limitations and open problems
  - “Tell them what you told them”
Build the Story

• The presentation is **not a scan** of the paper!
  ▪ You are committed to the **story**, not the paper

• It does **not** need to be consistent with the flow of the paper
  ▪ For example, results/experiments first, then technique/development

• Design the presentation in a way that
  ▪ More time is spent on the **main idea**
  ▪ Less time is spent on standard details and trivial ideas

• If the main idea goes through, do not hesitate to **exclude details**
  ▪ Mention what’s missing, apologize and direct people to the paper
  ▪ But give enough details to support a clear and nontrivial story

• What’s important and what’s detail?
  ▪ The answer is often in the **abstract and introduction**
Example: Proofs

Would you include a proof in a talk?
Definitions and Notation

• A presentation is **not** a paper: the audience **cannot refer back** to preliminary definitions/notation/terminology

• Do not assume that previous definitions are clear
  ▪ Unless they are very standard for the audience

• **Repeat and remind** definitions and notation when needed

• If no intuitive names are provided in the paper, provide ones
  ▪ Can be simplistic, e.g., “good case,” “nice function,” etc.

• **Rephrase** theorems to make them more intuitive
  ▪ Sometimes some informality can make the statement much clearer, e.g., “under reasonable assumptions,” “except for edge cases,” etc.

The Power of Examples

• Examples are useful for quickly conveying an involved concept
  ▪ Especially mathematical definitions, algorithms

• As a side effect, they also make the presentation interesting

• Should be taken very seriously!
  ▪ Simple, small, easy to grasp
  ▪ Core of the statement
    ▪ No edge cases and exceptions
  ▪ Intuitive
    ▪ “Real” examples should be consistent with reality
  ▪ Non-distracting
    ▪ Avoid sensitive issues like politics and social disputes
    ▪ Use colors/pictures only to serve the purpose (others are distracting)
Example: Definition by Text

**Definition: Tree Decomposition (of a Graph)**

Let $G$ be a graph. A *tree decomposition* of $G$ is a pair $(t, \beta)$, where $t$ is a tree and $\beta$ is a mapping $\text{nodes}(t) \rightarrow 2^{\text{nodes}(G)}$ such that all of the following hold:

1. For every edge $e$ of $G$ there is a node $u$ of $t$ such that $\beta(u)$ contains $e$
2. For every node $v$ of $G$, the set $\{u \in \text{nodes}(t) \mid v \in \beta(u)\}$ is a connected subtree of $t$
Example: Definition by Example

Every edge is contained in some box.

Every node occurs in a connected subtree.
Discussion: What’s Best?

- Definition, then example
- Example, then definition
- Definition, then example, then repeat definition
- Anything else?
Text in Slides

• No need to follow the usual list-of-items pattern (as in this slide)
• Prefer vertical to inline lists
• Include key phrases, concise descriptions of important points, definitions, theorems, etc.
• *Sorry* – Include:
  ▪ Key phrases
  ▪ Important point (concise)
  ▪ Definitions
  ▪ Theorems
  ▪ …
• Shorter is better: *break* long statements, break loaded slides
• Use short titles (avoid >4 words)
Text in Slides (cont’d)

• Don’t “read from the slides”
  ▪ You should say much more than what’s in the slides
• Don’t overload slides with content
• Font size: prefer 28/32 pt, avoid going under 20 pt
• Use a consistent font type across the presentation
• Emphasize:
  ▪ *Italic* (not always clear), **bold** (clarity differs across font families)
  ▪ **Underline**
  ▪ **Colors** (next)
• Do not over emphasize!
  ▪ Otherwise distracting, diminished effect
Colors

• Be careful when using colors!
  ▪ People’s limitation
    o Color blind (or have trouble distinguishing between nuances)
  ▪ Hardware limitations
    o Yellow on white disappears, blue and green look the same, etc.

• Try to use two very different colors in a text slide
  ▪ No more
  ▪ I often use blue (emphasize), and red/orange (strongly emphasize)

• The more “red” you see on the screen, the less impact “red” has as an emphaser
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• Avoid basing a statement entirely on color
Example: Colors in Figures
Animation

• Animation is a **useful tool** for clarity and interest

• Use animation only when it **serves a purpose**
  - Explain a dynamic concept (e.g., algorithm execution, automaton run)
  - Incrementally add content for organization
  - Add pointers to get audience attention
  - Don’t use animation just to raise interest – it will not be appreciated

• Cons of animation:
  - Incremental items force you to relate to **every item individually**
  - Incremental items take **more time**
  - Animation does not appear on a **hardcopy/pdf** of the slides
Charts in Slides

• If possible, do not copy charts from the paper
• Rather, build new charts that effectively utilize the effects (space, color, animation) you have on stage
• Explain the charts (x-axis, y-axis, etc.) in simple words
• Emphasize the interesting parts
Example (KKS, VLDB11)

Experiments: Graph Search
2 Intel Xeon processors (2.67GHz), 4 cores each (8 total); 48GB memory

On average, with 8 threads we got 5.7% of the original running time
Example (BCK, SIGMOD2015)

Synthetic (random) data

- **k=1**
  - 13x faster

- **k=2**
  - 24x faster

- **k=3**
  - 237x faster

- **k=4**
  - >2d
  - 3217x faster

- **OurSolution**
  - 15.5s

- **Previous**
  - >2d
  - 15.5s
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Timing

• Do not overrun your allocated time!
  ▪ Annoying, rude, unprofessional

• Repeatedly rehearse the lecture (at a pleasant pace), aiming for 5 minutes questions in the end

• Prepare a compensation/backup plan
  ▪ Technical parts that you can avoid in the absence of time

• What if there are questions along the way?
  ▪ Questions and interaction add to the interest and joy of the presentation (pathos), and may help clarity (logos)
  ▪ However, the audience assumes you are in control of the time, so either reject questions (“in the end”) or compensate
Standing & Speaking

- **Eye contact**
  - Don’t talk to the floor/screen or to a single person
- **Be aware of the projector and screen**
  - Do not hide the picture
- **“Natural” speech pace**
  - Fast speaking may give the impression that you either want to be unclear, get the presentation over with, or in a timing crisis
- **Stress & pause to distinguish important details**
  - May be crucial for listeners with a limited attention level
Question Time: 4 Question Types

1. Genuine desire for additional information
2. Genuine constructive suggestion
3. Desire to draw the attention of the audience
4. Desire to expose a weakness of the speaker/speech
Desire for Information

• Examples:
  ▪ Could you say more about the proof of the main theorem?
  ▪ What was the data that you have used in the experimental study?

• Answer strategy:
  ▪ Typically easiest to answer
  ▪ “Let me lookup the details offline” – OK
  ▪ Nice habit to complement the questioner
    o Good question
    o Ah – you’ve touched an interesting challenge (+ smile)
Constructive Suggestion

• Examples:
  ▪ *Maybe you can get an improved running time by using the data structure of Tao et al. from last PODS?*
  ▪ *Have you tried to apply your techniques to genome mining? You should look at that*

• Good sign and good impression
  ▪ Your work is interesting and people wish to help

• Answer strategy:
  ▪ If possible, offer an insight on why it is reasonable / problematic
  ▪ Thank the asker for the help
    ○ Regardless of whether or not it is helpful
Desire to Draw Attention

• Examples:
  ▪ *In a recent paper I have shown a lower bound on graph mining; have you considered using that result?*
  ▪ *Do you think that there is a relationship to the Erdős–Szekeres theorem?*
  ▪ *Have you looked at Twitter data? We have observed that this dataset is difficult to handle on a similar problem*

• Answer strategy:
  ▪ If possible, give an informative answer
  ▪ Do not carry away to unrelated discussions
  ▪ ”Sounds very interesting” (complement); “let us discuss it offline” (end the discussion with a positive note)
Desire to Expose Weakness

• Examples:
  ▪ *It seems like most of this work has been done by Gottlob already in the early 90s; could you state the precise relationship?*
  ▪ *The main theorem seems like an immediate corollary of the algorithm of Yannakakis for acyclic joins; is there anything more than that?*
  ▪ *Your experimental study has been done on a tiny dataset; why should we conclude that the conclusions are valid?*

• Answer strategy:
  ▪ Try to be well prepared; it is your job to master related work
  ▪ Ask a question back: how would solve my problem using Yannakakis?
  ▪ Okay to say “I’ll need to check on that” (= “I don’t know”)
  ▪ Live with the ego bruise
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Summary

• Invest time in finding the right paper to present
• Paper reading ≠ novel reading
• Prepare a coherent story!
• Effects should be used to serve a purpose
• Examples make your presentation clearer and more interesting
• Natural pace, but respect the time frame!
• Invite to ask questions
  ▪ Better preparation reduces the risk of embarrassment, but people do get hurt and survive – comes with the profession
Rhetorical Appeals

Aristotle’s three basic ways to convince the audience:

- **Ethos**
  - “I am credible”
  - Refers to the credibility/authority of the speaker
  - Show knowledge, speak the jargon, reference your own past work, …

- **Pathos**
  - “Accept my talk with a positive attitude”
  - Refers to the emotions of the audience
  - Show excitement, explain the importance of the work, (self) humor, …

- **Logos**
  - “My arguments are correct”
  - Refers to the reason/logic of the audience
  - Back your statements with citations and figures, be clear and organized, …
Bibliography

• Lecture notes by Yehoshua Sagiv (http://www.cs.huji.ac.il/~sdbi)
• http://georgehwilliams.pbworks.com