Learning to Give an Excellent IW Talk

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Why This Title?
Why This Title?

There have been previous talks on this subject:

- How to give a great research talk, Ju
- How to give a good talk, Fleet and Hertzmann
- How to give a good research talk, Jones et al.
- How to give a good research talk, Zeller
- How to give a good research talk, Scott
- Give a good research talk, Xu
- How to give good presentations, Carlton & Jacob
- How to give a bad talk, Paterson
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- Give a good research talk, Xu
- How to give good presentations, Carlton & Jacob
- How to give a bad talk, Paterson

At Princeton, we strive for EXCELLENCE!
(why settle for just “good” or “great”?)
Motivation

Giving excellent technical talks helps you …

- Communicate your ideas to others
- Get useful feedback to guide your next steps
- Encourage people to learn more about your work
- Garner interest in your ideas

Giving excellent talks is one of the core skills to learn as a student
Goal of this Information Session

Teach you how to design excellent technical talks

- Stimulate critical thinking about talk design
- Enhance awareness of common pitfalls
- Provide concrete guidance for your upcoming talk

Main takeaway: guidelines for designing excellent talks
Plan for this Information Session

Part 1: Discuss basic principles of slide design
- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Part 2: Provide a roadmap for how to organize a talk
- Suggest a particular flow of ideas
- Explain why that flow of ideas is good
- Discuss alternatives

Part 3: Suggestions for the Presentation
- Understand your audience
- How to speak
- Practice
Plan for this Information Session

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- Understand your audience
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- Practice
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.
Part 1: Slide Design

Basic principles of slide design

- Colors
  - Fonts
  - Text
  - Equations
  - Figures
  - Animations
  - Layout
  - Context
  - Consistency
  - etc.
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
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- Consistency
- etc.

Choose colors carefully
(what you see on your laptop is not what your audience sees)
Part 1: Slide Design

Basic principles of slide design

- Colors
  - Fonts
  - Text
  - Equations
  - Figures
  - Animations
  - Layout
  - Context
  - Consistency
  - etc.

Popular Sorts

- Insertion Sort
- Merge Sort
- Heap Sort
- Quicksort

Don’t do this
Part 1: Slide Design

Basic principles of slide design

- Colors
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- etc.

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  - Layout
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  - etc.

Do this

Dark letters against a light background

Light letters against a dark background
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.

It is a common mistake to highlight a word by using a light color on a light or white background.

It is a common mistake to highlight a word by using a dark color on a dark or black background.

Don’t do this.
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
  ➢ 28pt: Arial, Cambria, Times, Courier, Monotype
- Text
  ➢ 24pt: Arial, Cambria, Times, Courier, Monotype
- Equations
  ➢ 22pt: Arial, Cambria, Times, Courier, Monotype
- Figures
  ➢ 20pt: Arial, Cambria, Times, Courier, Monotype
- Animations
  ➢ 18pt: Arial, Cambria, Times, Courier, Monotype
- Layout
  ➢ 16pt: Arial, Cambria, Times, Courier, Monotype
- Context
  ➢ 14pt: Arial, Cambria, Times, Courier, Monotype
- Consistency
  ➢ 12pt: Arial, Cambria, Times, Courier, Monotype
- etc.

Choose fonts that are easiest to read
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.

Slide Cosmetics

- Include graphics! And not the cheap Microsoft graphics — spend some time looking for good ones. Your colleagues’ great slides, Google Images...
- Make the text as big as possible so that it fits but looks ridiculous maybe... then back off a bit. 18 pt or greater. Times Roman font doesn’t look good on slides.
- All figures should have axes labeled, lines identified, variables defined, source acknowledged. If showing comparison of model results to research observations, make sure to mention who took the measurements especially if they are in the audience (duh!).
- Use a plain background to avoid distracting the audience and allow more room for content. Avoid cheesy templates.
- Animation schemes, successive uncovering of text may be effective but don’t overdo it — audience may resent the game of cat and mouse, and it makes your slides less handy for others to use. Avoid distracting your audience with needless animation schemes.
- Consider showing a short movie if your topic warrants it — everyone likes movies. A bit of blackboard work in the middle can also be an effective break — but make sure you know what you’re doing.
Part 1: Slide Design

Basic principles of slide design

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- Layout
- Context
- Consistency
- etc.

### Bad Decisions Regarding Fonts

<table>
<thead>
<tr>
<th>Don’t do any of this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small text (18pt font)</td>
</tr>
<tr>
<td>ENTIRE SENTENCES IN ALL CAPS</td>
</tr>
<tr>
<td>Entire sentences of bold text</td>
</tr>
<tr>
<td>Serif fonts (e.g., Times New Roman)</td>
</tr>
</tbody>
</table>
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.

24pt fonts or larger
(depending on size of room)

Sans serif fonts
- Arial
- Helvetica
- Tahoma
- Verdana

Do this
Part 1: Slide Design

Basic principles of slide design
- Colors
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- etc.
Part 1: Slide Design

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Popular Sorts

- **Insertion sort** is a simple sorting algorithm that is relatively efficient for small lists and mostly sorted lists, and is often used as part of more sophisticated algorithms. It works by taking elements from the list one by one and inserting them in their correct position into a new sorted list.

- **Heapsort** is a much more efficient version of selection sort. It also works by determining the largest (or smallest) element of the list, placing that at the end (or beginning) of the list, then continuing with the rest of the list, but accomplishes this task efficiently by using a data structure called a heap, a special type of binary tree. Once the data list has been made into a heap, the root node is guaranteed to be the largest (or smallest) element. When it is removed and placed at the end of the list, the heap is rearranged so the largest element remaining moves to the root.

- **Merge sort** takes advantage of the ease of merging already sorted lists into a new sorted list. It starts by comparing every two elements (i.e., 1 with 2, then 3 with 4...) and swapping them if the first should come after the second. It then merges each of the resulting lists of two into lists of four, then merges those lists of four, and so on; until at last two lists are merged into the final sorted list.

- **Quicksort** is a divide and conquer algorithm which relies on a partition operation: to partition an array an element called a pivot is selected. All elements smaller than the pivot are moved before it and all greater elements are moved after it. This can be done efficiently in linear time and in-place. The lesser and greater sublists are then recursively sorted.

Don’t do this
Part 1: Slide Design

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## Part 1: Slide Design

### Basic principles of slide design

- **Colors**
- **Fonts**
- **Text**
- **Equations**
- **Figures**
- **Animations**
- **Layout**
- **Context**
- **Consistency**
- **etc.**

Do this

- One message per slide
- Only short sentences or phrases
- Enough text to follow the story
- Not all the details
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.
Part 1: Slide Design

Basic principles of slide design

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- Layout
- Context
- Consistency
- etc.

Don’t do this
(Unless you plan to define every variable and step through every equation)
Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
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- Figures
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- Consistency
- etc.

Matching Local Shapes

1. Generate local shape features
2. Find correspondences minimizing distance function

\[ D(A,B) = \sum_{\text{Correspondences}} \Delta \text{FeatureShape} + \sum_{\text{Correspondence Pairs}} \Delta \text{SpatialConsistency} \]

Do this
(Only include equations that help tell your story)
Part 1: Slide Design

Basic principles of slide design

- Colors
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- Consistency
- etc.
Part 1: Slide Design

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- etc.

Approach

- The problem is: traditional methods are either a) too expensive, b) not readily available or c) make it hard to gauge progress
- Key idea: combine the freedom of self-learning with the feedback of a coach by use a Kinect camera to facilitate practice
- Select a number of key positions and steps that users can pick up
- Use skeletal tracking capabilities of Kinect to calculate how well user is recreating these steps compared to a ground truth model
- Integrate instruction with mental fidelity
- Use a game-like format to encourage user to track their progress, and create a sense of community

Do this
Part 1: Slide Design

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Don’t do this
Part 1: Slide Design

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- etc.

Do this
Part 1: Slide Design

Basic principles of slide design

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- etc.

Or even better, this
Part 1: Slide Design

Basic principles of slide design

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- Consistency
- etc.
Part 1: Slide Design

Basic principles of slide design

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Don’t do this
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- etc.

Do this (animated visualization)

http://www.pptalchemy.co.uk/
Part 1: Slide Design

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- etc.

Do this (demonstration)
Part 1: Slide Design

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- etc.
Part 1: Slide Design

Basic principles of slide design

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- etc.

Try to have main point of slide across top, supporting points in bullets, and a figure filling most of the slide.
Part 1: Slide Design

Basic principles of slide design

- Colors
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- Context
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- etc.

Goal

Find maps between surfaces
- Non-rigid
- Bijective
- Smooth
- Shape preserving
- Automatic
- Efficient computation
- Provide metric
- Semantic alignment

Try to have main point of slide across top, supporting points in bullets, and a figure filling most of the slide
Part 1: Slide Design

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- etc.

Symmetry Axis Alignment

O(mn) algorithm based on dynamic programming
- Dynamic time warping [Marzal et al., 2005]

Try to have main point of slide across top, supporting points in bullets, and a figure filling most of the slide
Part 1: Slide Design

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- etc.

<table>
<thead>
<tr>
<th>Timing</th>
</tr>
</thead>
</table>

Computational complexity:
- $O(F^6S\log M + N^3 + NFS\log M)$
  - $F = \#$ feature points ($\sim$5-10)
  - $S = \#$ sample points on mesh (128)
  - $M = \#$ vertices on mesh ($\sim$10K)
  - $N = \#$ sample points on axis curve (200)

Computation time, in practice:
- $\sim$1 min for symmetry axis detection (once per mesh)
- $\sim$5 sec for symmetry axis alignment
- $\sim$3 min for correspondence extrapolation

Rarely two points per slide
Rarely three levels
Part 1: Slide Design

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Part 1: Slide Design

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- Figures
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- Layout
- Context
- Consistency
- etc.

Part of Talk

Topic sentence

Content

Point being discussed

Do this
Part 1: Slide Design

Basic principles of slide design

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- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.
Part 1: Slide Design

Basic principles of slide design

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- etc.

Sorting Summary

- Insertion Sort
  - Best case – N
  - Worst case – N²
- Mergesort
  - best case - NlogN
  - Worst case – N Log N
- Quick sort
  - Best case – n log n
  - Worst Case – n²

Don’t do this
Part 1: Slide Design

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- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- **Consistency**
- etc.

Don’t do this
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- Figures
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- Layout
- Context
- Consistency
- etc.

![Sorting Experiments Graph]

Don’t do this
Part 1: Slide Design

Bonus Fact

- Easy to read slides lower the probability of critical examination!
  - *Thinking Fast and Slow* – D. Kahneman

Main takeaway: Are your slides easy to read?
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- Discuss alternatives

Part 3: Suggestions for the presentation
- Understand your audience
- How to speak
- Practice
Part 2: Flow of Ideas

Goal: organize your talk with a flow of ideas that …

- Makes a point
- Teaches the listener something they remember
- Tells a story
Part 2: Flow of Ideas

Goal: organize your talk with a flow of ideas that …

- Makes a point
- Teaches the listener something they remember
- Tells a story with a logical flow of ideas

Flow of Ideas

- Each idea should follow directly from previous one
- Details should be omitted unless necessary for story
  - Level of detail should be tailored to audience
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- Future work
- Acknowledgments
Part 2: Flow of Ideas

A flow that works for almost any talk:

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  - Conclusions
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**Motivation:**

Establish importance of your area or topic
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
  - Specify inputs and outputs
  - Define assumptions
  - Describe desirable properties
  - Provide concrete example(s)
- Related work
- Approach
- Implementation
- Results
- Conclusions
- Future work
- Acknowledgments

**Goal:**

Define problem:
Part 2: Flow of Ideas

A flow that works for almost any talk:

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**Related work:**

Provide taxonomy of previous approaches to achieve *your goal.*

For each one, briefly describe the key idea and explain why it doesn’t achieve your goal completely.
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
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  - Approach
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**Approach:**

- Present novel idea (Eureka!)
- Explain why it is a good idea (describe rationale)
- Provide simple example showing how your idea achieves your goal in situation where previous approaches would not
Part 2: Flow of Ideas

A flow that works for almost any talk:

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**Implementation:**

Provide overview:
- System organization
- Sequence of steps (flow chart)

For most important steps (or issues):
- Challenge
- Approach
- Implementation
- Results
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation

Results:

- Present results of evaluation aimed at testing whether met goal

For each evaluation:

- State goal of evaluation
- Describe evaluation setup
- Describe evaluation metric(s)
- Present results
- Discuss success/failure cases
- Explain implications
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results

Conclusions:
- Summarize key points
- Restate main results
- Describe implications
- Future work
- Acknowledgments
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- **Future work**

**Future work:**

This term: remaining steps, pending evaluations, etc.

Next projects: questions to investigate in a follow-up study

Long-term: how work could affect direction of your field 😊
Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- Future work

**Acknowledgments:**

Sources of code, data, etc.
Student collaborators
Faculty advisor
Funding
etc.
Part 2: Flow of Ideas

Alternatives:

Sure, but if you are reinventing the wheel, it better be good!

Example: Results first followed by how you got there.

\[ E=mc^2 \]
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Part 3: Suggestions for the presentation
- Understand your audience
- How to speak
- Practice
No one knows what you know:
  - But your audience is eager to know what you know

Your Job:
  - Create the structure of knowledge in your audience’s mind that you already have in yours

How you do it:
  - Tell them a story that builds, one layer at a time, the edifice of knowledge that you want to create

The Result:
  - The audience is happy because it learned something
Part 3: The Curse of Knowledge

No one knows what you know:
- Unfortunately, we forget what it feels like to *not* know something we know well

Vocabulary:
- Does your audience know the acronyms, jargon, and terms of art that you are using?

Structure your sentences:
- Link sentences with structural clues like “Although,” “An example is,” “Because,” “This shows,” etc. to enable your audience to follow your logic.
Part 3: How to speak

Establish your presence:
- Introduce yourself and your topic

Do not whisper or shout:
- For a live presentation, you need to reach the person in the last seat, but not beyond

Control the verbal tics:
- Umms, uhs, sniffles, grunts, etc.

Pace yourself:
- Speak conversationally, neither too fast or slow
Part 3: How to speak

For video presentations (Zoom job interviews too!):

- If the audience sees you, fill the screen
- Good audio is a must – test ahead of time if you can
- Practice looking directly at the camera
- If purely slides, try to go a little slower, it is ok to repeat a point
- Pause for and elicit questions
Part 3: Practice, Practice, Practice

Your slides can be improved:
- Share your slides with others and ask for suggestions

Your first talk shouldn’t be your final talk:
- Rehearse with a private audience

Ask your practice audience questions:
- Did it make sense?
- Was anything confusing?

Building confidence:
- More repetition leads to talk becoming easier to give
Part 3: Final Thoughts

Giving a talk is an opportunity

- Your chance to describe why what you did is cool!
- Your chance to convince others you are competent
- Why waste that opportunity by giving a bad talk?

Giving a talk does not have to be nerve-wracking

- You know more about topic than your audience
- Preparation and practice is very calming
Summary

Slide design is important

- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Probably best to follow suggested flow of ideas

- Motivation, goal, previous work, approach, implementation, results, conclusion, future work
- Same flow used by most top people in the world

Designing effective talks is hard, but important

- Most people are not good at it, mostly because they don’t think about the choices they are making
- You are now above the median in knowledge on this subject 😊
Acknowledgments

Thanks to IW coordinators (past and present) for slides and advice:

- Tom Funkhouser, Alan Kaplan, Andrea LaPaugh

Thanks to the following people for ideas:

- Ju, Fleet & Hertzmann, Jones et al., Zeller, Scott, Xu, Carlton & Jacob, Paterson, Fatahalian

Thank You!