Learning to Give an Excellent IW Talk

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Princeton University

Why This Title?

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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
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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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Part 3: Suggestions for the Presentation
- 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
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- 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
○ Fonts
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○ Consistency
○ etc.

Popular Sorts

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Don't do this

Part 1: Slide Design

Basic principles of slide design

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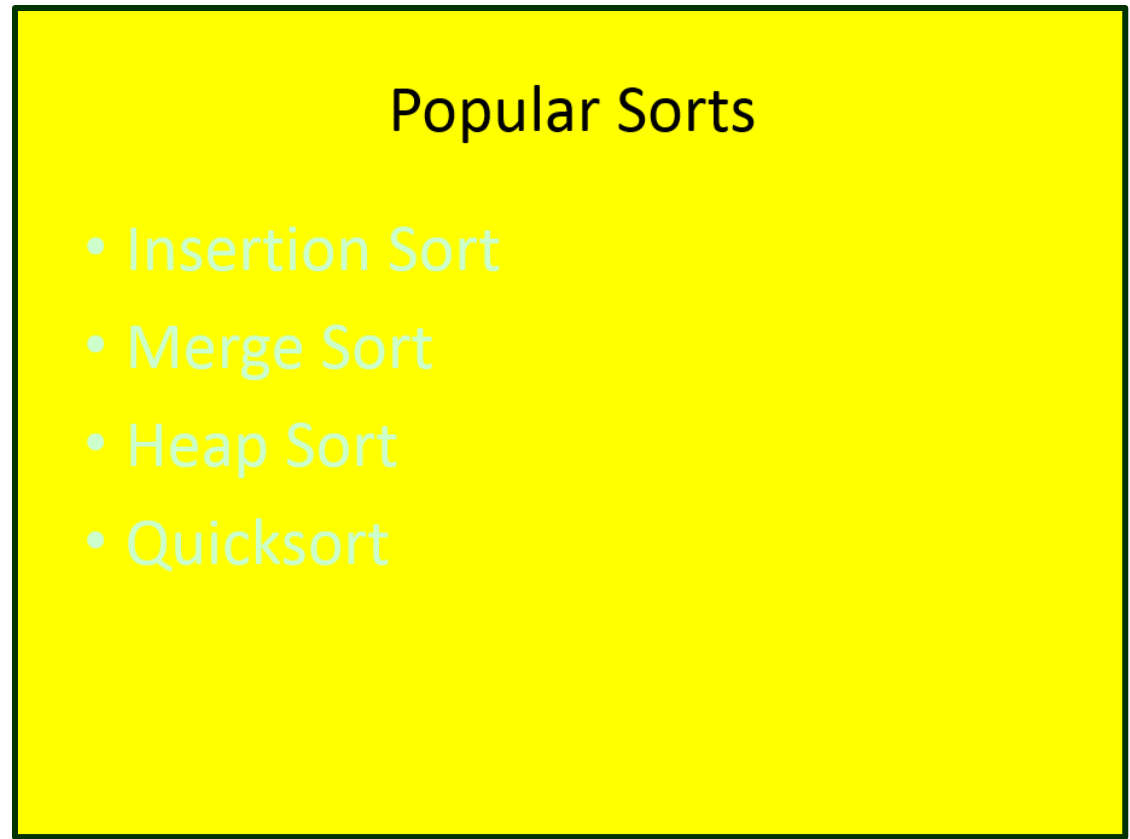- Animations
- Layout
- Context
- Consistency
- etc.

Dark letters against a light background

Light letters against a dark background

Do this

Part 1: Slide Design

Basic principles of slide design

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

Part 1: Slide Design

Basic principles of slide design

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

28pt: Arial, Cambria, Times, Courier, *M*

24pt: Arial, Cambria, Times, Courier, *Monotype*

22pt: Arial, Cambria, Times, Courier, *Monotype*

20pt: Arial, Cambria, Times, Courier, *Monotype*

18pt: Arial, Cambria, Times, Courier, *Monotype*

16pt: Arial, Cambria, Times, Courier, *Monotype*

14pt: Arial, Cambria, Times, Courier, *Monotype*

12pt: Arial, Cambria, Times, Courier, *Monotype*

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.

HOW TO GIVE GOOD PRESENTATIONS

ANN MARIE CARLTON
DANIEL JACOB (AUTHOR OF YOUR TEXTBOOK)

Don't use this as a model: avoid bulleted lists, use graphics, avoid Microsoft templates

Ann Marie Carlton & Daniel Jacob

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.

Don't do this

Part 1: Slide Design

Basic principles of slide design

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- ➤ Fonts
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- ○ Context
- ○ Consistency
- ○ etc.

Bad Decisions Regarding Fonts

Small text (18pt font)

ENTIRE SENTENCES IN ALL CAPS

Entire sentences of bold text

Serif fonts (e.g., Times New Roman)

AaBbCc   Serif font

AaBbCc   Serif font
(serifs in red)

Don't do any of this

Part 1: Slide Design

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- ○ etc.

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

Sans serif fonts

    Arial
    Helvetica
    Tahoma
    Verdana

Do this

Part 1: Slide Design

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Part 1: Slide Design

Basic principles of slide design

- ○ Colors
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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.[25] 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

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- 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.

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Basic principles of slide design
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- ○ Layout
- ○ Context
- ○ Consistency
- ○ etc.

One message per slide

Only short sentences or phrases

Enough text to follow the story

Not all the details

Do this

Part 1: Slide Design

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

Basic principles of slide design

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EXAMPLE 1 CONT.

$$u_1(x,t) = x\left[t - \frac{2t^5}{15} - \frac{t^7}{63} - \frac{t^{2-\alpha}}{\Gamma(3-\alpha)} - \frac{2t^{4-\alpha}}{\Gamma(5-\alpha)}\right],$$

$$u_2(x,t) = x\left[t - \frac{t^3}{3} - \frac{2t^5}{15} + \frac{t^7}{45} + \frac{2t^9}{567} - \frac{4t^{11}}{2475} - \frac{4t^{13}}{12285} - \frac{t^{15}}{59535} - \frac{2t^{2-\alpha}}{\Gamma(3-\alpha)}\right.$$

$$+ \frac{t^{3-2\alpha}}{\Gamma(4-2\alpha)} + \left(\frac{2}{\Gamma(3-\alpha)} - \frac{2}{\Gamma(4-\alpha)}\right)\frac{t^{4-\alpha}}{(4-\alpha)}$$

$$+ \left(\frac{4}{\Gamma(5-\alpha)} + \frac{16}{\Gamma(6-\alpha)}\right)\frac{t^{6-\alpha}}{(6-\alpha)}$$

$$+ \left(\frac{80}{\Gamma(8-\alpha)} - \frac{4}{15\Gamma(3-\alpha)}\right)\frac{t^{8-\alpha}}{(8-\alpha)}$$

$$- \left(\frac{8}{15\Gamma(5-\alpha)} + \frac{2}{63\Gamma(3-\alpha)}\right)\frac{t^{10-\alpha}}{(10-\alpha)} - \frac{4t^{12-\alpha}}{63(12-\alpha)\Gamma(5-\alpha)}$$

$$+ \left(\frac{2}{\Gamma(5-2\alpha)} - \frac{1}{\Gamma(3-\alpha)^2}\right)\frac{t^{5-2\alpha}}{5-2\alpha} - \frac{4t^{7-2\alpha}}{(7-2\alpha)\Gamma(3-\alpha)\Gamma(5-\alpha)}$$

$$\left. - \frac{4t^{9-2\alpha}}{(9-2\alpha)\Gamma(5-\alpha)^2}\right],$$

27

Don't do this
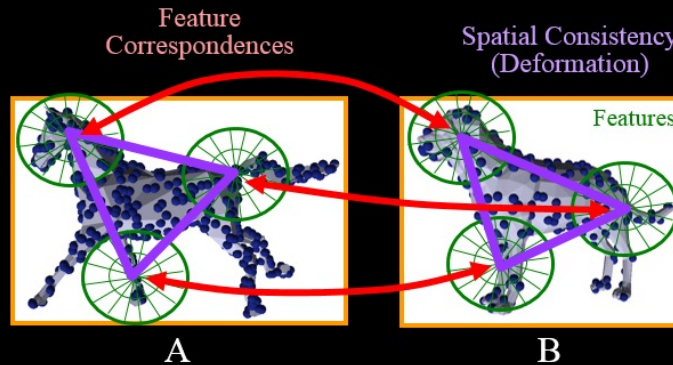(Unless you plan to define every variable
and step through every equation)

Part 1: Slide Design

Basic principles of slide design

- ○ Colors
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- ○ Consistency
- ○ etc.

Matching Local Shapes

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

Feature Correspondences

Spatial Consistency (Deformation)

Features

A   B

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

Do this
(Only include equations
that help tell your story)

Part 1: Slide Design

Basic principles of 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 <u>freedom</u> of self learning with the <u>feedback</u> 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 fidelity
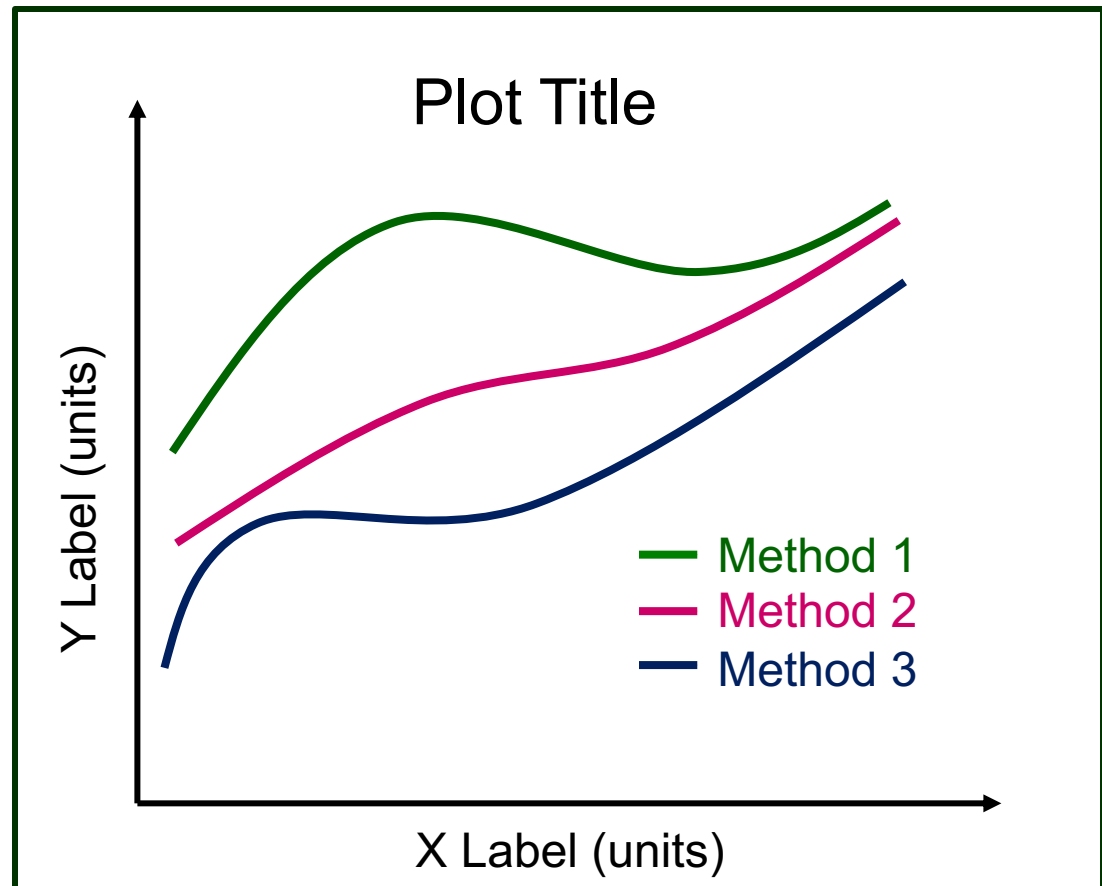- ❖ Use a game-like format to progress, and create a sen

Do

Michael Li

Do this

Part 1: Slide Design

Basic principles of slide design

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Big-O Complexity

Source: http://bigocheatsheet.com/

Don't do this

Part 1: Slide Design

Basic principles of slide design

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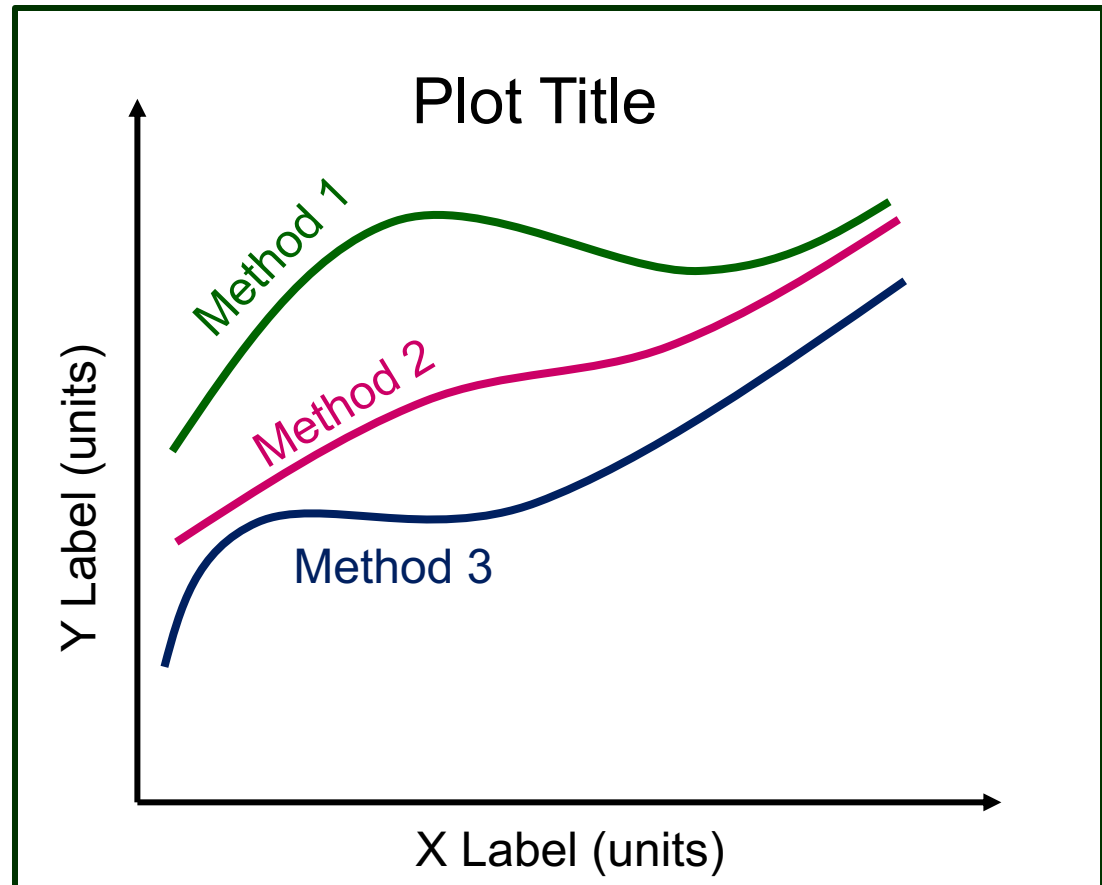- ➢ Figures
- Animations
- Layout
- Context
- Consistency
- etc.

Plot Title

Y Label (units)

X Label (units)

— Method 1
— Method 2
— Method 3

Do this

Part 1: Slide Design

Basic principles of slide design

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- ○ etc.

Plot Title

Method 1

Method 2

Method 3

Y Label (units)

X Label (units)

Or even better, this

Part 1: Slide Design

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Part 1: Slide Design

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Don't do this

Part 1: Slide Design

Basic principles of slide design

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- ○ etc.

Elementary red-black BST operations

Left rotation.   Orient a (temporarily) right-leaning red link to lean left.

rotate E left
(before)

less
than E

between
E and S

greater
than S

```
private Node rotateLeft(Node h)
{
    assert isRed(h.right);
    Node x = h.right;
    h.right = x.left;
    x.left = h;
    x.color = h.color;
    h.color = RED;
    return x;
}
```

Invariants. Maintains symmetric order and perfect black balance.
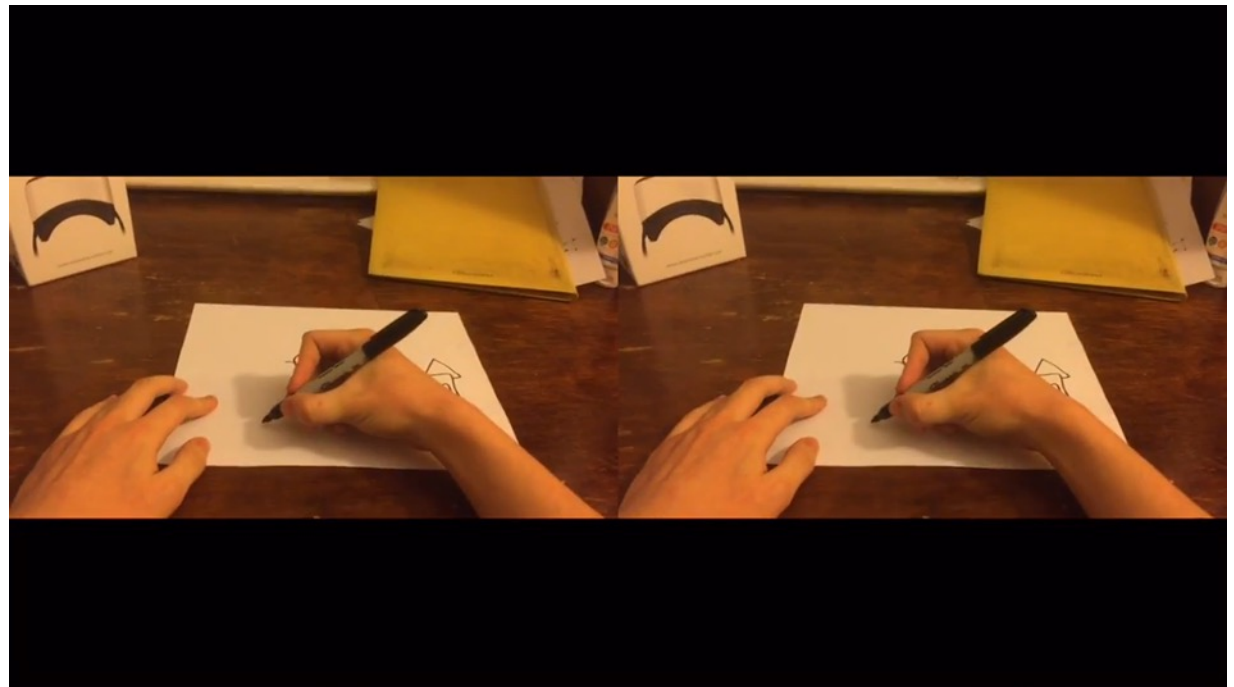
23

Do this
(animated visualization)

Part 1: Slide Design

Basic principles of slide design

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- ○ Equations
- ○ Figures
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- ○ Consistency
- ○ etc.

Do this
(demonstration)

Luke Li

Part 1: Slide Design

Basic principles of slide design
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- ◦ Context
- ◦ Consistency
- ◦ etc.

Part 1: Slide Design

Basic principles of slide design

- ○ Colors
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- ➢ Layout
- ○ Context
- ○ Consistency
- ○ etc.

Title

Main point of slide

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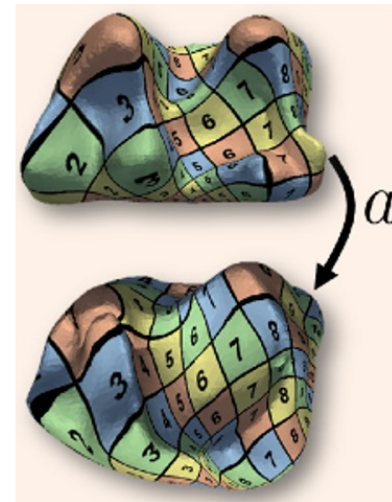a figure filling most of the slide

Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
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- Equations
- Figures
- Animations
- ➤ Layout
- Context
- Consistency
- 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
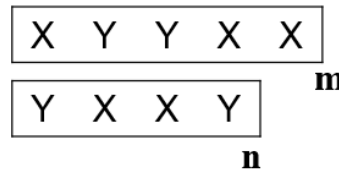
Part 1: Slide Design

Basic principles of slide design

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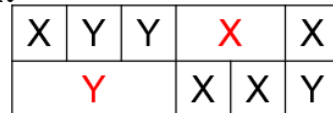- ○ Animations
- ➤ Layout
- ○ Context
- ○ Consistency
- ○ etc.

Symmetry Axis Alignment

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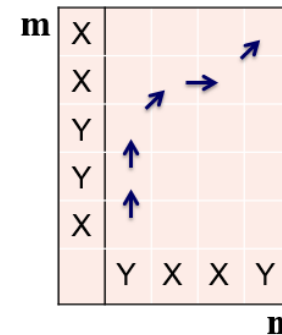- ○ Dynamic time warping [Marzal et al., 2005]

Input:

| X | Y | Y | X | X |

m

| Y | X | X | Y |

n

Solution:

| X | Y | Y | **X** | | X |

| | **Y** | | X | X | Y |

Edit graph:

m

| X |
| X |
| Y |
| Y |
| X |

Y X X Y

n

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.

Timing

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

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

Rarely two points per slide
Rarely three levels

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- ➢ Context
- ○ Consistency
- ○ etc.

Part 1: Slide Design

Part of Talk

Basic principles of slide design

Topic sentence

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

Point being discussed

Content

Do this

Part 1: Slide Design

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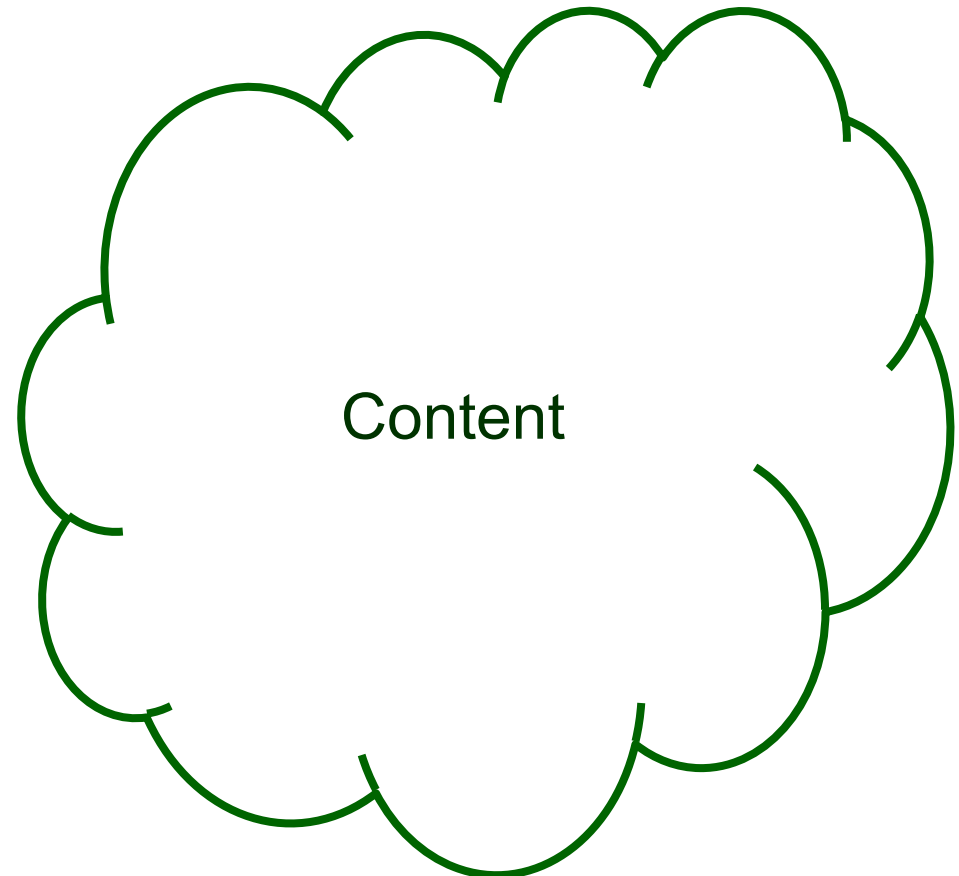- ➤Consistency
- etc.

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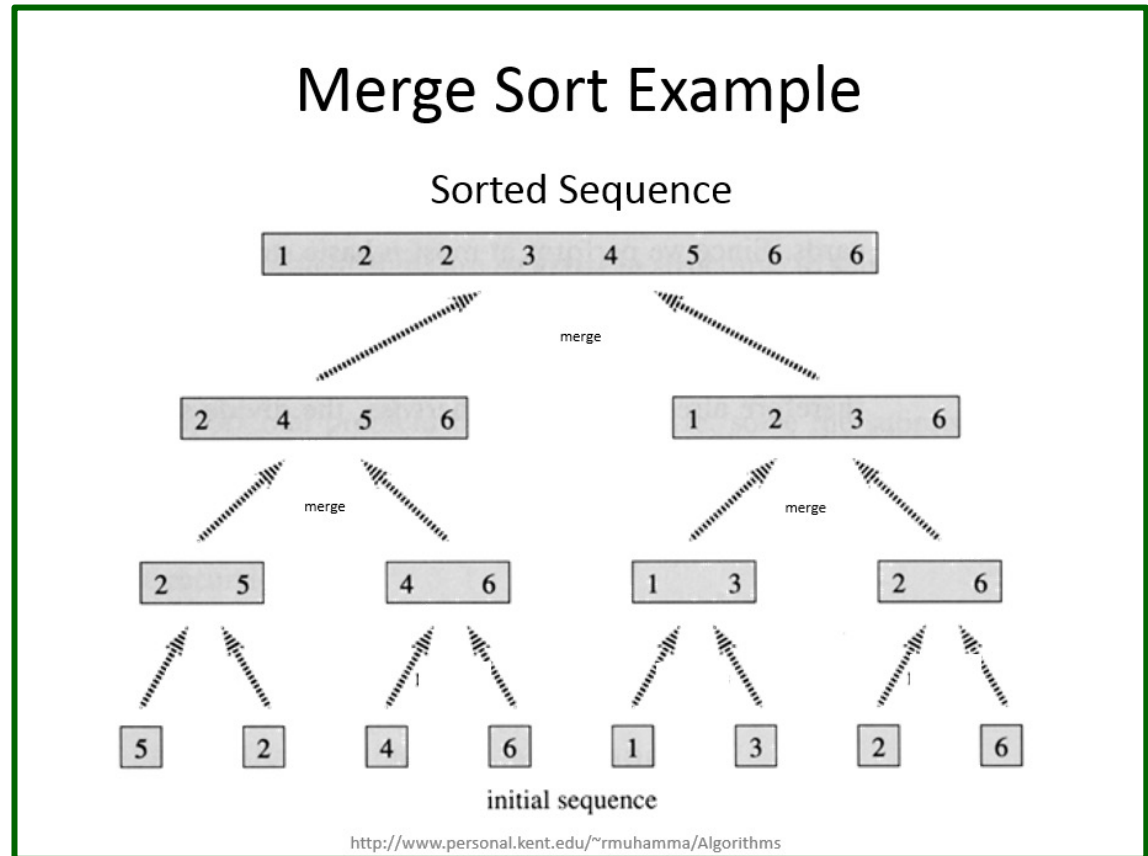- ○ Context
- ➢ Consistency
- ○ etc.

Sorting Summary

- Insertion Sort
  - Best case – N
  - Worst case – N^2
- Mergesort
  - best case - NlogN
  - Worst case – N Log N
  -
- Quick sort
  - Best case – n log n
  - Worst Case – n^2

Don't do this

Part 1: Slide Design

Basic principles of slide design

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

Merge Sort Example

Sorted Sequence

| 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 |

merge

| 2 | 4 | 5 | 6 | | 1 | 2 | 3 | 6 |

merge   merge

| 2 | 5 | | 4 | 6 | | 1 | 3 | | 2 | 6 |

| 5 | | 2 | | 4 | | 6 | | 1 | | 3 | | 2 | | 6 |

initial sequence

http://www.personal.kent.edu/~rmuhamma/Algorithms

Don't do this

Part 1: Slide Design

Basic principles of slide design
- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
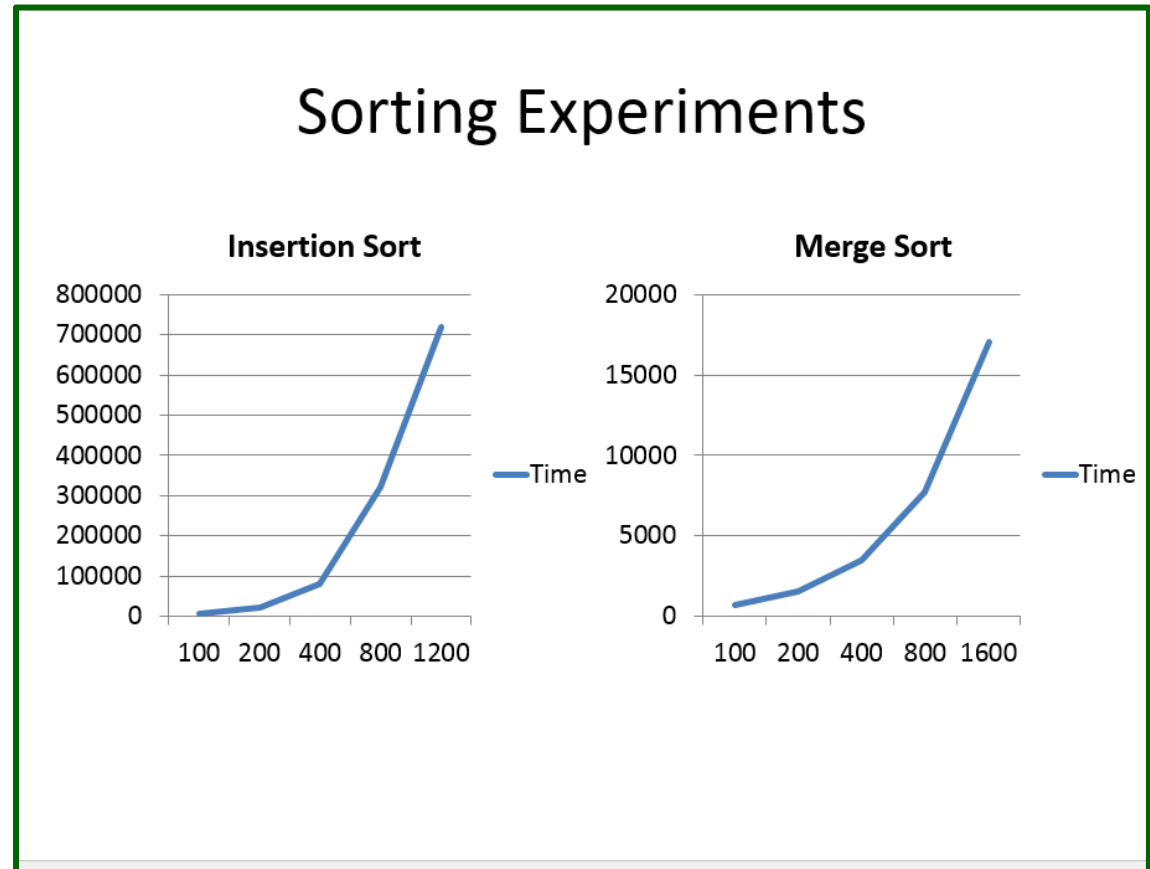- Layout
- Context
➤ Consistency
- etc.

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?

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

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:

➢ Motivation ⬅
- ○ Goal
- ○ Related work
- ○ Approach
- ○ Implementation
- ○ Results
- ○ Conclusions
- ○ Future work
- ○ Acknowledgments

Motivation:

- Establish importance of your area or topic

– Why are you doing this?

– What change in the world do you want?

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Goal:

Define problem:
- Specify inputs and outputs
- Define assumptions
- Describe desirable properties
- Provide concrete example(s)

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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

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<u>Approach</u>:

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

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<u>Implementation</u>:

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

For most important steps (or issues):
- Challenge
- Approach
- Implementation
- Results

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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

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Conclusions:

Summarize key points

Restate main results

Describe implications

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- Results
- Conclusions
- ➢Future work ⟵
- Acknowledgments

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 ☺

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- ○ Approach
- ○ Implementation
- ○ Results
- ○ Conclusions
- ○ Future work
- ➤ Acknowledgments

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: You Are the Expert!

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 - Attitude and Body Language

- Look at the audience, but scan, don't fixate

- Smile – Audience relaxes, bits of humor are ok

- Don't be a statue, but this isn't an exercise class

- If time and format permits, allow clarification questions only during the talk. Be polite, but finish.

- Stuff happens – stay calm and deal with it.

Part 3: How to speak

For video presentations (Zoom job interviews too!):
- If the audience sees you, fill the screen
- If the audience sees you, you should be well lit
- 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, it takes longer to understand on video
- If interactive video, pause for questions
- If recorded video, try a few takes and use editing tools

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

ATTITUDE AND BODY LANGUAGE

Ann Marie Carlton & Daniel Jacob

- Look your audience in the eyes – don't look at your slides (you shouldn't need to). And don't just look at the big shots – scan the room.

- Smile – it relaxes the audience. A bit of humor is always appreciated.

- Don't be a statue. But don't flail your arms aimlessly either. Don't make the laser pointer dance on the screen.

- Some people like to ask questions during the talk, and sometimes that's expected – but make sure these questions don't compromise your ability to finish your talk in due time. If they do, be polite but firm about moving on.

- Take some time before the talk to set up, test your slides. Stay cool if equipment malfunctions – it's not your fault. If it happens, politely ask the chair or your host to deal with it – no one expects you to fix a bulb, or a mike, or a light, etc. And then go on anyway if you possibly can – your audience will sympathize and admire you for doing the best possible under lousy circumstances.

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!