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# Learning to Give an Excellent IW Talk

Robert S. Fish  
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
- 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

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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

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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 1: Slide Design

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## 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
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- Context
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- 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
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- Layout
- Context
- Consistency
- etc.



Don't do this

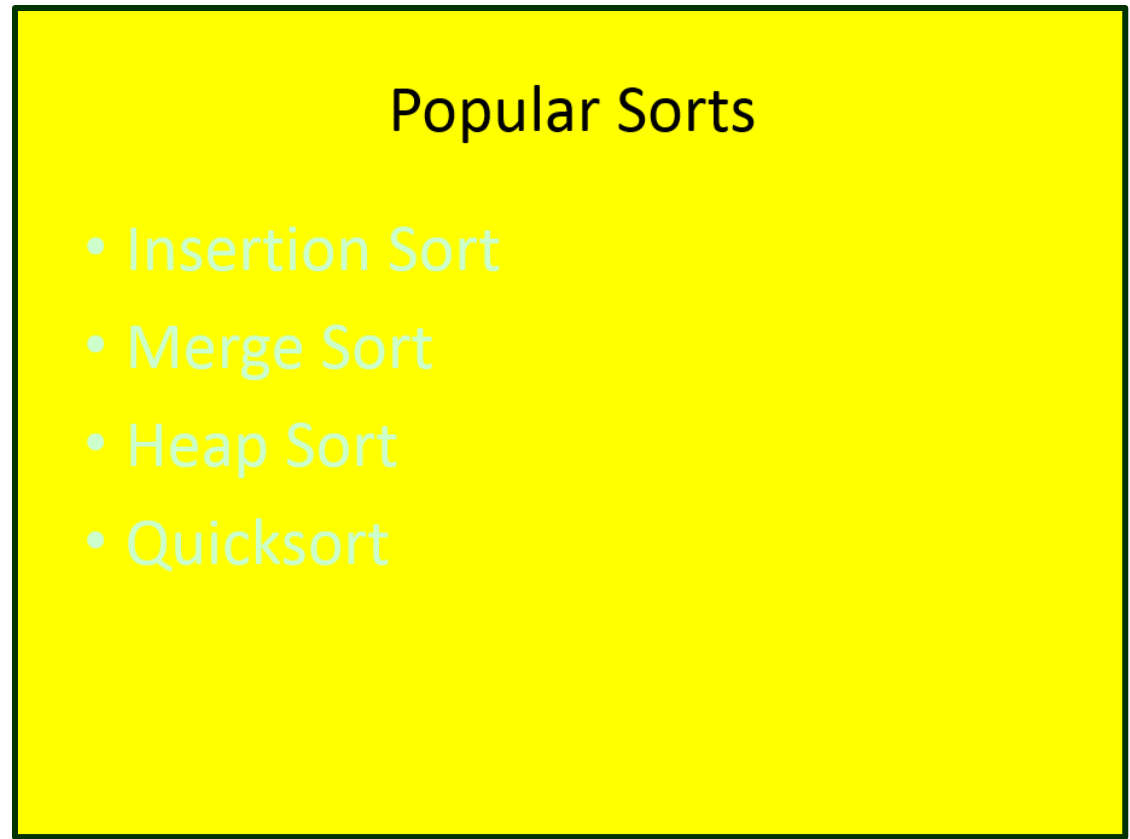
# Part 1: Slide Design

---

## Basic principles of slide design

### ➤ Colors

- Fonts
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Don't do this

# Part 1: Slide Design

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## Basic principles of slide design

### ➤ Colors

- Fonts
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- 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
- 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**
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- etc.



# Part 1: Slide Design

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## Basic principles of slide design

- Colors
- Fonts
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- Consistency
- etc.

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

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**
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- 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

- Colors
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- 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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## Basic principles of slide design

- Colors
- **Fonts**
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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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## Basic principles of slide design

- Colors
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# Part 1: Slide Design

## Basic principles of 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.[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

# Part 1: Slide Design

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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.

Don't do this

# Part 1: Slide Design

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- 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

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- etc.

# Part 1: Slide Design

## Basic principles of slide design

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EXAMPLE 1 CONT.

$$u_1(x, t) = x \left[ t - \frac{2t^2}{15} - \frac{t^3}{63} - \frac{t^{2-\alpha}}{\Gamma(3-\alpha)} - \frac{2t^{4-\alpha}}{\Gamma(5-\alpha)} \right],$$
$$u_2(x, t) = x \left[ t - \frac{t^3}{3} - \frac{2t^5}{15} + \frac{t^7}{45} + \frac{2t^9}{567} - \frac{4t^{11}}{2475} - \frac{4t^{13}}{12285} - \frac{t^{15}}{59535} - \frac{2t^{2-\alpha}}{\Gamma(3-\alpha)} \right. \\ \left. + \frac{t^{3-2\alpha}}{\Gamma(4-2\alpha)} + \left( \frac{2}{\Gamma(3-\alpha)} - \frac{2}{\Gamma(4-\alpha)} \right) \frac{t^{4-\alpha}}{(4-\alpha)} \right. \\ \left. + \left( \frac{4}{\Gamma(5-\alpha)} + \frac{16}{\Gamma(6-\alpha)} \right) \frac{t^{5-\alpha}}{(6-\alpha)} \right. \\ \left. + \left( \frac{80}{\Gamma(8-\alpha)} - \frac{4}{15\Gamma(3-\alpha)} \right) \frac{t^{8-\alpha}}{(8-\alpha)} \right. \\ \left. - \left( \frac{8}{15\Gamma(5-\alpha)} + \frac{2}{63\Gamma(3-\alpha)} \right) \frac{t^{10-\alpha}}{(10-\alpha)} - \frac{4t^{12-\alpha}}{63(12-\alpha)\Gamma(5-\alpha)} \right. \\ \left. + \left( \frac{2}{\Gamma(5-2\alpha)} - \frac{1}{\Gamma(3-\alpha)^2} \right) \frac{t^{5-2\alpha}}{5-2\alpha} - \frac{4t^{7-2\alpha}}{(7-2\alpha)\Gamma(3-\alpha)\Gamma(5-\alpha)} \right. \\ \left. - \frac{4t^{9-2\alpha}}{(9-2\alpha)\Gamma(5-\alpha)^2} \right],$$

⋮

27

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

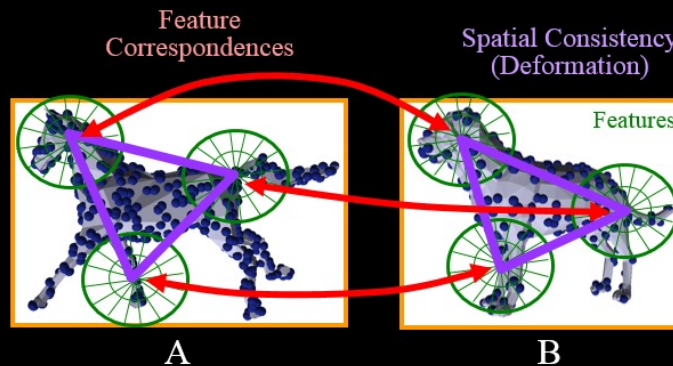
# Part 1: Slide Design

## Basic principles of slide design

- Colors
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- 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

---

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# Part 1: Slide Design

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Don't do this

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### 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 fidelity
- ◇ Use a game-like format to track progress, and create a series of

Do



Michael Li

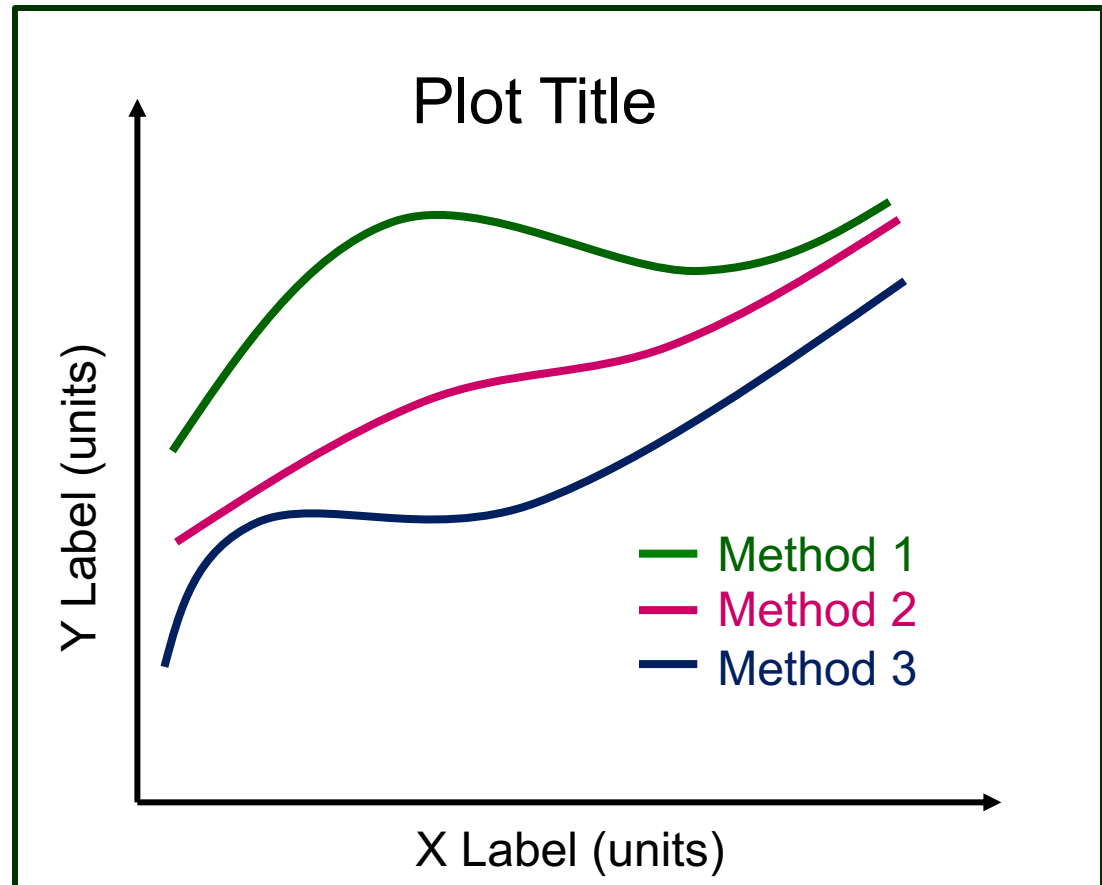
Do this



# Part 1: Slide Design

## Basic principles of slide design

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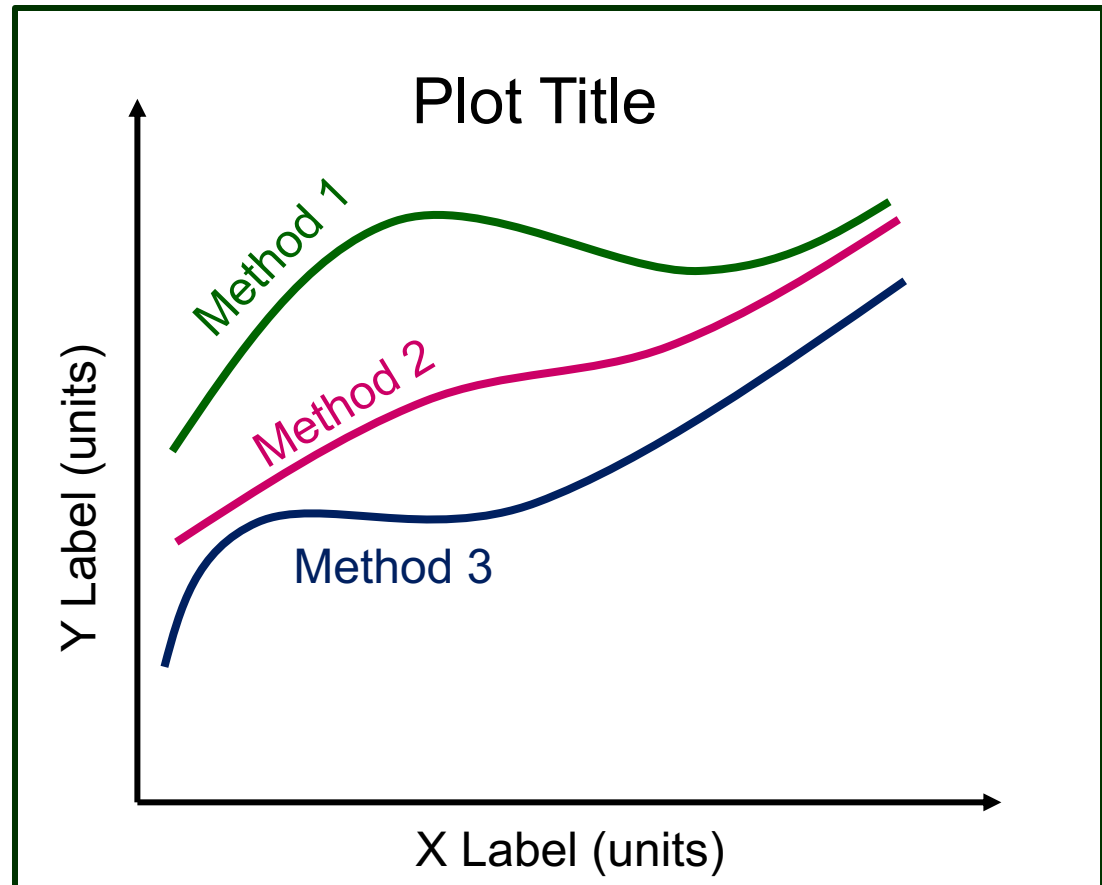
Do this



# Part 1: Slide Design

## Basic principles of slide design

- Colors
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- etc.



Or even better, this

# Part 1: Slide Design

---

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# Part 1: Slide Design

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## Basic principles of slide design

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Don't do this

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Elementary red-black BST operations


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

rotate E left (before)

```
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

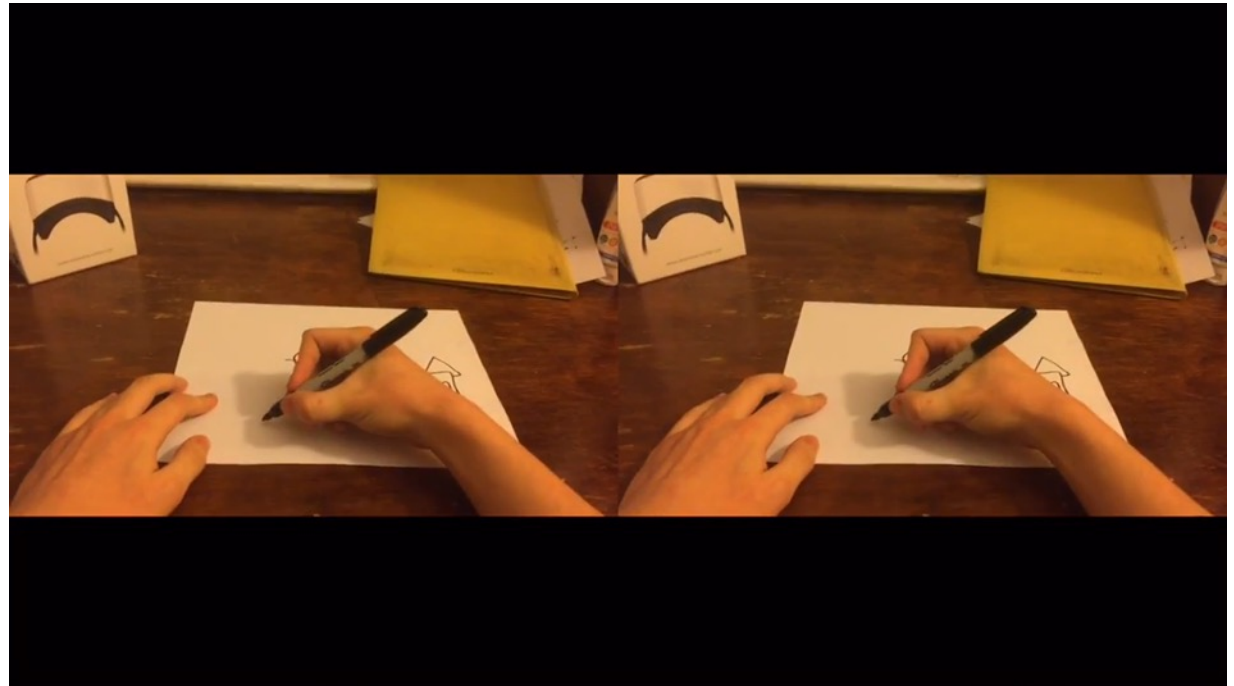


Do this  
(animated visualization)

# Part 1: Slide Design

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Do this  
(demonstration)

Luke Li

# Part 1: Slide Design

---

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# Part 1: Slide Design

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<b>Title</b>
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

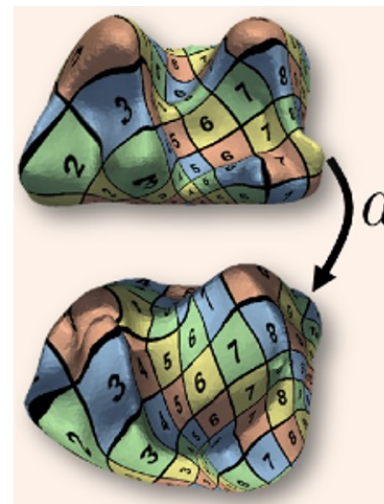
## Basic principles of slide design

- Colors
- Fonts
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- **Layout**
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- etc.

### Goal

Find maps between surfaces

- Non-rigid
- Bijjective
- 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

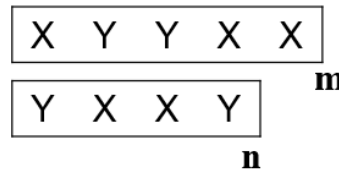
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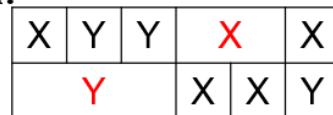
### Symmetry Axis Alignment

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

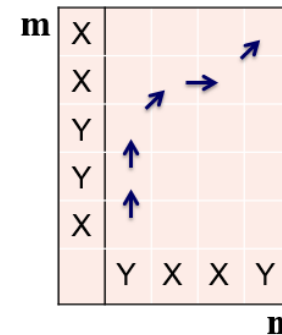
Input:



Solution:



Edit graph:



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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- **Layout**
- Context
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- etc.

### Timing

Computational complexity:

- $O(F^6 S \log M + N^3 + N F S \log M)$ 
  - 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

# Part 1: Slide Design

---

## Basic principles of slide design

- Colors
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# Part 1: Slide Design

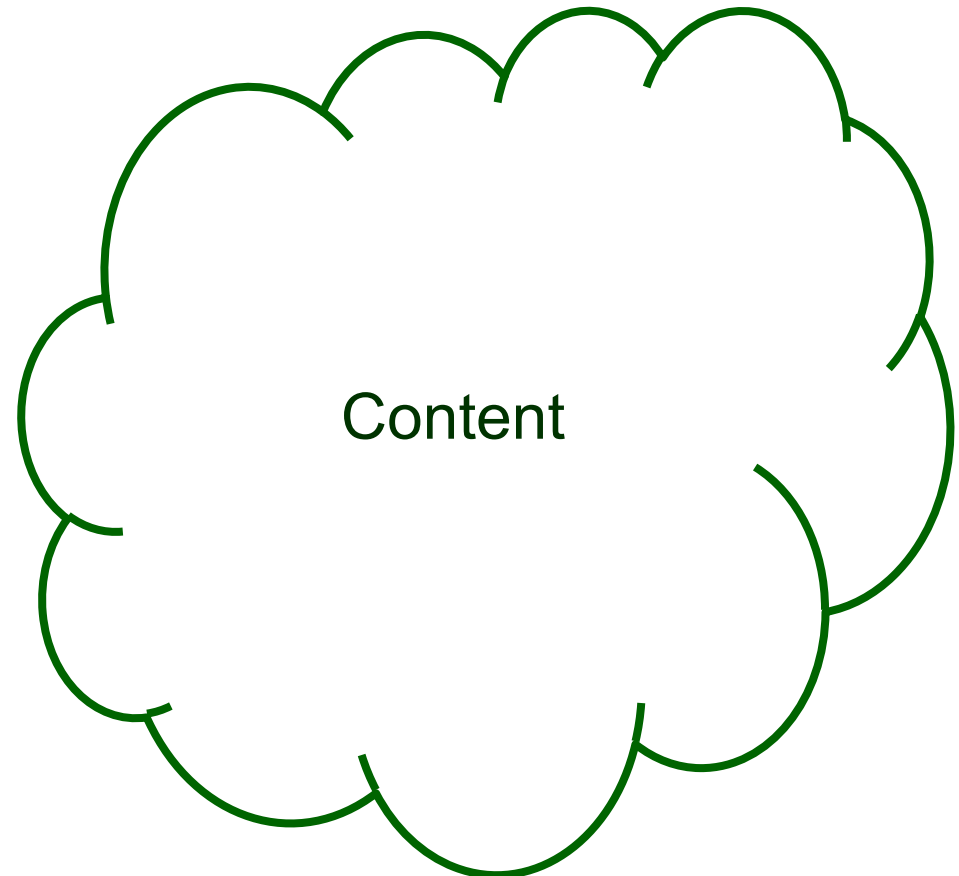
Part of Talk

## Basic principles of slide design

Topic sentence

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

Point  
being  
discussed



Do this

# Part 1: Slide Design

---

## Basic principles of slide design

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

# Part 1: Slide Design

## Basic principles of slide design

- Colors
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### Sorting Summary

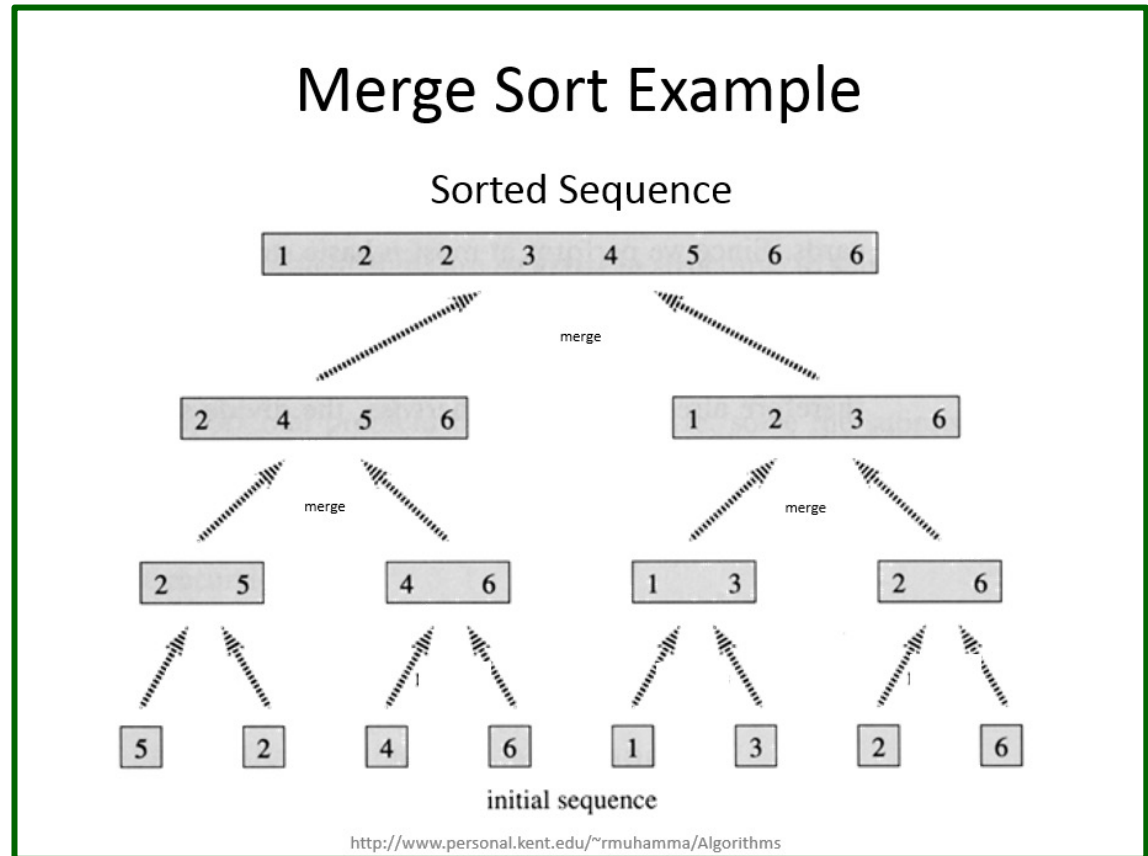
- Insertion Sort
  - Best case –  $N$
  - Worst case –  $N^2$
- Mergesort
  - best case -  $N \log N$
  - Worst case –  $N \log N$
  -
- Quick sort
  - Best case –  $n \log n$
  - Worst Case –  $n^2$

Don't do this

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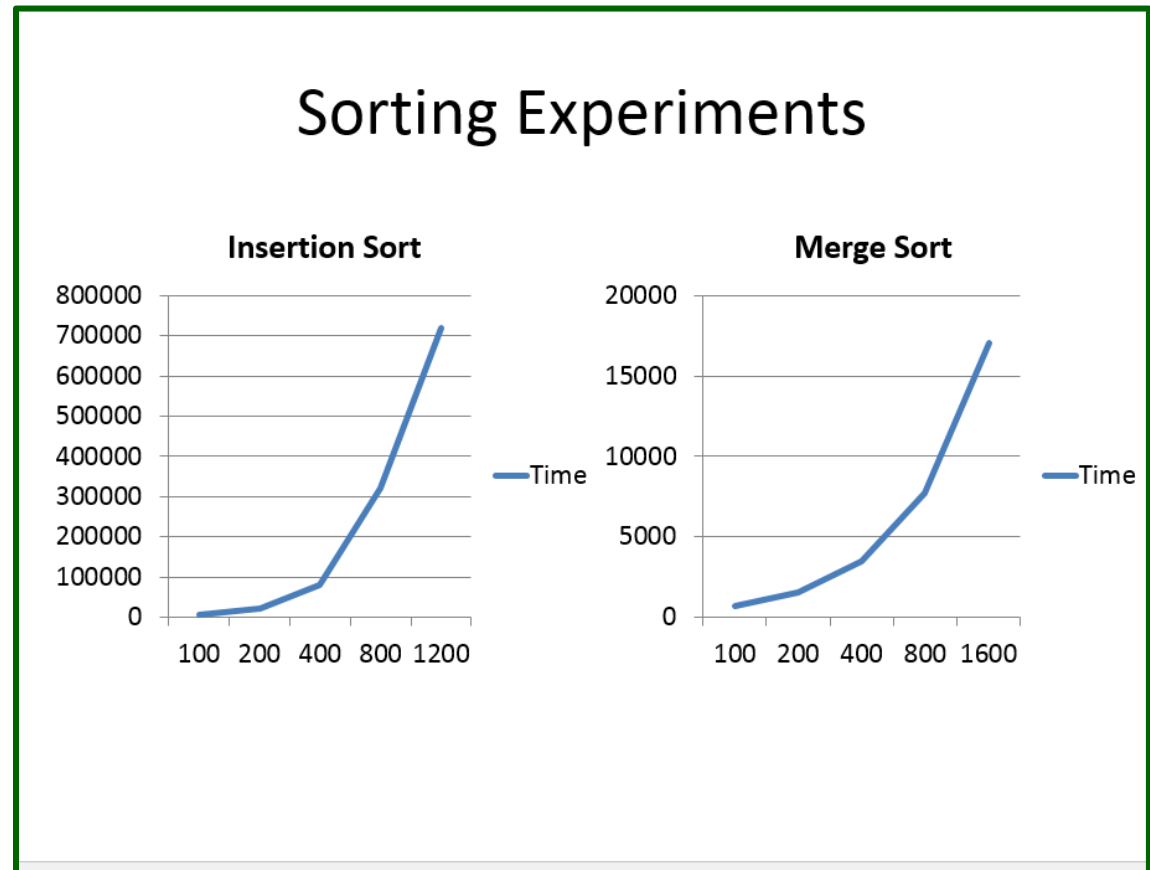


Don't do this

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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

# Part 2: Flow of Ideas

---

A flow that works for almost any talk:

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

## Goal:

Define problem:

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

# Part 2: Flow of Ideas

---

A flow that works for almost any talk:

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

## 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

---

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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

---

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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:

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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

# Part 2: Flow of Ideas

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A flow that works for almost any talk:

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- **Conclusions** ←
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## Conclusions:

Summarize key points

Restate main results

Describe implications

# Part 2: Flow of Ideas

A flow that works for almost any talk:

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- 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 😊

# Part 2: Flow of Ideas

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A flow that works for almost any talk:

- Motivation
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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

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Alternatives:

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

Example: Results first followed by how you got there.

$$E=mc^2$$

# Plan for this Information Session

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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 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

---

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

## 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

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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

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# Thank You!