



Research Methods in Science in Engineering  
Presentations

Slide 1

1

## Outline

- Focus of Attention
- 100 MPH Slides
- Layout
- Use of a Laser Pointer
- Rehearsing Your Presentation
- General Advice

Slide 2

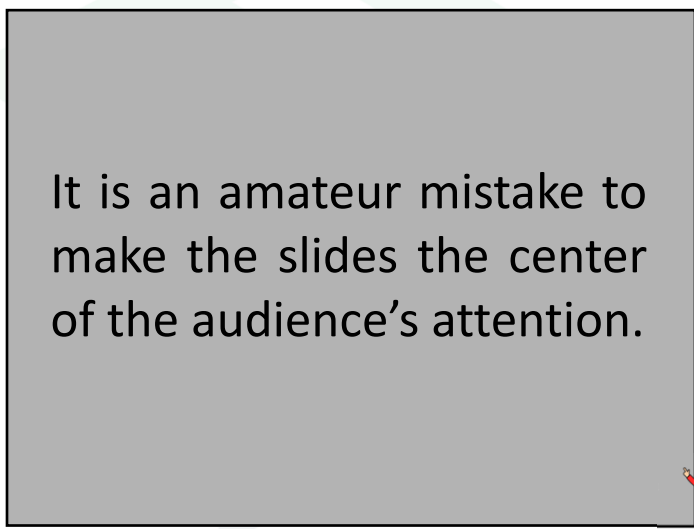
2



# Focus of Attention

3

You Should be the Main Focus of Attention (1 of 2)



It is an amateur mistake to make the slides the center of the audience's attention.

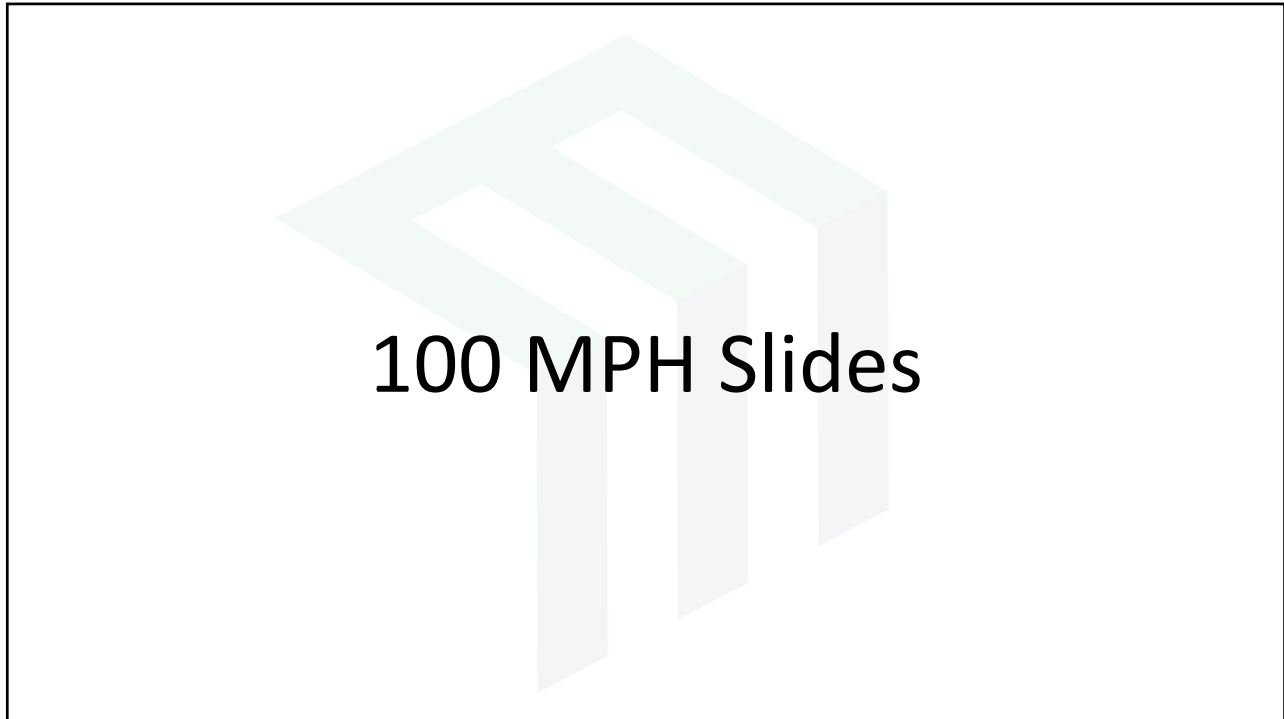
4

## You Should be the Main Focus of Attention (2 of 2)

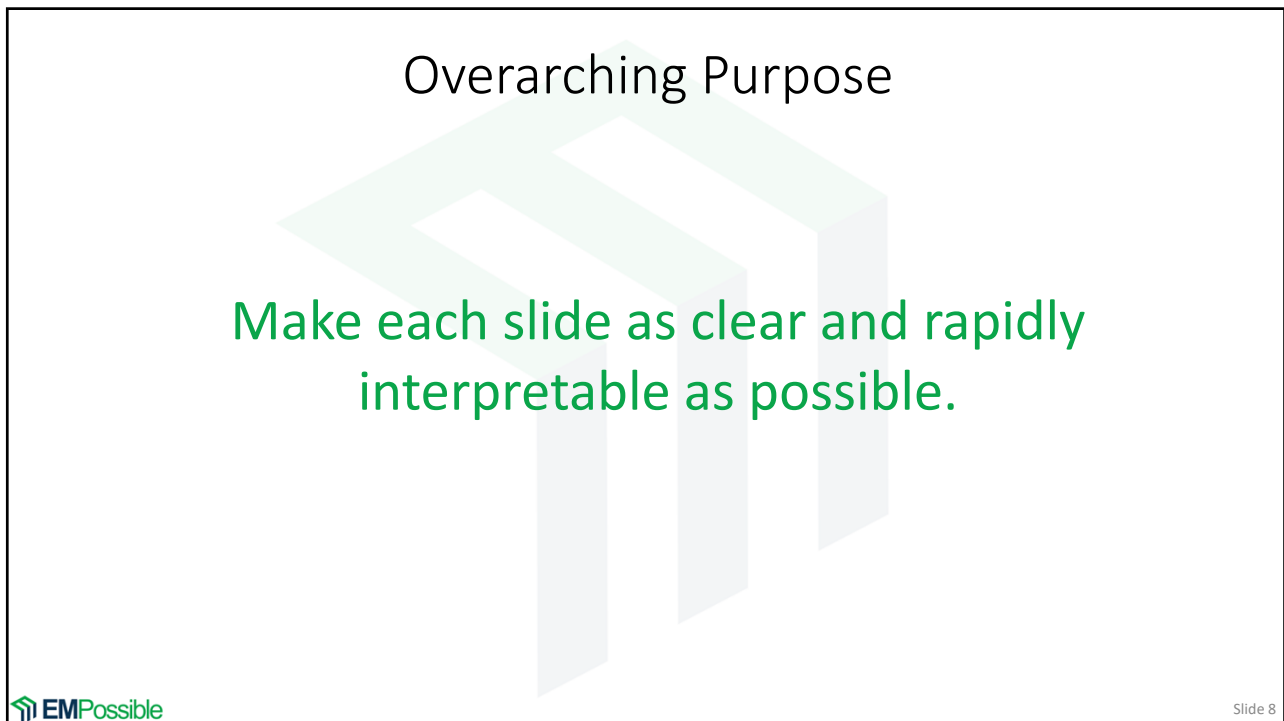


## Why Should You Be the Focus?

- People will remember you
  - Good for career and job interviews
- A live person will hold another person's attention better than a picture or slide.



7



8

# The 100 MPH Slide



Pretend a person is driving very fast along a highway and your slide is on a billboard.

How would you design your slide so that it quickly conveys all of the information you want it to convey to that person?

That person does not have long to view the billboard and the billboard is not even their center of attention.

# Minimize or Eliminate Any Use of Text

Why use any text at all? Are you not supposed to be speaking the information instead of the audience having to read it for themselves?

If the audience is reading text, they are paying less attention to you. When the audience pays less attention to you, they may miss information that causes confusion throughout your entire presentation.

Bad Slide for a Presentation

The Yee Grid Scheme is Used in the Finite-Difference Time-Domain (FDTD) Method

**Description:** The Yee grid scheme was developed by Kane Yee around 1966. The scheme staggers the field components throughout the grid so that all electric field components are encircled by magnetic field components, and all magnetic field components are encircled by electric field components.

see Kane "Numerical solution of initial boundary value problems involving Maxwell's equations in isotropic media" IEEE Transactions on Antennas and Propagation Vol. AP-14, pp. 302-313

<p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• The Yee grid scheme makes the finite-difference approximations very compact and simple.</li> <li>• The divergence equations are implicitly satisfied so method only has to solve the curl equations.</li> <li>• Physical boundary conditions are naturally satisfied so no special treatment is necessary.</li> <li>• The Yee grid leads to an algorithm that is unconditionally stable.</li> </ul>	<p><b>Drawbacks:</b></p> <ul style="list-style-type: none"> <li>• The Yee grid places the field components at physical different positions on the grid.</li> <li>• Even though field components are part of same vector, they are out of phase and potentially reside inside of different materials.</li> <li>• The Yee grid scheme can be confusing and creates potential for making mistakes.</li> </ul>
--	--

Better Slide for a Presentation

Yee Grid Scheme

- Compact finite-differences
- Divergence free
- Boundary conditions satisfied
- Unconditionally stable

## Keep the Slides Simple

Perhaps we get emotionally attached to information that is actually not that important to the presentation.

Put your emotion aside and only present what is important for the audience.

11

## Oh, yeah!?!?! Then Explain These EMPossible Slides!

If the slides for this course were meant to only be presented, they would look a lot different than they do.

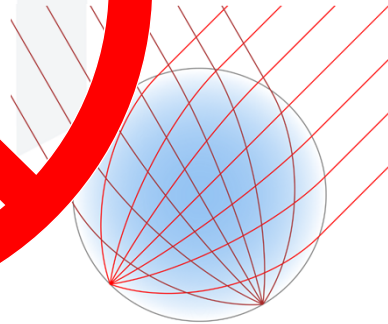
These slides serve a different purpose. They are intended to be notes for a course and should be sufficient by themselves to be completely understandable.

## Understand Your Audience

12

## The Luneburg Lens

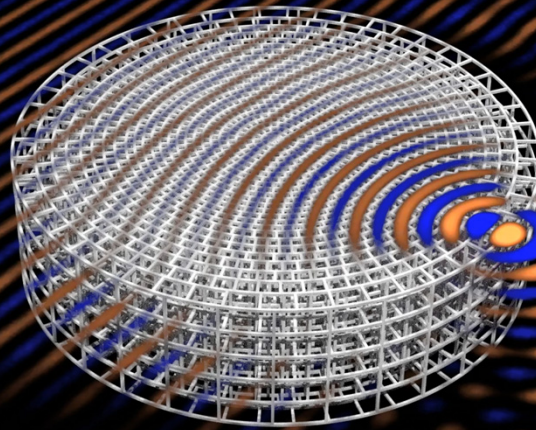
- The Luneburg lens is a spherically symmetric gradient-index lens where the refractive index decreases radially from the center to the outer surface.
- Relative permittivity profile:  $\epsilon_r(r) = 2 - (r/R)^2$
- Luneburg lenses have been made for radio frequencies up to optical frequencies.
- Applications include radar reflectors, microwave antennas, energy collection, and more.



13

## The Luneburg Lens

$$\epsilon_r(r) = 2 - \left(\frac{r}{R}\right)^2$$



14

First, you will look here


then here

then here

15


### Eyes are Drawn to Contrast

Avoid contrast where you do not want attention.



Eyes are drawn here first.

This wastes time and distracts the audience.

 EM Possible

Slide 16

16

## Eyes are Drawn to Contrast

A quick and easy fix is to blur the edges of the picture to suppress the contrast.

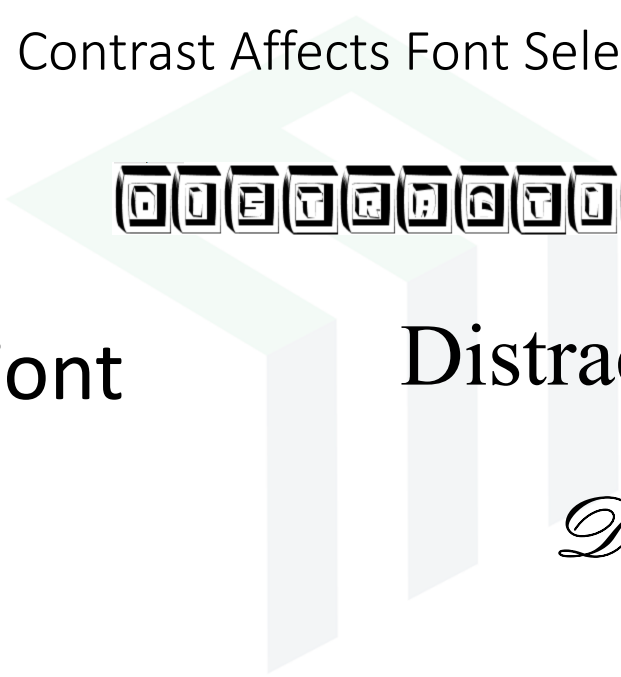


## Eyes are Drawn to Contrast

Even better, delete the background and all unnecessary features in the picture.



Contrast Affects Font Selection




Q Q E T R A G T O N G F O N T

Easy Font


Distracting Font

*Distracting Font*

 Slide 19

19

Read the text at the lower-right of the screen.

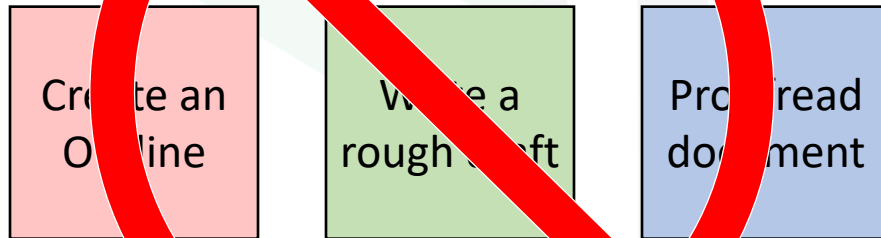


Why are you looking here?

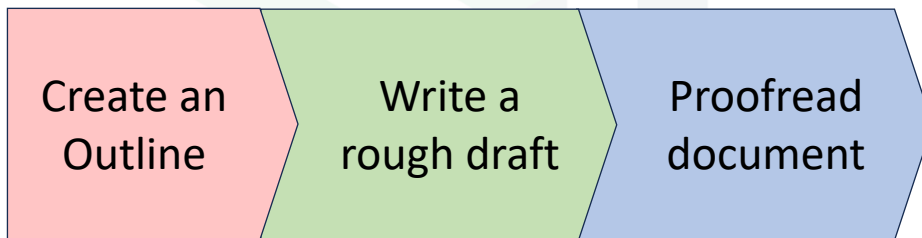
You were asked to look here.

20

# When Your Slide Summarizes a Flow, Create the Graphics to Imply the Flow (1 of 2)



# When Your Slide Summarizes a Flow, Create to Graphics to Imply the Flow (2 of 2)



# Layout & Composition

23

Consider Simple Slides with a Single Picture



24

## Rule of Thirds

**PowerPoints**

The powerpoints attract the eye before any other place on the slide. These are ideal locations to place important elements.

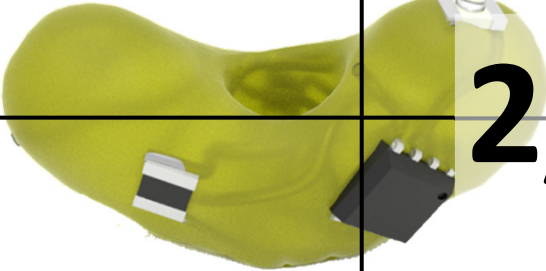
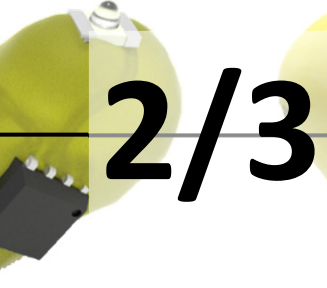
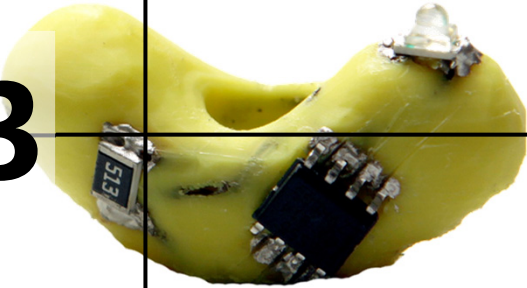
EMPossible Slide 25

25

# RULE OF THIRDS

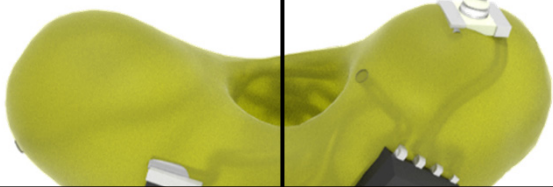



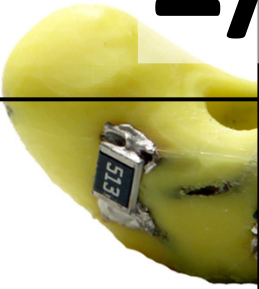
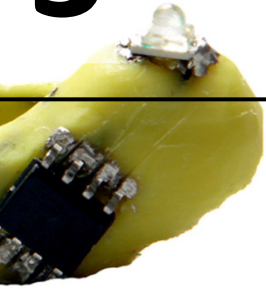
Did you ever notice that all high-level professional photographs never place the subject in the center?

26

<p>3D Volumetric Circuits</p>	<p>1/3</p>	<p>Dramatic reduction in size, weight, and power.</p>
		

Slide 27

27

<p>3D Volumetric Circuits</p>		
<p>1/3</p>		
<p>Dramatic reduction in size, weight, and power.</p>		

Slide 28

28

## Use of a Laser Pointer

29

## A Presentation is NOT Fruit Ninja!



Do not swing your laser pointer all over the slides.

Keep that dot still!

Most people are better off not using a laser pointer at all.

30

## Shakiness Exaggerated from the Side

$$\delta \approx \frac{\Delta\theta}{\theta} w$$

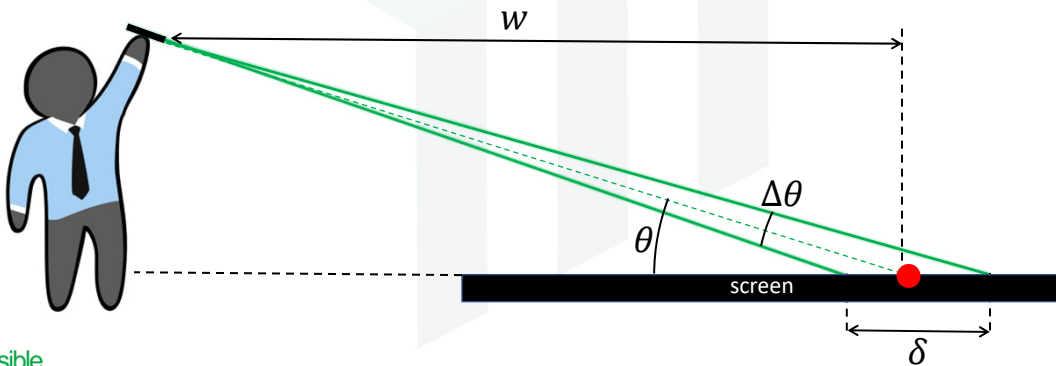
$\Delta\theta \equiv$  shakiness

$w \equiv$  distance from screen

$\theta \equiv$  angle of laser beam

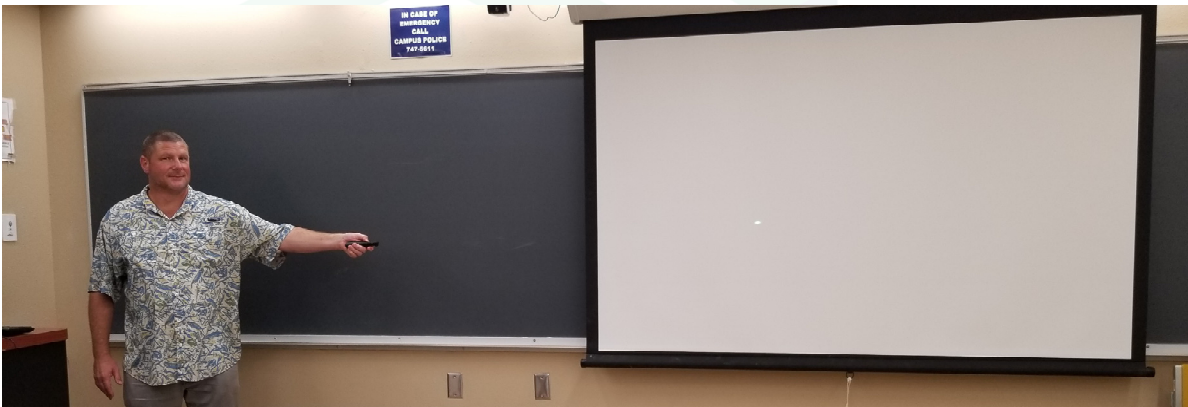
Example:  $w = 10 \text{ ft}$ ,  $\theta = 15^\circ$  and  $\Delta\theta = 2^\circ$

$$\delta \approx \frac{2^\circ}{15^\circ}(10 \text{ ft}) = 16 \text{ in}$$



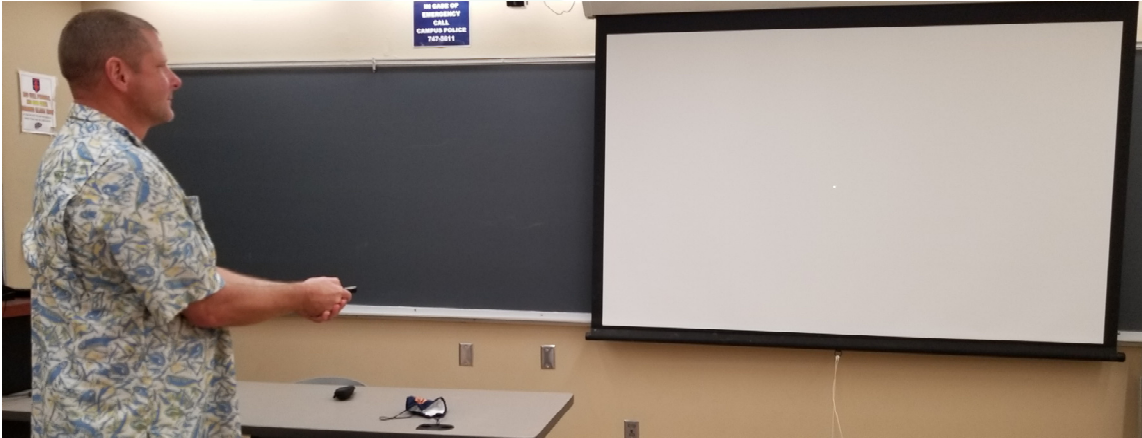
31

## Do Not Use Laser Pointer From the Side (Too Shaky)



32

## Use Laser Pointer From the Front



33

## If Nervous and Shaky, Hold Laser Pointer with Two Hands with Elbows Against the Body



34

## Best Practices for Using a Laser Pointer

- Use of a laser pointer should be rare.
- Use should be restricted to identifying key aspects of a busy slide.
- Keep the laser dot very still.
- If connecting two things, use a slow and methodical motion between the objects.
- Hold the laser pointer with two hands and point from as straight in front of slides as possible.

## Rehearsing Your Presentation

## Rehearse At Least Once

It is critical to do a dress rehearsal of your presentation at least once.

- Identify any problems with your slides, animations, transitions, timings, etc.
- Identify any issues with your own wording or descriptions.
- Practice coordinating your words with the slides.

## Over Rehearsing?

Some people say they don't like to practice because it will make them sound less natural and too robotic when presenting.

**Be careful you do not have this attitude out of laziness and using it as an excuse to avoid rehearsing your presentation.**

## Best Practices for Rehearsing

- Consider making notes about what to say before practicing.
- Make your rehearsal as similar to real presentation as possible.
  - Practice with computer in presentation mode.
  - Stand while practicing.
  - Speak aloud.
  - Use a presentation remote and laser pointer.
  - Consider rehearsing in front of people (your team, peers, etc.) and getting feedback.
- Time your presentation to ensure you do not go over your time limit.
- Consider recording your presentation and reviewing it.
- The more limited time you have to present, the more you should rehearse. Practice until your words are effortless.

## General Advice for Presentations

## Give Your Presentation Structure

- Outline what you are going to say.
  - *“Today I am going to talk about three things. They are...”*
- Say it.
- Summarize what you said.
  - *“Today I talked about three things. They were...”*

41

## Have a Prop

- Why just give a presentation?
- Hold something real to the audience.
- Show them something.
- Let them touch and see something.

42

## Ways to Start Your Presentation

- Thank the organizers and the audience (and others?)
  - Be specific and use names of key people when possible
- Start with a positive statement
  - “Today I will show you a really cool breakthrough that is going to enable...”
- Refer to a current event or perhaps a historical event.
- Make a shocking statement
  - “Within three years, everybody in this room is going to...”
  - “Did you know that 50% of engineers graduated in the bottom half of their class?”
- Start with something funny (be careful to stay professional)
- Ask the audience an engaging question.

## Dealing with Nervousness (Before You Present)

- Have great slides and be prepared.
- Practice your presentation
- Expect having stress and anxiety right before you talk.
- Get familiar with the room and location where you will talk. Walk around the room.
- Get a good night's sleep.
- Do your normal routine, eat normal meals, normal amount exercise, etc.
- Roll your head and make funny faces
- Arrive early to get situated.
- Avoid negative thoughts. Think positive!
- If possible, talk to a few key people in the audience before you present. Get to know them.

## Dealing with Nervousness (While Presenting)

- Have water available for dry mouth
  - If no water, bite your tongue or think about lemons
- Slow down your speech (#1 mistake)
  - Minimize caffeine
  - Take a few deep breaths
  - 100 to 150 words per minute
- Speak one-to-one
- Act as if your presentation is already the best.
- Adjust your attitude to be a giver. Present as a service to the audience, not to get the rewards at the end.
- See the audience, don't blindly scan them. Pick 5 or so people around the room to focus most of your eye contact.

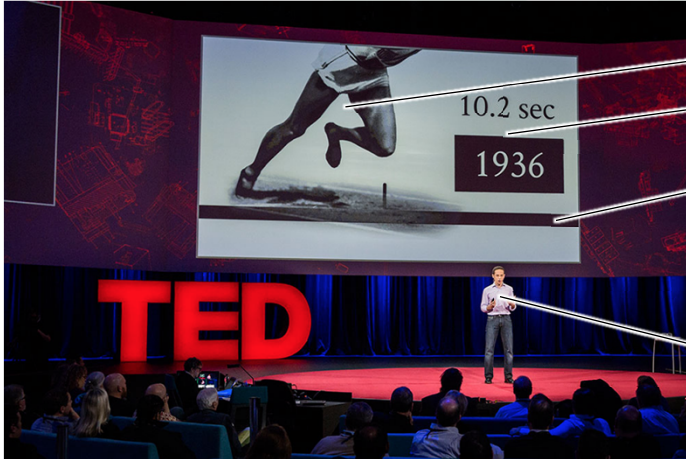
## Be Prepared to Abbreviate Your Presentation Without Notice

Very often when multiple presentations are happening in sequence, they run late.

If you are one of the last to present, you may have no choice but to radically shorten the length of your presentation with only a few minutes notice.

Always be prepared to do this!

# Where to Find Good Examples



Simple and large graphic

Minimized use of text

Elegant layout (notice rule of thirds)

Presenter is the focus of the presentation.