Giving an effective presentation: Using Powerpoint and structuring a scientific talk

based on a presentation at the 2005 Pew Foundation meeting by

Susan McConnell
Department of Biological Sciences
Stanford University
We may not be experts at public speaking, but we are all experts at listening to talks.
What do you want from a talk?
Before planning your talk think about its purpose, the audience you will be talking to, and the setting.

Don’t assume the audience will all be experts.

Never underestimate your audience!

Check on the time that has been allotted to you.

How big is the room?
What do you think of the following slide?
Emk1 knockdown inhibits lumen formation in MDCK cells:

- RT-PCR: EMK1 is effectively knocked down in MDCK cells 24 hours after transfection with P-SUPER (control) or P-SUPER-siEMK1 plasmid; knockdown confirmed on the right with antibodies to EMK1.

- Collagen overlay assay: cells cultured 24 h on collagen I before being overlaid with additional collagen on the apical surface, analyzed 24 h later. Note the lack of lumen in EMK1-KO cultures.

- Ca switch: control or EMK1-KO cells were plated in low Ca medium 24 h upon transfection with pSUPER or pSUPER-KO. After 12 h, cultures were switched to normal medium for 24 h. Transmission EM of cells sectioned perpendicular to the substratum shows lack of microvilli in EMK1-KO cells.
Of course, it is far too confusing and a clear take-home message does not come across!

This presentation will take you through a strategy for presenting the data in a clear and logical way.
Powerpoint basics:  
1. What font to use

Use a Sans Serif font:

This font is Arial.  
This font is Comic Sans.  
This font is Papyrus.

Serif fonts take longer to read…

This font is Times New Roman.  
This font is Courier.  
This font is Didot.
Powerpoint basics:
1. What font to use

Some fonts look really good in boldface:

Arial vs. Arial bold

Comic Sans vs. Comic Sans bold

Papyrus vs. Papryus bold
Powerpoint basics:
1. What font to use

Type size should be 18 points or larger:

18 point
20 point
24 point
28 point
36 point

* References can be in 14 point font
Powerpoint basics:
1. What font to use

AVOID USING ALL CAPITAL LETTERS BECAUSE IT’S REALLY HARD TO READ!
Powerpoint basics:
2. Color

Dark letters against a light background work.
Powerpoint basics:
2. Color

Light letters against a dark background also work.
Many experts feel that a dark blue or black background works best for talks in a large room.
Powerpoint basics:  
2. Color

Dark letters against a light background are best for smaller rooms and for teaching.
Avoid red-green combinations because a significant fraction of the human population is red-green colorblind.
Avoid red-green combinations because a large fraction of the human population is red-green colorblind.

Lots of people can’t read this – and even if they could, it makes your eyes hurt.
Powerpoint basics:
2. Color

Other color combinations can be equally bad:
Powerpoint basics:
2. Color

View your slides in grayscale to ensure that there is adequate color contrast in each slide.

Other color combinations can be equally bad!
Powerpoint basics:
3. Layout

Keep the layout and style as consistent as possible

Every slide should have a heading.

Sentences are preferred if it’s possible to make a statement.
Powerpoint basics:

3. Layout

Limit text blocks to no more than two lines each.
The reason for limiting text blocks to two lines is that when the text block goes on and on forever, people in the audience are going to have to make a huge effort to read the text, which will preclude them from paying attention to what you are saying. Every time you lose their focus, your presentation suffers!
Powerpoint basics:
3. Layout

Lists should contain no more than 3 items:

• Item 1
• Item 2
• Item 3
Powerpoint basics:
3. Layout

It is often effective to “unveil” your list one by one:

You can do this using the “Slide show” - “animations” - “custom” - option

• Point 1
• Point 2
• Point 3
Powerpoint basics:
3. Layout

Avoid sublists!

- Item 1
  - Item 1a
  - Item 1b
  - Item 1c
- Item 2
  - Item 2a
  - Item 2b
- Item 3
Powerpoint basics:  
3. Layout

Be generous with empty space.
3. Layout

If you try to cram too much into a slide, and place things too close to the sides, they can get cut off if you’re using a poor projector. In any case, the slide looks all cluttered and junky.
Try your best to include a simple image on every slide.
Powerpoint basics:
4. Style

Limit the number of items on each slide.

Each slide should make just one or two points!
Powerpoint basics:
4. Style

Arrrgh!
Powerpoint basics:
4. Style

Don’t try to show too many slides.

Often, less is more.
It’s very easy to use PowerPoint really badly
Emk1 knockdown inhibits lumen formation in MDCK cells:

- RT-PCR: EMK1 is effectively knocked down in MDCK cells 24 hours after transfection with P-SUPER (control) or P-SUPER-siEMK1 plasmid; knockdown confirmed on the right with antibodies to EMK1.

- Collagen overlay assay: cells cultured 24 h on collagen I before being overlaid with additional collagen on the apical surface, analyzed 24 h later. Note the lack of lumen in EMK1-KO cultures.

- Ca switch: control or EMK1-KO cells were plated in low Ca medium 24 h upon transfection with pSUPER or pSUPER-KO. After 12 h, cultures were switched to normal medium for 24 h. Transmission EM of cells sectioned perpendicular to the substratum shows lack of microvilli in EMK1-KO cells.
It takes some work and forethought to use Powerpoint well
It takes some work and forethought to use PowerPoint well.

Let’s break down the previous slide into its minimum essential components.
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods
MDCK cells form a lumen following a change in extracellular $[Ca^{++}]$
MDCK cells form a lumen following a change in extracellular $[Ca^{++}]$.

MDCK cells

Surface view from lumen

Side view of lumen

gp135  β-catenin  ZO-1
Lumen formation is blocked in EMK1 knockdown cells
EMK1 knockdown cells also fail to form microvilli

MDCK cells
EMK1 knockdown cells also fail to form microvilli

MDCK cells

EMK1 knockdown
The structure of a good talk: start broad, get specific, and end broad
The structure of a good talk: start broad, get specific, and end broad
The structure of a good talk: start broad, get specific, and end broad

Start with the biggest questions and get progressively more specific
A powerful tool in a talk is a “home slide”

Design and introduce a “home slide” that you’ll come back to at each major transition in your talk.
A powerful tool in a talk is a “home slide”

Now we’ll build an introduction and a home slide that puts the previous data into context.
Our bodies are full of tubes
Our bodies are full of tubes

Intestine:

digestive enzymes
How do cells become polarized and form a lumen?

Intestine:

digestive enzymes
MDCK cells are a model system for a polarized cell type (from the kidney)
MDCK cells are highly polarized
MDCK cells are highly polarized

apical proteins
MDCK cells are highly polarized

apical proteins  centrosome
MDCK cells are highly polarized
MDCK cells are highly polarized

- apical proteins
- centrosome
- tight junctions
- microtubules
MDCK cells are highly polarized

- apical proteins
- centrosome
- tight junctions
- microtubules
- extracellular matrix
MDCK cells lose their polarity in low $[\text{Ca}^{++}]$
MDCK cells regain their polarity in normal [Ca$$^{++}$$] and reform a lumen.
MDCK cells regain their polarity in normal \([\text{Ca}^{++}]\) and reform a lumen.
Questions addressed today:
Questions addressed today:

- What molecular mechanisms regulate cell polarization?
Questions addressed today:

- What molecular mechanisms regulate cell polarization?
- What molecular mechanisms regulate lumen formation?
Questions addressed today:

• What molecular mechanisms regulate cell polarization?
• What molecular mechanisms regulate lumen formation?
• How do different tissues form different types of tubes?
The structure of a good talk: start broad, get specific, and end broad

The middle is the meat of the talk...
...but talks are delivered to audiences with limited attention spans

Audience attention curve
The structure of a good talk: start broad, get specific, and end broad

The middle is also the time at which the audience tends to zone out
The structure of a good talk: start broad, get specific, and end broad

After going into depth, come back to your home slide to make transitions
The structure of a good talk: start broad, get specific, and end broad

After going into depth, come back to your home slide to make transitions
The structure of a good talk: start broad, get specific, and end broad

Let’s review “episode 1” (which we’ve already designed) and add a home slide
Questions addressed today:

- What molecular mechanisms regulate cell polarization?
- What molecular mechanisms regulate lumen formation?
- How do different tissues form different types of tubes?
EMK1 (also known as Par1) is a serine-threonine kinase that is essential for cell polarity.

EMK1 localizes to tight junctions.
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods.
Lumen formation is blocked in EMK1 knockdown cells

MDCK cells

EMK1 knockdown

gp135  β-catenin  ZO-1
EMK1 knockdown cells also fail to form microvilli
EMK1 is required for cell polarization

Normal MDCK cells:

low [Ca$^{++}$] → normal [Ca$^{++}$]
EMK1 is required for cell polarization

EMK1 knockdown cells:

low $[\text{Ca}^{++}]$  normal $[\text{Ca}^{++}]$
Use your home slide repeatedly to build a theme over time and enable the audience to catch up.
Over the course of the talk, you can progressively build a fairly complex model.
EMK1 regulates microtubules and cell polarity in two steps
The structure of a good talk: start broad, get specific, and end broad

Focus now on conclusions
Audience attention increases as you signal the end of the talk - so avoid false endings!

**Audience attention curve**

- Percentage of class paying full attention
- Time (min)

![Graph showing audience attention curve](image)
The structure of a good talk: start broad, get specific, and end broad

End with the most specific conclusions then build back out to the “big picture”
EMK1 regulates microtubules and cell polarity in two steps

1. Columnar polarity
2. Hepatic polarity

MDCK
WIFB9

low Ca
normal Ca

spontaneous

?
EMK1 can regulate the type of lumen formed by epithelial cells

Intestine: digestive enzymes

Liver: bile
This enables the body to make many different types of tubes in different organs.

Intestine:

Liver:

digestive enzymes

bile
Organizing a great talk

- Be smart about Powerpoint
Organizing a great talk

- Be smart about Powerpoint
- Your introduction should start broad then get specific
Organizing a great talk

• Be smart about Powerpoint

• Your introduction should start broad then get specific

• Think of your talk as consisting of episodes
Organizing a great talk

- Be smart about Powerpoint
- Your introduction should start broad then get specific
- Think of your talk as consisting of episodes
- Use a home slide to make transitions effectively
Organizing a great talk

• Be smart about Powerpoint

• Your introduction should start broad then get specific

• Think of your talk as consisting of episodes

• Use a home slide to make transitions effectively

• Your conclusion should start specific but end broadly
There is more to giving a good talk than showing good slides

Do face the audience and make eye contact
Do be enthusiastic and vary the tone of your voice,

Don’t pace up and down but also don’t stand rigid!
Don’t wave your pointer all over the slide
Don’t take lots of drinks- it is distracting and unprofessional
There is more to giving a good talk than showing good slides.

Do practice beforehand, preferably using a video camera and timer.

Do ask your friends (and family) for feedback.

Don’t use too many gimmicks.
Here are some of the things many listeners want from a talk:

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CLARITY AND ORGANIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveys new information</td>
<td>Understandable</td>
</tr>
<tr>
<td>Poses an interesting question</td>
<td>Avoids jargon</td>
</tr>
<tr>
<td>Conveys how people in other</td>
<td>Uses clear and simple visual aids</td>
</tr>
<tr>
<td>fields think</td>
<td>Well organized</td>
</tr>
<tr>
<td>Describes important ideas</td>
<td>Enables me to catch up if I space out</td>
</tr>
<tr>
<td>Novel discovery</td>
<td>Doesn’t run over time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STYLE AND DELIVERY</th>
<th>EXPERTISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keeps me awake</td>
<td>Credible</td>
</tr>
<tr>
<td>Varies voice</td>
<td>Inspires trust and confidence</td>
</tr>
<tr>
<td>Conveys enthusiasm</td>
<td>Answers questions clearly</td>
</tr>
<tr>
<td>Doesn’t stay in one place</td>
<td></td>
</tr>
<tr>
<td>Friendly and approachable</td>
<td></td>
</tr>
</tbody>
</table>
A great resource is

**The Craft of Scientific Presentations**

by Michael Alley