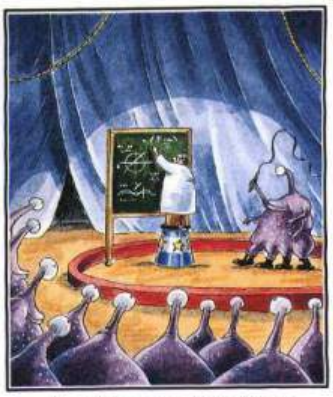
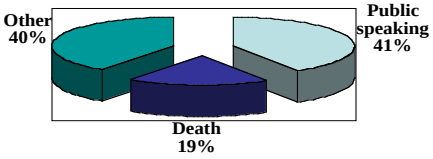
Giving technical presentations:
Do's, Don'ts, and Why Nots?



Abducted by an alien circus company, Professor Doyle is forced to write calculus equations in center ring.

Neal Lerner, Northeastern Writing Program
n.lerner@neu.edu; 617-373-2451

First thing to do to prepare an oral presentation is to overcome fear



On October 7, 1973, the *Sunday Times* in London published a survey asking 3,000 Americans: "What is your greatest fear?" The result: 41% of respondents answered "speaking in public."

An oral presentation to evaluate

http://www.youtube.com/watch?v=tyzKrQv9zFI&feature=related

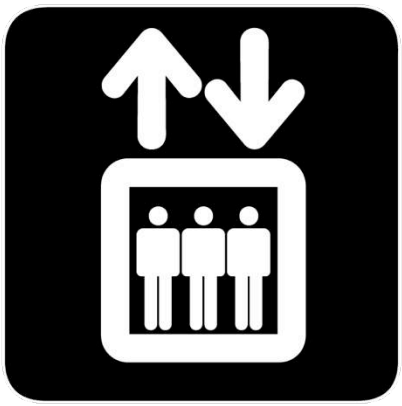
Five Canons of Classical Rhetoric or the art of persuasive speech

1. *Invention*: Generating content and honing your message
2. *Arrangement*: Organizing the material
3. *Style*: Using "proper words in proper places" (J. Swift).
4. *Memory*: Speaking without notes.
5. *Delivery*: Controlling voice, gesture, expression--and graphics!

Invention: What's your essential message?

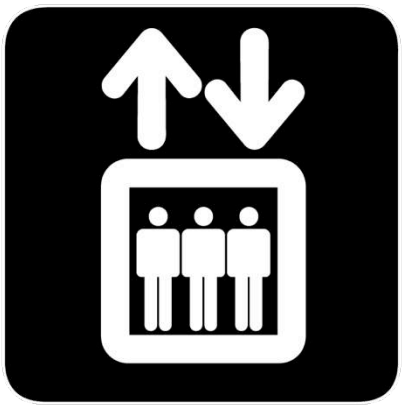
Prepare an **elevator speech** or a concise summary of your project in spoken language.

Practice your elevator speech.



Invention: What's your essential message?

Exercise: Give a two-minute version of your research to as many people in the room as possible.



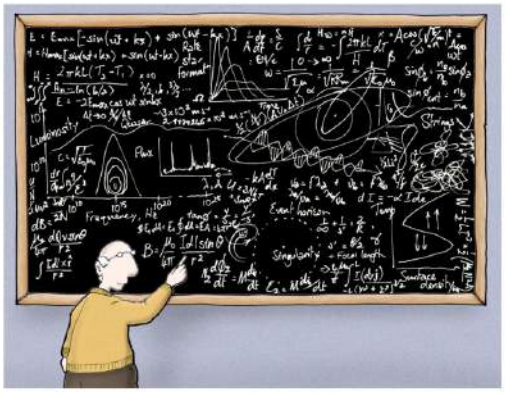
Arrangement: Control the story that you want to tell about your content (in three parts).

1. **Develop a general goal.**
   - Inform? Persuade? Brainstorm?
2. **Develop a precise objective.**
   - e.g., After my presentation, the listeners will be able to identify my three major conclusions and their implications.
3. **Consider the questions your presentation will answer for your audience.**

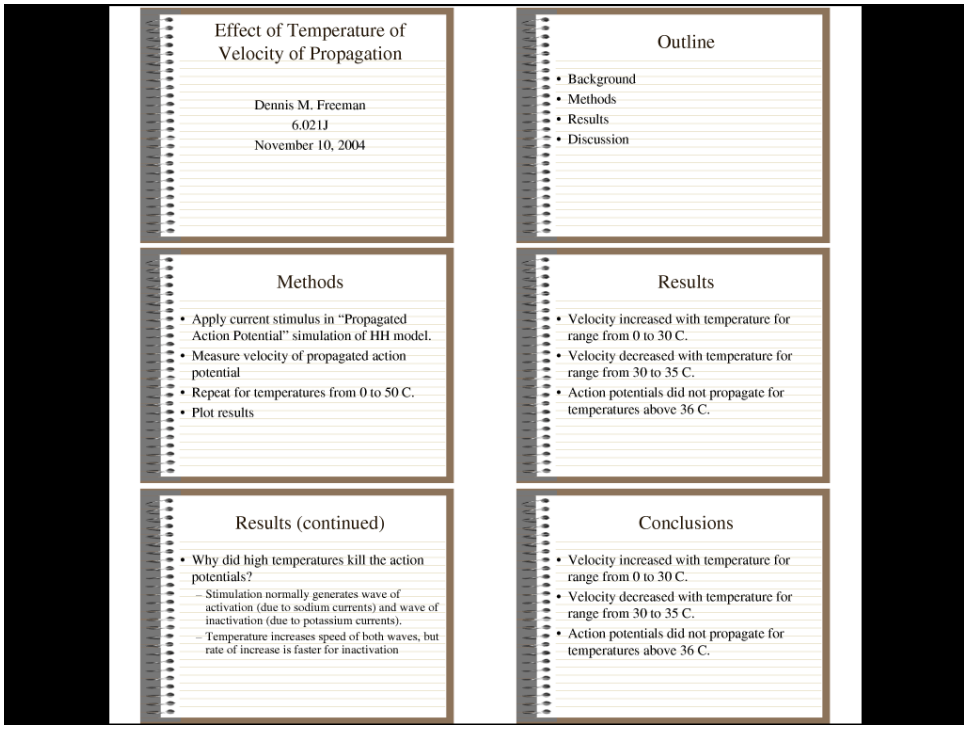
Arrangement Step 1: Organize your data & assemble a storyboard

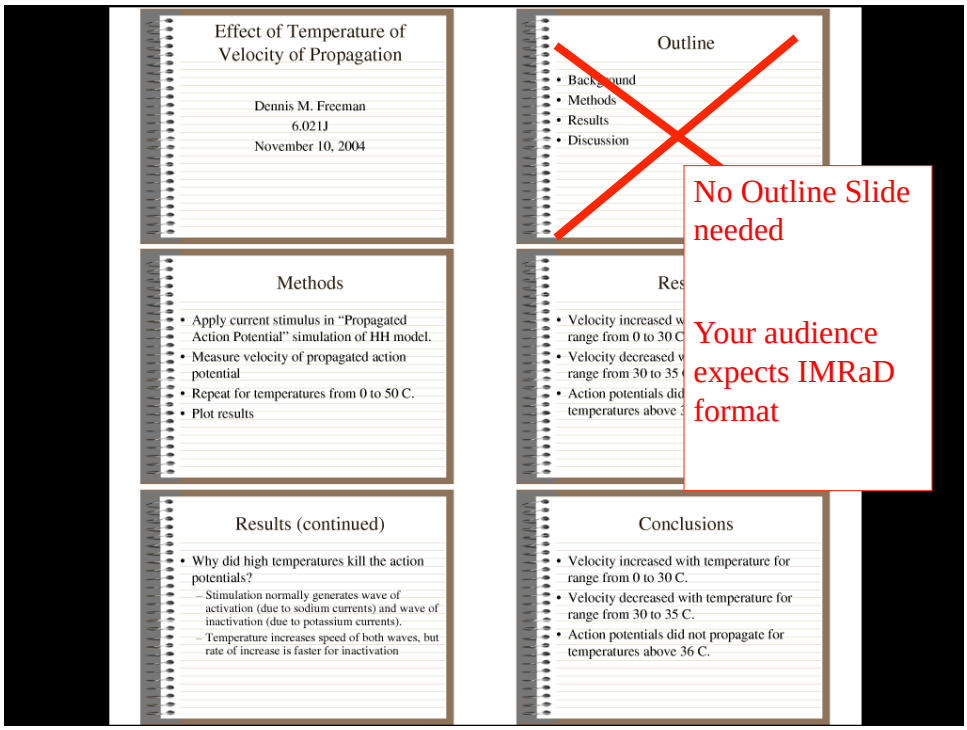
Start with figures:

- Assemble hard copies of your figures in a "storyboard."
- Figure out the major technical theme of your presentation.
- Assess how each figure contributes to the major theme.
- REVISE figures to focus on the major theme (develop figures that summarize that major theme).



http://www.nearingzero.net/index2.html


Effect of Temperature of Velocity of Propagation
Dennis M. Freeman
6.021J
November 10, 2004
Outline
• Background
• Methods
• Results
• Discussion
Methods
• Apply current stimulus in "Propagated Action Potential" simulation of HH model.
• Measure velocity of propagated action potential
• Repeat for temperatures from 0 to 50 C.
• Plot results
Results
• Velocity increased with temperature for range from 0 to 30 C.
• Velocity decreased with temperature for range from 30 to 35 C.
• Action potentials did not propagate for temperatures above 36 C.
Results (continued)
• Why did high temperatures kill the action potentials?
– Stimulation normally generates wave of activation (due to sodium currents) and wave of inactivation (due to potassium currents).
– Temperature increases speed of both waves, but rate of increase is faster for inactivation
Conclusions
• Velocity increased with temperature for range from 0 to 30 C.
• Velocity decreased with temperature for range from 30 to 35 C.
• Action potentials did not propagate for temperatures above 36 C.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Conclusions
• Velocity increased with temperature for range from 0 to 30 C.
• Velocity decreased with temperature for range from 30 to 35 C.
• Action potentials did not propagate for temperatures above 36 C.
No Outline Slide needed
Your audience expects IMRaD format

T+IMRaD = Talk Structure

- ***Title*** establishes the focus
- ***Introduction*** provides general field or context.
- ***Methods*** follows a particularized path.
- ***Results*** describe specific findings.
- ***Discussion*** moves from specific findings to wider implications.

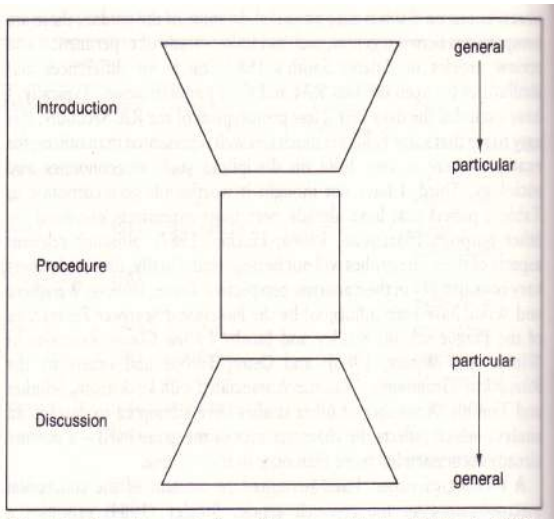


Figure 7 Overall organization of the research paper (Hill et al., 1982).

Titles are mini-abstracts

- Informative
- Specific
- **Understandable at a glance**
- Your name and partner's name
- Date
- Institutional Affiliation

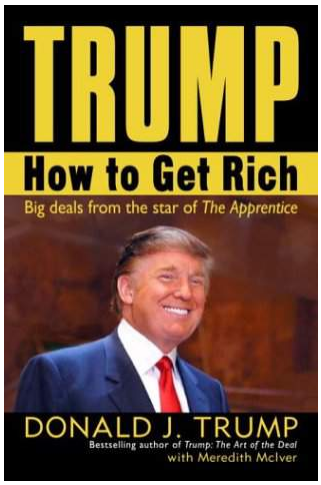
Thermal Blockage of Propagated Action Potentials in the Hodgkin-Huxley Model

Dennis M. Freeman and Aek Thitimon

6.021J: Quantitative Physiology
Massachusetts Institute of Technology
November 21, 2004

Titles are mini-abstracts

- Informative
- Specific
- **Understandable at a glance**
- Your name and partner's name
- Date
- Institutional Affiliation



Introduction provides context & purpose of research

- If you wish, you may have a background slide.

Purpose slide

- Explains the ***purpose of the project*** (aims?)
  - Relate to Results + Discussion points
- Show logic of ideas in words or text
- Meaningful graphic OK; bullet points OK

The "ideal" introduction follows . . .

Create **a** **R**esearch **S**pace

1. Re-establish significance of research field.

2. Situate actual research in these terms.

3. Show how this niche will be occupied and defended.

Swales (1990)

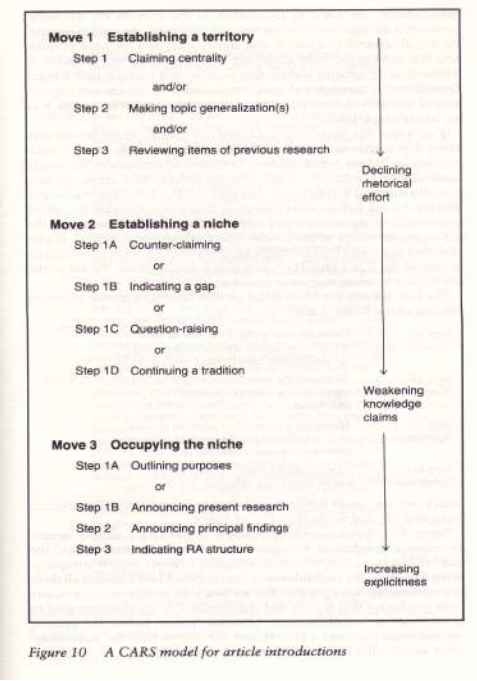


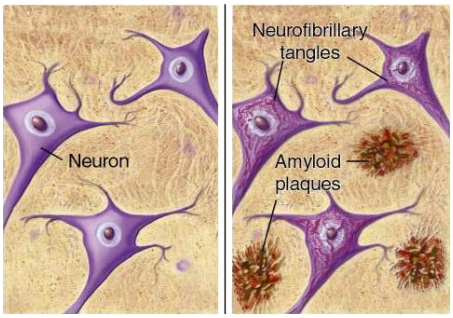
Figure 10 A CARS model for article introductions

- Sample Introductions:
  - 1 slide
  - 2 slide
  - Multi-slide

MGH/MIT/HMS Athinoula A. Martinos Center For Biomedical Imaging

Alzheimer's Disease Difficult to Detect in Early Stages

- Problem: Lack of inexpensive, effective imaging techniques for Amyloid-β (Alzheimer's cause)
- Alzheimer's normally diagnosed in latter stages, when symptoms are severe
- Overall Project Goal: to enable non-invasive, effective amyloid burden imaging techniques
- Summer Aim: to calibrate instrumentation and automate imaging system



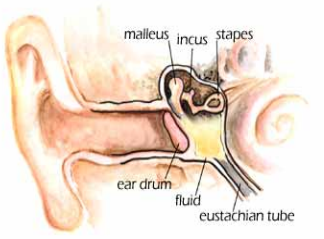
Figure[1] depicting both the accumulation of amyloid-β as plaques in neural tissue and neurofibrillary decay

Courtesy of F. Hammond

[1] - American Health Assistance Foundation

Otitis Media (OM)

- inflammation of the middle ear space, usually associated with fluid backup
- different types: acute, chronic, with effusion
  - different types of fluids: purulent, mucoid, serous

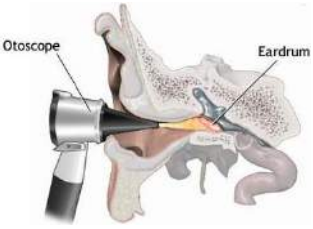


- 30 million physician visits and $5 billion spent on diagnosis/treatment annually

Courtesy of S. Hon

The Problem:

- current standard: otoscopy
- misdiagnosed up to 50% of the time
- leads to inappropriate prescription of antibiotics



http://www.uvm.edu/cmsi/luse/otoscope-examination.jpg

The Long-Term Goal:

- develop an optical device that enables accurate diagnosis of otitis media, leading to more effective treatment

Courtesy of S. Hon

BRIGHAM AND WOMEN'S HOSPITAL
Specializing in care for a lifetime

HARVARD MEDICAL SCHOOL
TEACHING AFFILIATE

Reversible Phosphorylation is an Important Regulatory Mechanism

Edwin Krebs

Edmond Fischer

Krebs, E. G. and Fischer, E. H. The phosphorylase b to a converting enzyme of rabbit skeletal muscle. *Biochim Biophys Acta*. 150-7 (1956).

Reversible phosphorylation can modulate a protein's:

- Enzymatic activity
- Interaction with other proteins
- Stability or its Destruction
- Subcellular Localization

Courtesy of R. Carey

BRIGHAM AND WOMEN'S HOSPITAL
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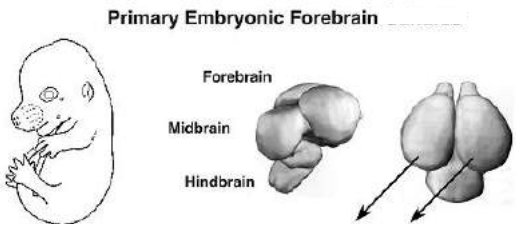
Global Tyrosine Phosphorylation Extraction

- Emerging technologies to identify phosphorylation sites for more than a single protein
- Technology used for first time in primary animal tissue,
- 239 phosphorylation sites extracted in one experiment



"Phosphoproteomic analysis of the Developing Mouse Brain", Bryan Ballif, ppt presentation

Courtesy of R. Carey

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TEACHING AFFILIATE

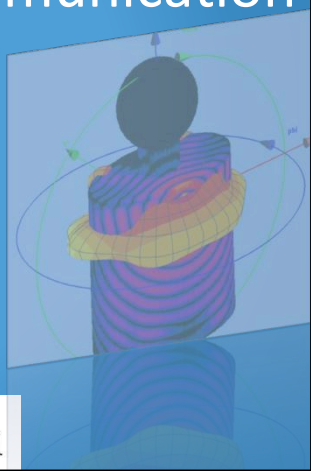
Project Goals

- Develop a method to calculate a conservation score for phosphorylated residues
- Automate method for high throughput analysis
- Find biologically meaningful correlations in the resulting conservation scores

Courtesy of R. Carey

Multi-path 2-Port Channel Characterization for Galvanic Coupled Intra-body Communication

Meenupriya Swaminathan
Joan Sebastia Pujol
Gunar Schirner
Kaushik R. Chowdhury

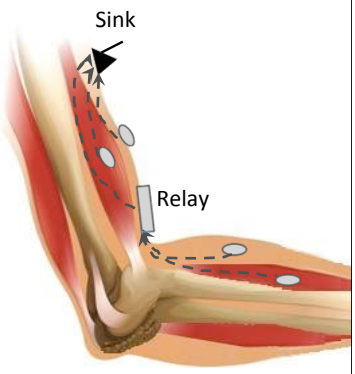


Courtesy of M. Swaminathan

Northeastern

Intra-body Network (IBN)

- IBN allows implanted sensor to actuator communication
- High frequency signals (Eg. RF signals)
  - Get absorbed by wet tissues
  - Requires high transmission power
  - Propagates through air and not secured

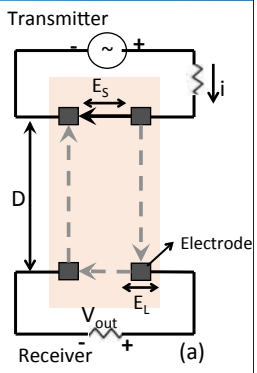


✓ Need low power consuming communication paradigm that is suitable for signal propagation through tissues.

Courtesy of M. Swaminathan

Galvanic Coupling (GC)

- A pair of electrodes directly couple weak electrical signals to tissue
- The difference in voltage propagates through tissue and is detected by a pair of receiver electrodes



Courtesy of M. Swaminathan

Methods describes FINAL APPROACH you took in your experiment.

The Methods Section is cool to you but often dull to the audience.

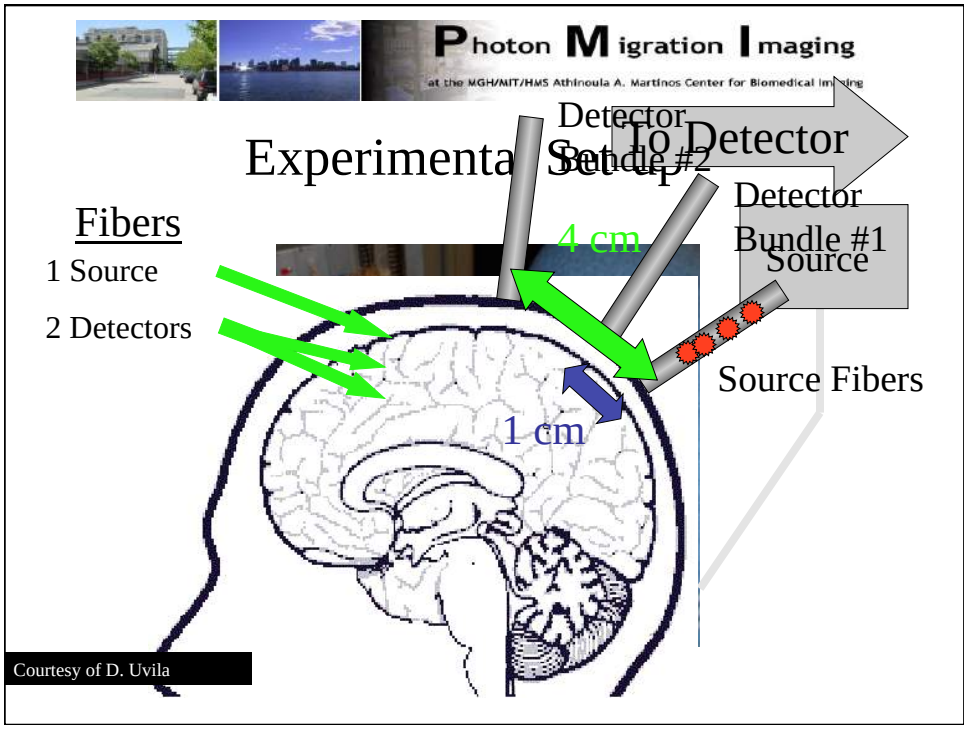
Methods = *How* data were accumulated.

Results = *What* data were accumulated.

- Approximately 1-2 slides (may be supplemental material)
- Distill Methods to key procedures
- Equations should be extremely simple and friendly
- Visual representations of methods are easiest to comprehend

Methods

- Apply current stimulus in "Propagated Action Potential" simulation of HH model.
- Measure velocity of propagated action potential
- Repeat for temperatures from 0 to 50 C.
- Plot results



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Extracting the Sequence

Phosphorylation Data: Gene Phos-Tyrosine

Dab1 KKEGVY*DVPKS

Entire Sequence:

```
MSTETELQVA VKTSAKKDSR KKGQDRSEAT LIKRFKGEGV RYKAKLIGID EVSAARGDKL CQDSMMKLKG VVAGARSKGE
HKQKIFLTIS FGGIKIFDEK TGALQHHHAV HEISYIAKDI TDHRAFGYVC GKEGNHRFVA IKTAQAAEPV ILDARDLFQL
IYELKQREEL EKKAQKDKQC EQAVYQTILE EDVEDPVYQY IVFEAGHEPI RDPETEENIY QVPTSQKKEG VYDVPKSQPN
SQPLEDFESR FAAATPNRNL SMDFDELLEA TKVSAVTQLE LFGDMSTPPD ITSPPTPATP GDAFLPSSSQ TLPGSADVFG
SMSFGTAAVP SGYVAMGAVL PSFWGQQPLV QQQIAMGAQP PVAQVIPGAQ PIAWGQPGLF PATQQAWPTV AGQFPPAAFM
PTQTVMPLAA AMFQGPLTPL ATVPGTNDSA RSSPQSDKPR QKMGKESFKD FQMVQPPPVP SRKPDQPSLT CTSEAFSSYF
NKVGVAQDTD DCDDFDISQL NLTPVTSTTP STNSPPTPAP RQSSPSKSSA SHVSDPTADD IFEEGFESPS KSEEQEAPDG
SQASSTSDPF GEPSGEPSGD NISPQDGS
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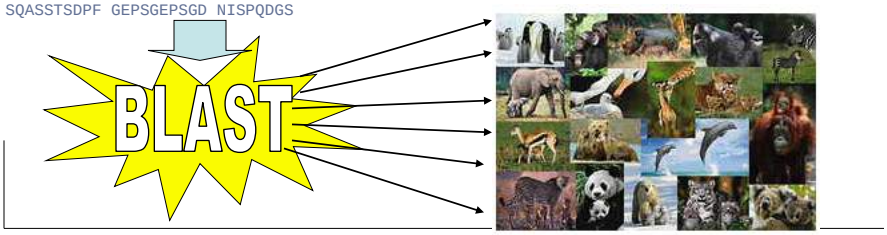
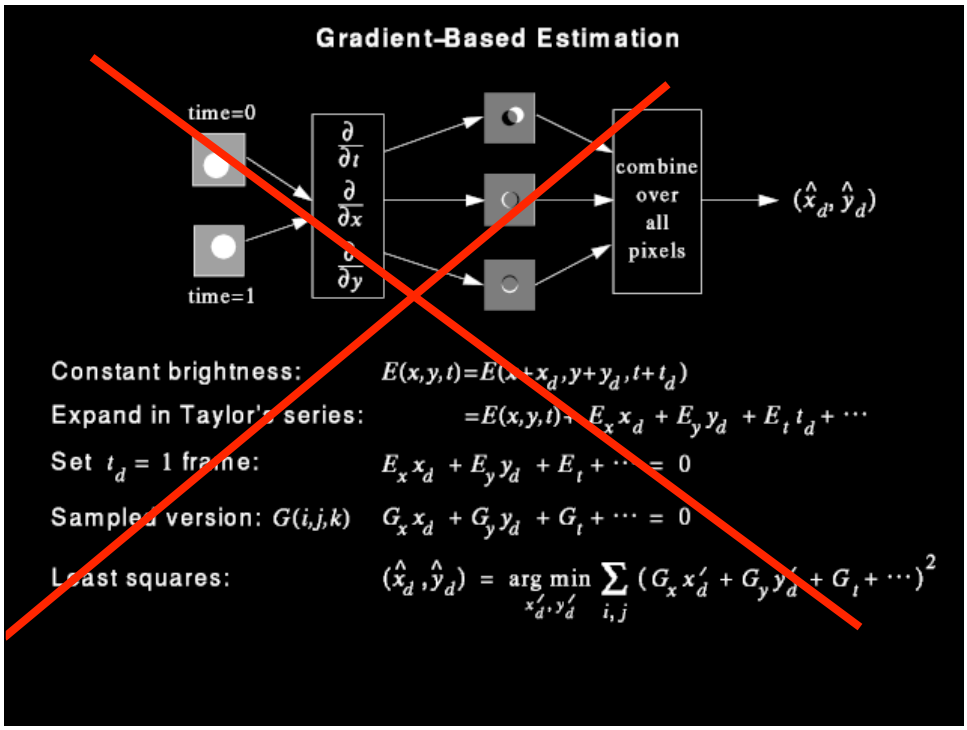
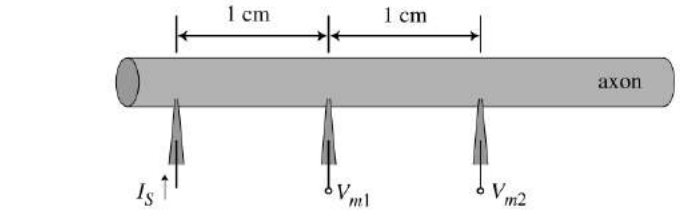
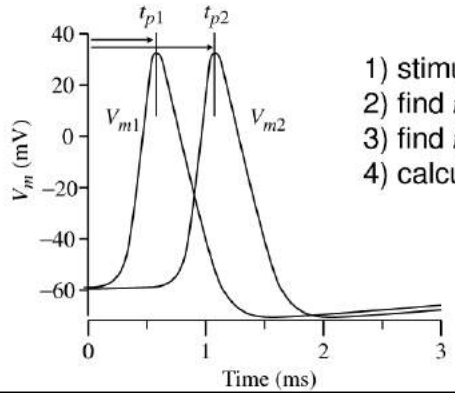


Courtesy of R. Carey



Methods: Calculating Velocity of Propagation





1) stimulate with current I_S
2) find t_{p1}, time to peak at 1cm point
3) find t_{p2}, time to peak at 2cm point
4) calculate

$$\text{velocity} = \frac{1\text{ cm}}{t_{p2} - t_{p1}}$$

Results section describes the major findings of experiment.

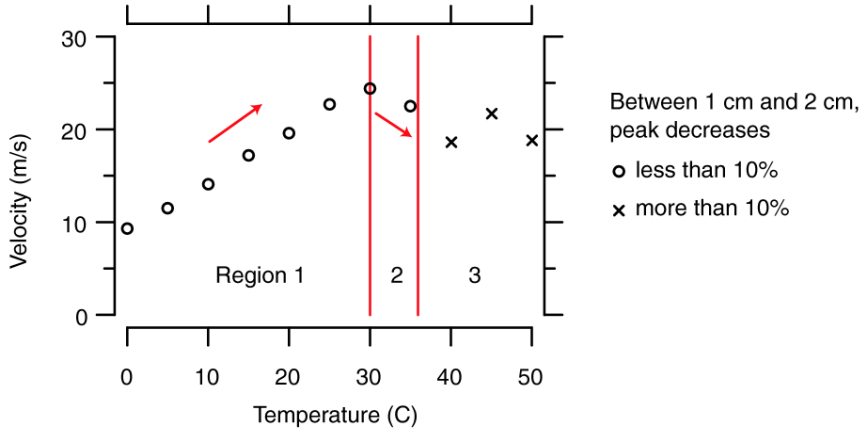
- Approximately 2-3 relevant figures
- Distill information about each figure into 2-3 bullet points
- Include key words in figures to remind yourself (and audience) of each bullet point

http://www.nearingzero.net/index2.html

Results

- Velocity increased with temperature for range from 0 to 30 C.
- Velocity decreased with temperature for range from 30 to 35 C.
- Action potentials did not propagate for temperatures above 36 C.

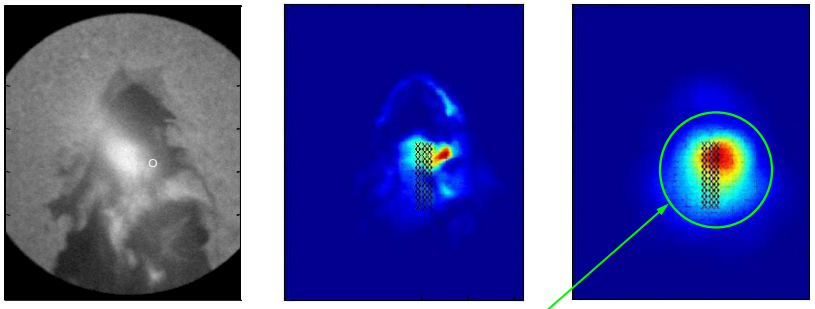
Three Effects of Temperature on Propagated Action Potentials



Temperature↑ then { Velocity↑ in Region 1; Velocity↓ in Region 2; Propagation Fails in Region 3

Phantom Test – Reconstruction

Acquired 2D image of mouse specimen, showing accumulation of ICG in the head



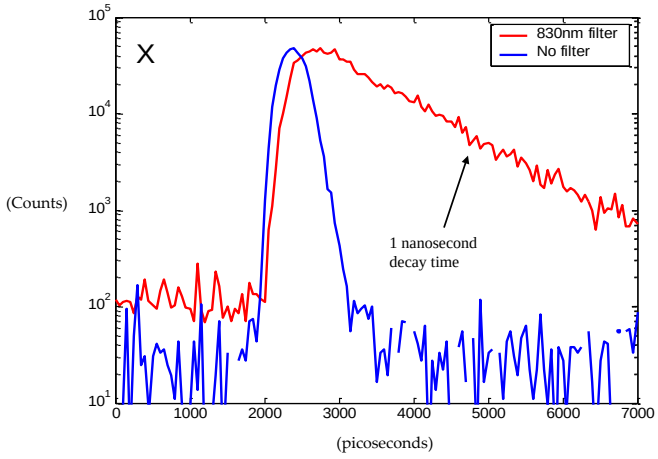
White Light Source Capture | NIR Scan (no filtering) | NIR Scan (with 830nm filter)

Fluorescence shows accumulation of ICG in brain/CSF

Courtesy of F. Hammond

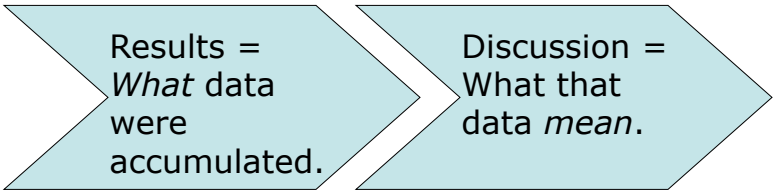
Temporal Point Spread Function

TPSF of NIR pulse detection through mouse skull



Courtesy of F. Hammond

The Discussion offers your interpretations of your findings.



- Approximately 1-2 slides
- Explain **limitations**, questions left unanswered, major experimental constraints, lack of correlation, negative results. It's not all NOISE!
- How do your results **relate to the goals** of the study? (See Introduction)
- How do your results **relate to the background information** obtained in outside readings?

Summer 2005 Conclusions

Ductile Tissue Phantom

- Currently in calibration trials for TOBI at MGH

The future..

- Optically different phantoms: Truly mimic tissue

- Mechanically develop to be softer

Breast Spectroscopy System

- Developed and working: patient trials have begun!

The future…

- More patient trials and data analysis to capture breast tissue makeup

Courtesy of G. Lewis

Summary

- Created a library of decorrelation time constants for different tissue types:
  - Fatty-Fibrous, Glandular, Smooth Muscle, Fibrous
- Found that the rate of speckle decorrelation is dependent on tissue composition

Courtesy of A. Elliott

Future Directions

- Expand speckle library by increasing number of sampled tissues
- Utilize ability to characterize tissue using LSA to build a guidance probe with potential uses in needle biopsies

Courtesy of A. Elliott

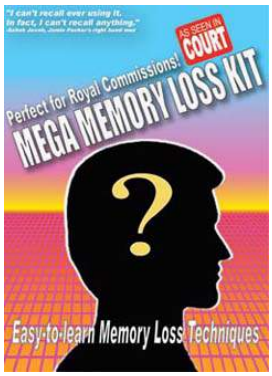
Arrangement Step 2: Edit the Slide Show

- Edit slides for coherence
- Check for irrelevant bullets, plots.
- Check for balance and coherency in storyboard
- Spell-check and proofread

Style: Consider your speaker's persona

- Think in terms of talking to people
- Look at your audience
- Observe their reactions
- Adjust your style accordingly
- Make your enthusiasm for your work infectious
- Even shy people can be very effective public speakers!

Memory: Memorizing your talk word-for-word is not necessary



However, use notes, note cards, or a printed version of your PPT slides to keep yourself organized and on track.

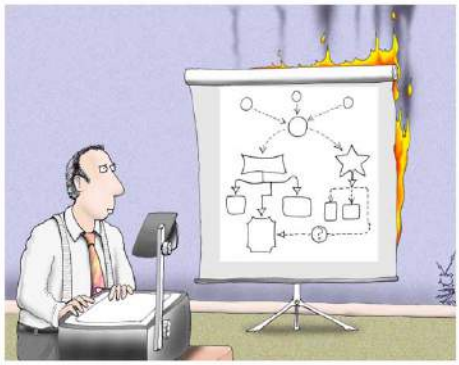
Delivery: The rain in Spain falls mainly on the plane.

- Avoid filler words and distracting sounds (um, like, you know, okay).
- Don't hide from your audience.
- Talk to your audience not to the screen or poster.
- Don't fix your gaze on only one or two audience members.
- Don't read your visual aids verbatim.
- Practice, practice, practice.

The key to effective delivery is to practice!

- Stick to the time limit.
- Practice speaking slowly. Breathe.
- Work around your nervous habits.
- Use visuals as cues, not notes.
- Know how to use the equipment.

- Have a printed copy of your presentation for backup.
- If you get lost, stop and regroup. Your audience wants you to succeed.



Chapter 3. Andrew's scheme backfires.

http://www.nearingzero.net/index2.html

Prepare for Q&A

Big Picture

- Q&A is usually the best part of the talk!
- Usually questions are easier than you expect.
- Stay polite & composed. You're the expert.
- The moderator should police the audience.

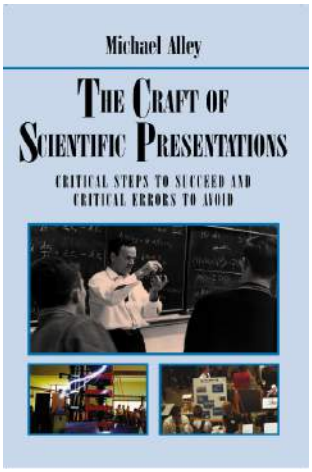
Q&A Protocol

1. Invite questions from different parts of the room.
2. Listen to the ENTIRE question.
3. Make sure everyone hears the question
4. Identify the type of question.
5. Answer concisely.
6. End Q&A on good note.
7. Don't offer to answer via email unless you mean it.
8. Prepare backup slides.
9. Thank the audience.

What to do about bad questions

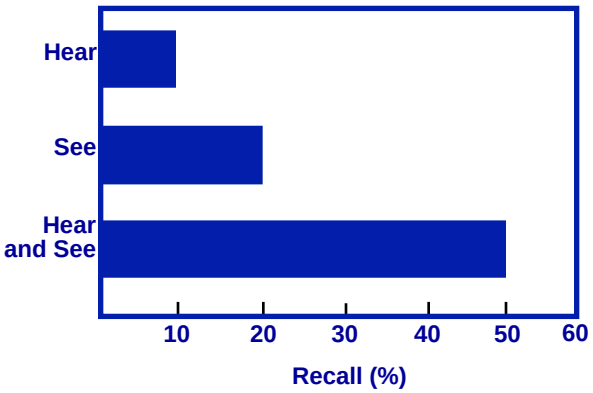
If . . .	Then . . .
A question contains many parts	Acknowledge many parts - Answer 1 of the questions - Answer more than 1 if time
There is no question	Spin into a question
The question is vague	"As I understand your question . . ."
The question is combative	"I disagree." + explain "Thank you for your concerns." - "Perhaps we can talk after the Q&A"

Michael Alley has sensible advice on how to use PowerPoint.



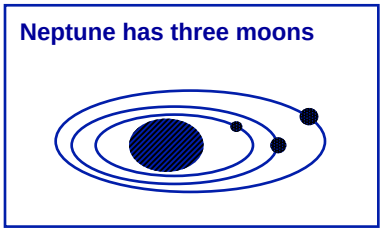
http://www.writing.engr.psu.edu/

Audiences remember more when you use well-designed slides

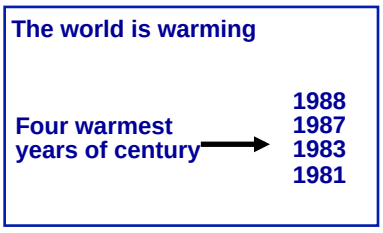


Include slides that accent important details

Images



Results



Exclude details that the audience does not need or cannot remember

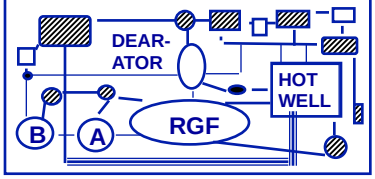
Avoid filler information

Roentgen discovered x-rays in 1895. He found that a cathode-ray tube produced fluorescence in a distant plati-num-barium-cyanide screen.

Avoid long lists

- Corrosion
- Acid rain
- Toxic materials
- Pulsed combustion
- Energetic materials
- Pyrogenic materials
- Smog

Avoid complex images



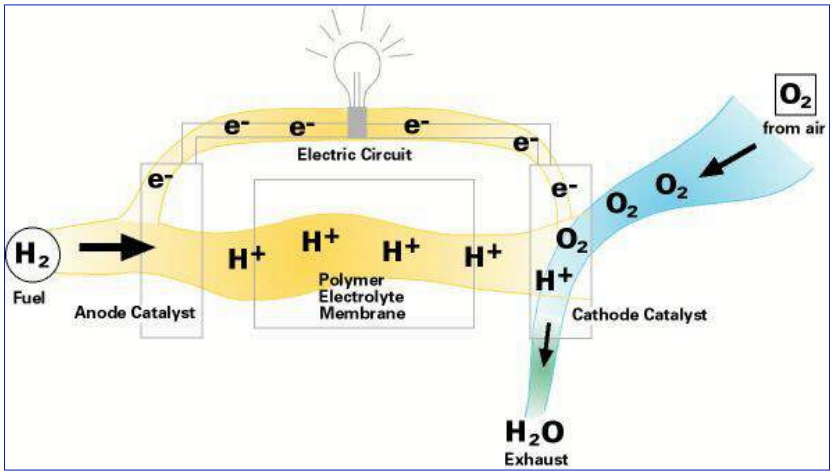
This sentence headline introduces the first topic (28 points, left justified, no more than two lines)

Image(s) about first topic

Subordinate point (keep point to no more than two lines)

Logo

Fuel cells are devices for energy conversion



[Breakthrough Technologies Institute/Fuel Cells 2000]

This sentence headline introduces the 2nd topic (28 points, left justified, no more than two lines)

First point (keep points to no more than two lines)

Second point (parallel in structure to the others)

Third point (parallel in structure to the others)

Image about second topic

Logo

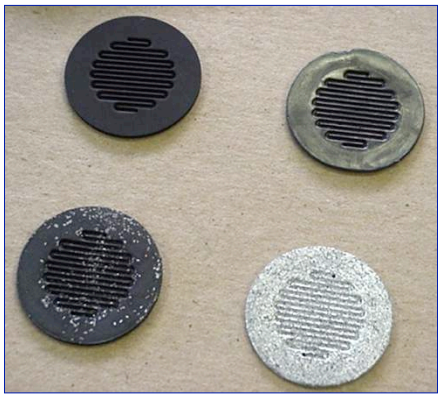
Composite materials are ideal for bipolar plates

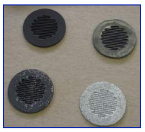
Advantages

- Easy to shape
- Light in weight
- Resistant to corrosion

Disadvantages

- Low conductivity
- High cost (at present)





This sentence headline introduces the third topic (28 points, left justified, no more than two lines)

Image about third topic

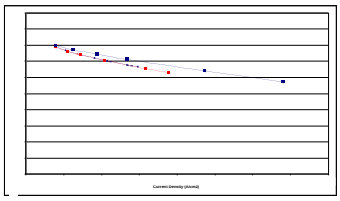
First point (keep points to no more than two lines)

Second point (parallel in structure to the others)

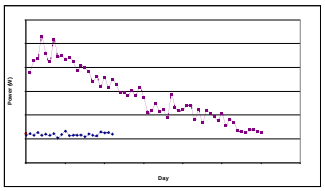
Third point (parallel in structure to the others)

Logo

Three methods exist for evaluating bipolar plates

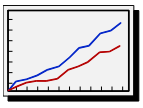


Polarization Curves



Power Curves

Visual Inspection



In summary,… (here, you state your most important conclusion of the work)

Supporting point (no more than two lines)

Another supporting point (parallel to the first)

A third supporting point (parallel to the first)

Image that supports conclusion

Questions?

Logo

In summary, composite bipolar plates show promise for fuel cells

- Composite materials function well, while under operating conditions
- Minimal corrosion was observed
- Conductivity difficulties need to be addressed

Questions?

Virginia Tech

An oral presentation to evaluate

http://www.youtube.com/watch?v=4Iu9DVSWK4g

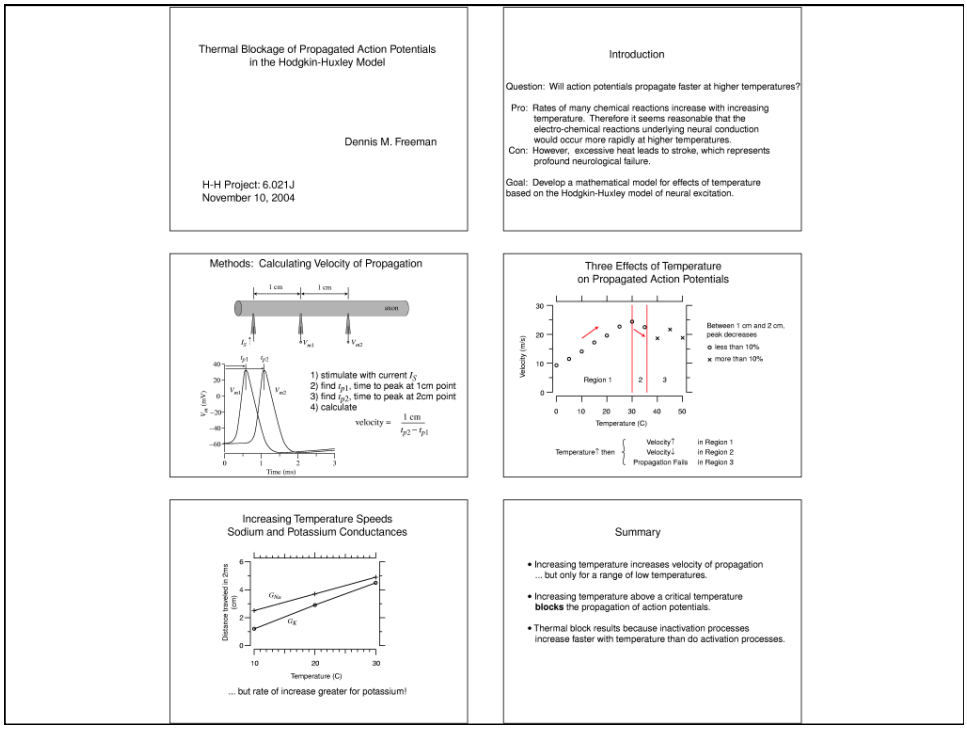
Oral presentation evaluation criteria

Communication—Presenter exhibits proper:
- eye contact
- voice
- gestures
- stance
- respect for viewers
- use of time

Content—Presenter exhibits:
- knowledge of subject
- concise explanation/summary of content
- effective answers to questions

An exercise

- From your one-page project description, create a six-slide storyboard of your presentation.
- Share your description and your storyboard with a colleague for feedback.



Acknowledgements

Thanks to Mya Poe, Marilee Ogren, and Leslie Roldan for slides and support.

Questions?