Writing and presenting a research talk or poster

1. Message: what essential message do you want to convey?
2. Organization: logical, clear structure
3. Style: Simple, effective, attractive slides or poster figures
4. Talks: Speaking style, clarity
5. Posters: Presentation strategy

Why? You want people to UNDERSTAND your work, BE INTERESTED in your work, and RESPECT you as a young scientist
Writing and presenting a research talk or poster

“Surveys show that the #1 fear of Americans is public speaking. #2 is death. Death is #2. That means that at a funeral, the average American would rather be in the casket than doing the eulogy.”

--Jerry Seinfeld

Sources: [http://www.glossophobia.com/](http://www.glossophobia.com/)
Picture courtesy of [http://media.salon.com/2012/08/seinfeld_rect.jpg](http://media.salon.com/2012/08/seinfeld_rect.jpg)
1. What is the essential message you want to convey?

Decide the essential scientific question that your thesis addresses.

State it in one sentence.

Now state it again with the absolute minimum jargon.

This is your title, and is the main point you will show convincingly in your talk or poster.
2. Organization

1. Title, authors, affiliation
2. Introduction – general area, specific question, and why your question is important
3. Goal of your honors thesis
4. Methods – equipment, technique, not detailed
5. Results – experimental design, observations, measurements, tables, figures
6. Conclusions – Could you answer your main question? Implications of your work for overall function of cells, organs, or organisms
7. Acknowledgements
Overall organization of a poster

Dynamics of Assembly of SNARE Complex in Hippocampal Presynaptic Terminals

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1. Molecular and Cell Biology Department, 2. Helen Wills Neuroscience Institute, University of California Berkeley, CA, USA. 3. HHMI, Physiology Department, University of Wisconsin, Madison, WI, USA

1. Introduction
   - Exocytosis is essential for chemical synaptic transmission
   - Exocytosis describes fusion of intracellular vesicles with the plasma membrane
   - Assembly of the SNARE complex is a key step in synaptic vesicle exocytosis
   - The neuronal SNARE complex is made from a 1:1:1 ratio of SNAP-25B, Syntaxin-1A, and VAMP-2.

2. Objective
   - Direct measurement of the spatio-temporal dynamics of the SNARE complex in neurons
   - Questions:
     1. Are SNARE complexes assembled in nerve terminals prior to action potential firing and exocytosis of calcium?
     2. Do conformational changes occur in the SNARE complex during exocytosis?
     3. Can the cycle of SNARE complex assembly and disassembly be directly measured in a dynamic way (assembly - docking, priming, vesicle release and disassembly - exocytosis)?

3. Methods: FRET Imaging
   - Time-lapse FRET imaging provides information on specific events by monitoring the changes in FRET efficiency during synaptic transmission
   - Experimental system based on sensitized emission "3-box" FRET with 1-box

4. GFP-SNAREs target properly in neurons
   - mcrulean-vamp2 (red)
   - motime-snap25 (green)

5. mGlu-SNAP-25B and mCer-VAMP-2 can function in place of endogenous proteins
   - Are fluorescent SNARE proteins functional?
   - Double knock-out and rescue assays

6. A stable SNARE complex exists at rest
   - Assay to detect the stability of the SNARE complex
   - Inactivation and reactivation of the SNARE complex

7. Time-lapse FRET reveals dynamics of complex formation
   - Time course of SNARE complex assembly correlates with exocytosis rate
   - Time-lapse FRET measurements may reveal timing of SNARE complex assembly

8. Conclusions
   - GFP-tagged SNAP-25 and VAMP-2 can functionally replace endogenous SNARE proteins.
   - A positive level of interaction is present in resting nerve terminals suggesting pre-assembly of the SNARE complex.
   - Our assay reports an increase in FRET shortly after onset of stimulation which may reflect a conformational change or accumulation of assembled complex; rate of initial increase is consistent with rate of vesicle release.
   - Timing of SNARE assembly and disassembly measured by FRET is consistent with estimates of lag between exocytosis and subsequent endocytosis.

9. Future technical refinements
   - GFP-FRET techniques are large and suffer from limited resolution. Fusion of SNAP-25 and VAMP-2 may improve SNAP-25

10. Acknowledgements
    - 1. Funding from NIH grant 032366 and HH grant 040518
    - 2. Jinhong Bai for providing initial constructs and helpful discussions
    - 3. Kelm Bars who started the project
A talk/poster is not a research paper

A research report includes:

- A comprehensive introduction
- Necessary background and prior results
- Methodological details sufficient for repetition
- Full presentation of all results
- Details of all control experiments
- Exhaustive discussion of
  - Limitations
  - Implications
  - Applications
  - Conclusions

A poster or talk has none of these at this level of detail! Rather, it is a summary of key points and findings.
3. Simple, effective, attractive graphics

Each slide or poster panel has a title that states the general scientific question, topic, or conclusion.

Easy-to-read figures. Delete unessential elements. Label important elements. Maximize the information-to-ink ratio on all figures.

Relatively little text, that should be simple, well-defined, jargon-free.

Keep it simple and to the point. Do not get hung up on details. It’s not a publication.
Taste in the Peripheral Nervous System

Include proper attributions for borrowed graphics

Stocker, 1994
What is Itch?

An unpleasant sensation evoking the desire to scratch

**Why study itch?**

- Common symptom
- Can be debilitating in some cases

"The One With Chicken Pox"

Consider adding major points as text boxes to slides of graphs or graphics.
Evidence for positive selection on these amino acid changes in the human lineage

Two amino acid substitutions unique to humans

Enard et al. 2002
**pickpocket** ($ppk$) is related to Epithelial Na Channels (ENaC)

**Epithelial Na\(^+\) Channel (ENaC) Tree**

**Conserved ENaC Channel**
In Situ Hybridization

1. Linearize, transcribe
   - Plasmid with exon
   - Riboprobe

2. Hybridize to sample RNA
   - mRNA hybridized Riboprobe

3. Wash with Ab
   - mRNA hybridized Riboprobe
• Pass success rate in FRET football goes with $1/r^6$
• Orientation between donor/acceptor is crucial

Referring to something familiar may be helpful. Consider using a dark background to reduce glare.
Goals of the project

- Determine if and when Foxp2 expression is induced during embryoid body (EB) formation. Establish whether it plays a role during early embryogenesis and cell lineage specification.

- Determine the consequences of ectopic expression of Foxp2 in embryonic stem (ES) cells.
Large, readable fonts

Font Size: You are close to the screen or poster, your audience is far away. Use sans serif fonts.

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Easy-to-read graphics

1. Make lines thicker, fonts & symbols larger.
2. Use distinct types of lines and symbols.
3. Make axis ticks visible; use appropriate minor ticks.
4. Use labels instead of legends.
5. Label the axes! Position them intelligently.

Bad!

Good!

This slide uses PowerPoint’s animation features.
Easy-to-read graphics

**Bad!**

**Good!**

1. Use vivid colors with different brightnesses.

2. Avoid separate keys. Add labels within the drawings.
7% of males in your audience are color blind

Color Blind Simulator
Vischeck
http://vischeck.com/

Double-staining with red and green signals.

normal vision  protanope (red)  deuteranope (green)
Easy-to-read graphics

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Dark backgrounds work best for dim color images
“3-cube FRET” with a single cube

TILL polychrome monochromator
Alternate ex. 436nm/500nm

Dual-bandpass filter
436nm/500nm (Chroma; 51017x)

Polychroic filter
Reflects 436 nm/500 nm
Transmits 470 nm/535 nm (Chroma; 51017bs)

Optical Insights Image Splitter with 505 nm dichroic

Em. 470 nm 535 nm
Ex. 436 nm
Ex. 500 nm

Sample (CFP/YFP)

A Methods panel may be appropriate if new techniques are developed.
Easy-to-read graphics

The two most common problems:

Too much information.
   Simplify!
   Avoid too much text, lists, long tables.

Jargon, unexplained terms or symbols.
   Define, use plain English, or remove.

In talks, use movies and animations with care.
   Make very certain they run properly.
4. Talks: Speaking style, clarity

Get your audience interested (show enthusiasm)
Speak clearly, concisely, & loudly (but don’t shout), avoid monotone.
More than 1 slide per minute usually doesn’t work.
State results in past tense.
Avoid jargon if possible, define terms if you must.
It’s ok to use “I” and “we.
It’s ok to say “I don’t know”.
Practice (the entire talk, and key ideas or transitions in your poster presentation)!
Preparing for talks

1. Know the lecture hall: visit it before your talk.

2. Show up early, prepare in advance:
   a) Learn how to control lights, turn on projector, lower screen.
   b) To use board, bring your own thick chalk or dark non-permanent markers.
   c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with <ctl>h, a.
   d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen.
   e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.
Slide Show: Normal View

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This is a screen shot of Normal View: Your computer shows what the projector shows (including the pointer).
Slide Show: Presenter View

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This is a screen shot of Presenter View: The projector shows only the left pane. You also see notes and slide tape. But beware of pointer behavior! Presenter View is activatable only with projector connected!
5. Posters: presentation strategy

Prepare a 2-minute and 5-minute presentation of your poster; NEVER LONGER!

The introduction should be clear and accessible.

Poster presentations are interactive – judge the expertise and interest of your audience and tailor your presentation to them.

Your goal is to present the major points and conclusions, not every detail of what you’ve done!
Programs useful for graphing & analysis

GraphPad’s **Prism** is a popular and easy to use statistical analysis, curve fitting, and graphing program. But it can only plot Y columns vs. one X column (*really...!*)

Golden Software’s **Grapher** is a more powerful and customizable graphing, analysis, and spreadsheet program

Microsoft’s **Excel** is best for sophisticated spreadsheet manipulations and many functions, but statistical tests are very limited and graphing is primitive, not designed for presentation

And then there’s **Matlab, Mathematica, SAS** (statistics), ....
Programs useful for drawing

**CorelDraw** is a popular and relatively easy to use graphics design application.

**Adobe Illustrator** is more extensive and comprehensive, but also more expensive and difficult to learn.

For presentation, it’s best to use Microsoft’s **PowerPoint**, in case you have to load your talk onto someone else’s computer (carry a back-up on a memory stick).
Thanks

To Prof. Dan Feldman
for his slides from an earlier talk on this subject.