

Guidelines for Scientific Presentations

Know Your Audience

There are many different contexts in which you might be asked to give a scientific presentation: department colloquium, conference presentation, outreach at a public library or school, for a funding agency (to name a few). The content and tone of your presentation will significantly depend on your audience. You will give a very different talk to a group of high school students than to a group of research scientists.

Think carefully about the goal or purpose of your talk. This will likely be different for different audiences. The biggest difference will be in the level of background knowledge of different audiences. For a general audience, you'll want to focus on important concepts and limit the mathematics. For a more scientific audience, you won't have to explain basic principles and can jump to the methods and results of your research much faster.

Suggested Format for a Colloquium/Seminar Talk

Introduction:

- In a few sentences, summarize the questions that were addressed in the research.
- Give a brief overview of what you will discuss in your presentation.

Background:

- Provide the audience with background information that will be necessary/helpful in understanding the research (define terms, explain general concepts, etc.).
- Where appropriate, talk a little bit about previous research to provide some context ("set the stage" for this particular study). Why is it interesting and important?

Methods:

- Describe the methods used in the study (especially if they are new, fairly complex, or particularly interesting).
- Be sure to explain how the data was collected. What instruments were used? How do these instruments work?

Results:

- Describe the results of the study (you may not have time to give all of the results; in some cases, you might be better off showing an illustrative sample of the data).
- Include actual data from the study – graphs, charts, tables. Be sure to explain what the data mean and the significance of any error bars. Make sure charts and graphs are large enough to be easily read by the audience. Explain the axes.
- Discuss the implications/importance of the results.

Discussion:

- Come prepared to discuss the research after the formal portion of your presentation is over by thinking of possible questions, answers, comments, etc.

General Presentation Tips

Prepare yourself well by understanding the research - The more prepared you are, the more confident you'll be...and this confidence will show in your presentation. Understand every word that comes out of your mouth!

Practice - Run through the presentation a few times beforehand. Although you probably don't want it to sound too rehearsed, practicing the presentation keeps you from stumbling over words, helps you to fine-tune your presentation, allows you to become familiar with the audio-visual tools, and prevents a too-long or too-short presentation.

Don't simply read off of cards, notes, or your slides - Sparing use of notes is OK, but speak clearly and maintain eye contact with the audience. Use the bullet points on your slides as talking points. Again, a "natural" presentation style (in which you simply share what you've learned in your own words, almost like a conversation) projects confidence.

Use the audio-visual aids wisely - Its best if each slide conveys no more than one or two major points. Don't put too much information on any one slide, and don't put large amounts of text. Make sure graphs and tables are readable. Use large fonts so that the audience can read the text. Use pictures where appropriate if they're of good quality.

Prepare for the discussion - Try to anticipate obvious questions the audience might ask, and know the answers. Come prepared to start discussion in the (very) unlikely event that no one raises their hand; you might start things off by discussing what you think would be the next step in this research. This portion of the seminar is sometimes the most intimidating for students because they fear that someone will ask a question to which they don't know the answer. Generally speaking, the questions are not asked to trick you or make you feel bad; we tend to be curious people and just want to learn more. Don't get defensive.

Resources:

- "Beautiful Evidence" by Edward Tufte (Also recommend "Visual Explanations," and "Envisioning Information")
- "The craft of scientific presentations : critical steps to succeed and critical errors to avoid" by Michael Alley
- "Giving academic presentations" by Susan Reinhart
- "Designing Science Presentations: A Visual Guide to Figures, Papers, Slides, Posters, and More" by Matt Carter
- "Slide:ology : the art and science of creating great presentations" by Nancy Duarte
- Edward Tufte's Powerpoint is Evil <http://www.wired.com/2003/09/ppt2/>
- Matthew Rave's 9 kinds of Physics seminar
<https://manyworldstheory.com/2013/10/03/the-9-kinds-of-physics-seminar/>
- Ewa Bulska "Good Oral Presentation of Scientific Work"
<http://www.imaging.robarts.ca/parraga/How%20To%20Papers/Oral/Good%20oral%20presentation%20of%20scientific%20work.pdf>
- <http://www.speaking.pitt.edu/student/public-speaking/basics.html>
- <https://debate.uvm.edu/NFL/rostrumlib/presencebdavis0994.pdf>
- <http://www.assertion-evidence.com/>
- <http://mitcommlab.mit.edu/nse/commkit/slideshow/>
- <http://sixminutes.dlugan.com/>