How to Give Effective Scientific Presentations

Tiffani L. Williams

Department of Computer Science
Texas A&M University
http://faculty.cs.tamu.edu/tlw
Part I

Introduction
Why Do We Give Presentations?

- **Persuasive**: Convincing your audience to follow a particular course of action.
- **Instructional**: Showing others how to perform a specific task (e.g., laboratory demonstration).
- **Informative**: Presenting new findings or information.
What Makes Giving a Presentation Difficult?

- One chance for the audience to hear.
- The audience cannot look up background information.
- The audience is restricted to the speaker’s pace.
- Success is dependent upon the speaker’s ability to deliver.
- Training on how to give scientific presentations is often not provided.
Today's talk is on keeping the attention of the audience.
Part II

Overcoming Our Fears
Activity #1

What are your fears when giving a scientific presentation?
My Fears

- Losing the audience’s attention.
- Lacking sufficient material.
- Appearing too simple.
- Presenting work to a mixed audience.
A successful presentation starts with a confident speaker.

- Stay calm and relaxed.
- Know your material.
- Practice giving your presentation.
- You have a valuable message to share!
Part III

Structure: The Strategy You Choose
Figure: Boston subway.
Figure: Boston subway.
Maps and Presentations

- Every map has an intended audience.
- Maps are defined by what they include but are often more revealing in what they exclude.
- It is impossible to show everything!
- No matter how hard you try to include everything, there will always be something missing.
- However, whatever you decide to present should tell a story.
What Story Will You Tell?

- Remember, you will never be able to tell the full story.
- Instead, you must select the pieces that are the most relevant.
- But, how do you select what to present?
Activity #2

Imagine that you are packing for a trip. What will you bring?
I Need More Information!

- What is my destination?
- What is my purpose (e.g., vacation, business trip)
- How long will I be gone?
Packing and Presentations

- You wouldn’t pack for a trip without knowing the destination and the intended purpose of the trip.
- Similarly, you should never give a presentation without considering your audience and their needs.
Thinking About Your Audience

- What does the audience know?
- What are they unlikely to know?
- What kind of talk would the audience find appealing?
My Audience

- Composed mostly of students.
- Has given or seen a scientific presentation.
- Interested in learning about giving effective presentations.
- May have been strongly encouraged (or forced) to attend by their advisor.
Part IV

Sample Presentation
What Does the Audience Want to Know?

- What’s the Problem? (Introduction)
- What are You Doing? (Experiment and Method)
- What Have You Found and What Does It Means? (Results and Discussion)
- Take-Home Message (Conclusions)
- Who Did and Paid for the Work? (Acknowledgements)
Get rid of the outline slide!

- Motivation
- Your Algorithm or Methodology
- Experimental Results
- Conclusions
- Future Work
Figure: You can’t please everyone all of the time. Adapted from The Craft of Scientific Presentations by Michael Alley.
Figure: Phylogeny: Illustration.
What's the problem?

Phylogeny

From the Tree of the Life Website, University of Arizona

- Orangutan
- Gorilla
- Chimpanzee
- Human
What’s so hard about reconstructing a tree?

- We can’t verify the answer! We are trying to predict the past.
- The number of possible trees for $n$ organisms (or taxa) is $(2n - 5)!! = 1 \times 3 \times 5 \times 7 \times \cdots (2n - 5)$.
- How many possible hypotheses are there for 500 taxa?
What’s the problem?

Number of trees for 500 taxa

```
1011526368532533027401254553681418454595395103177817441326760
575354540027354239923185120850729281452188845672454906078405199
54833466355835357489797004048815238277235828789778883827083
879520379654335442692118284017668933765146297741290321491422188
461934211322520490553755930128491420943083731473702853911575459
092790187541739039779539968260469372709754907153967724213213301
6192112426777117570421168602680327046424393282604683928277544702
04024525439745312625940855936045351781359433925232787668240389
543059720773515213084928436546402475634030885682876051282569771
792020997072230898150513179396946394522142159208349384664346962
256120104483730916485543102772698545449577536942796787841027981
718342034235251080912363733252495409554975559313272782465380621
055314336272287166870064159034339277014925661499965120537691592
06143282569961825679289495401900633880555360239418241295638642
828064143651877071620389850413570868327006823979839417007571891
860810831375937653051279717486968104181402271737999015446125297
308847695505977363634413078780761890937449555118036210351806866
727116790075717314222532435108543175076637978946516065697371580
15993048147973138305849465619440609086057839545119918916887394
920259212050615153793334686404827729255644086503451717362622730
433940887451171875
```
What’s the problem?

What do we do now?

- The problem isn’t going away.
  - Grand Challenge problem: *Tree of Life*
  - Evolutionary history of all known species on the planet
    (estimates between 10 to 100 million)
- We need heuristics!
  - Recast as an optimization problem.
  - Optimization criterion of interest: maximum parsimony
Remainder of Presentation

- What am I Doing? (Experiment and Method)
- What Have I Found and What Does It Means? (Results and Discussion)
- Take-Home Message (Conclusions)
- Who Did and Paid for the Work? (Acknowledgements)
Part V

Visual Aids: Your Supporting Cast
Presentation Software

- **PowerPoint**
  - The most frequently used software for creating presentations.
  - “Power corrupts. PowerPoint absolutely corrupts.” – Edward Tufte

- **Keynote (only available on Mac OS X)**

- **Latex-based tools**
  - Prosper
  - Beamer (used for this presentation)
Keep It Short and Simple (K.I.S.S.)

- Some people cannot resist the temptation to assert their mathematical superiority.
- Consider the following equation

\[ \ln(e) + \sin^2 x + \cos^2 x = \sum_{n=0}^{\infty} 2^{-n} \]

and its more “trivial” form

\[ 1 + 1 = 2. \]
Figure: A poorly designed plot.
Figure: Another poorly designed plot.
Part VI

Delivery: It’s Showtime!
Speech

- Show enthusiasm.
- Speak freely.
- Speak clearly.
- Speak slower than you would in a normal conversation.
- Make sure you are speaking the audience’s language.
Don’t go over your allotted time!
Handling Questions

You say: That’s a very interesting question.
You mean: You obviously didn’t listen properly.

You say: I’m glad you raised that point.
You mean: I’ll say it again, so listen this time!

You say: I’m afraid I don’t know the answer to that one.
You mean: Why did you have to ask that? It’s irrelevant here.

You say: Yes, the additional experiments you suggest are very appropriate.
You mean: I don’t care about running more experiments. I simply want to graduate!
Don’t forget ...

- You are the expert!
- A few people ask questions to be obnoxious.
- Many people ask questions because they are interested in your work.
- The sign of a good presentation is a lively discussion afterwards.
Part VII

Wrap-Up
Summary

- The key to an effective presentation is concern for your audience.
- Don’t overwhelm them, but don’t underwhelm them either.
- Say what you need to say and sit down. Everyone’s internal clock is ticking.
- Relax, stay calm, and remember you are the expert!
References

Thank you for your attention