

PY410 / 505  
Computational Physics 1

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# Goal

- Scientific communication skills are often undersold
- They are (nearly) as critical as technical skills in your career
  - You definitely need them to progress!
- Idea here is to enhance your communication:
  - Written: 4-5 page research-like paper OR jupyter
  - Verbal: 15 minute presentation (+5 mins questions)

# General Overview

- Difficulty != time length
  - Actually usually the inverse... short talks are hard, short papers need to be succinct
- This gives you an opportunity to get feedback on your skills

# Paper

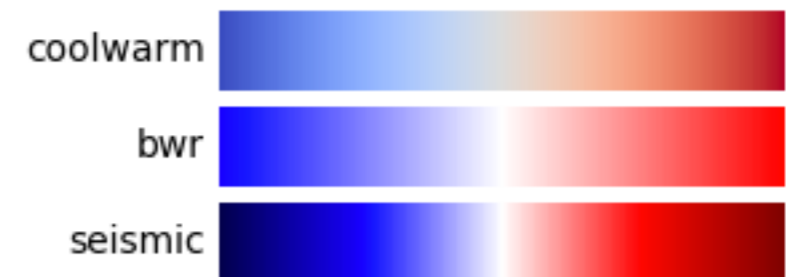
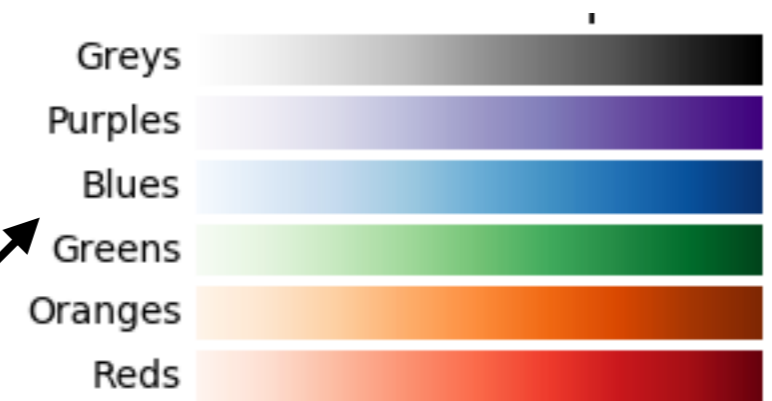
- Two formats:
  - Research-like paper
    - 4-5 pages
  - Jupyter notebook
    - More interactive, but similar content and length (4-5 pages)
- In both, I want:
  - Introduction, Methodology, Results, Discussion
  - Correct spelling and grammar
  - Legible figures (axis labels, color, marker styles, etc)
  - Concise explanations

# Paper

- Some grammatical guides that may help you out:
  - <http://www.quickanddirtytips.com/grammar-girl>
  - <https://faculty.washington.edu/heagerty/Courses/b572/public/StrunkWhite.pdf>
- When in doubt, type it into MS Word (or similar) and check grammar and spelling!

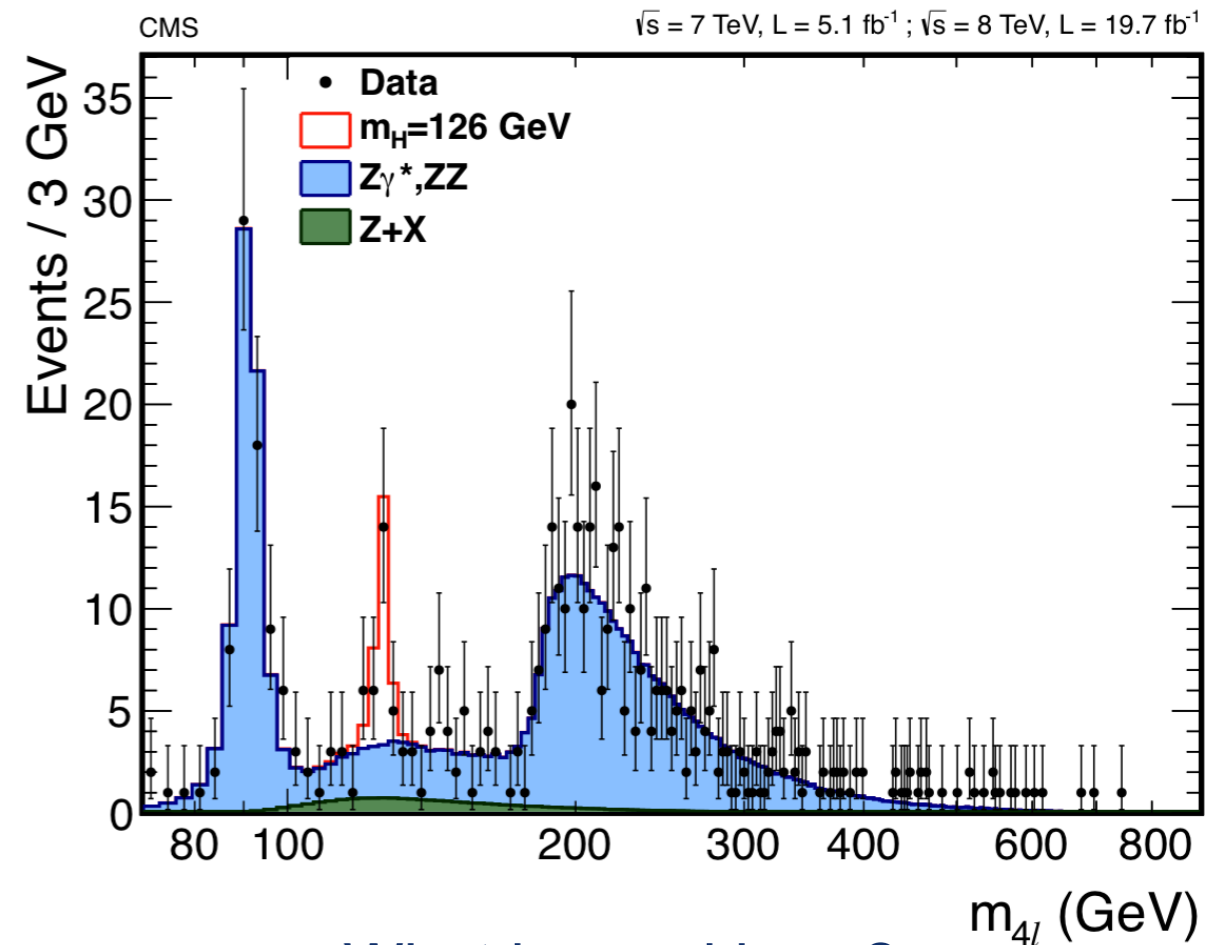
# Colors

- <https://matplotlib.org/users/colormaps.html>
- Some good ideas for color schemes:
  - Proportional data:
    - 0 → 1: Sequential (“grayscale”) colormaps
    - -1 → 1: Diverging colormaps
  - Qualitative data:
    - High contrast for different categories



# Plots

- Everything on plot needs to be visible
  - Axis labels
  - Titles
- Correct number of sig. figs.
- Make sure to use as much of the space as you can
  - Not much whitespaces



What is good here?

What is bad?

# Giving the Talk

- Many different kinds of talks
  - Lecture
  - Colloquium
  - Research talk / seminar
  - “Pitching” an idea
  - Update of existing project
- Also tailored to the time you have:
  - 10 minutes: bullet points only
  - 15 minutes : overall gist, few details
  - 30 minutes: some details
  - 60 minutes: overview of many things, or details of one

Your talk is a  
15 minute research talk.  
Plan accordingly!



# Giving the Talk

- Research talks:
  - Trying to convey:
    - The motivation
    - What you did
    - What your results were
  - Goal: Convincing your audience you did everything correctly!
  - Uninteresting technicalities can (and should) be summarized / skipped / put into backup slides
    - Many students spend time in the talk proportionate to the time it took them to do it
    - Usually exactly wrong to do this!

# Giving the Talk

- Rule of thumb : 1 minute per slide!
  - You want 15 minutes, so write ~15 slides
    - Remarkably accurate, but you will get a feel for your own pace
- Breakdown for a 15 minute talk:
  - Title slide (1 slide)
  - Motivation / Overview (1-4 slides)
  - Method (1-4 slides)
  - Results (2-5 slides)
  - Summary (1-2 slides)

# Giving the Talk

- Things to avoid:
  - Too much text on slide
  - Reading directly from your slides
  - Figures too small
  - Bad ordering
  - Too many animations
  - Too many jokes, not enough substance
- Things to do:
  - Practice your talk
  - Look at your slides on the projector (if possible)

# Giving the Talk

- Speak slowly / clearly
- Annunciate your words
- Face the audience more often than not
- Try to maintain a consistent volume
- Breathe (actually avoids excessive swallowing)
- Try to avoid “ahh, umm, uhhhh” and other fillers

We all violate ALL of these rules.  
Just try to be aware of them and  
do your best.

# Point breakdown

- Sort of: 50% paper, 50% talk
- But really: Numerical content 30%, Difficulty 20%
- Of the remaining 50%
  - Paper: Clarity 10%, Grammar 10%
  - Talk: Structure: 20%, Delivery 10%

# Point Breakdown

- Numerical content:
  - Solve the problem in finite time
  - Convince me it is right
    - Compare to analytic simple cases
    - Compare to actual data