

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 \neq 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

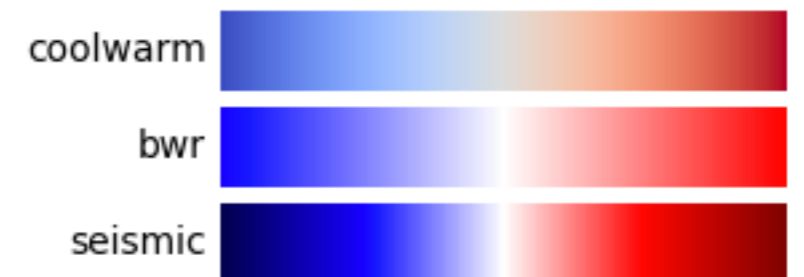
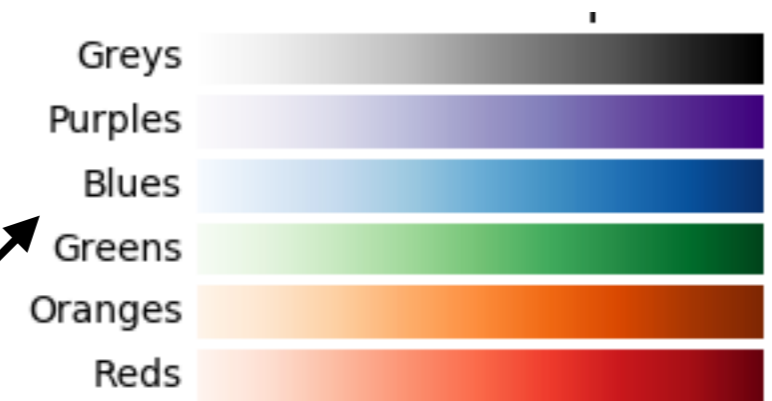
- Two formats:
 - Research-like paper
 - 4-5 pages
 - Jupyter notebook
 - More interactive, but similar content and length (4-5 pages)
- In both, I want:
 - Introduction, Methodology, Results, Discussion
 - Correct spelling and grammar
 - Legible figures (axis labels, color, marker styles, etc)
 - Concise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

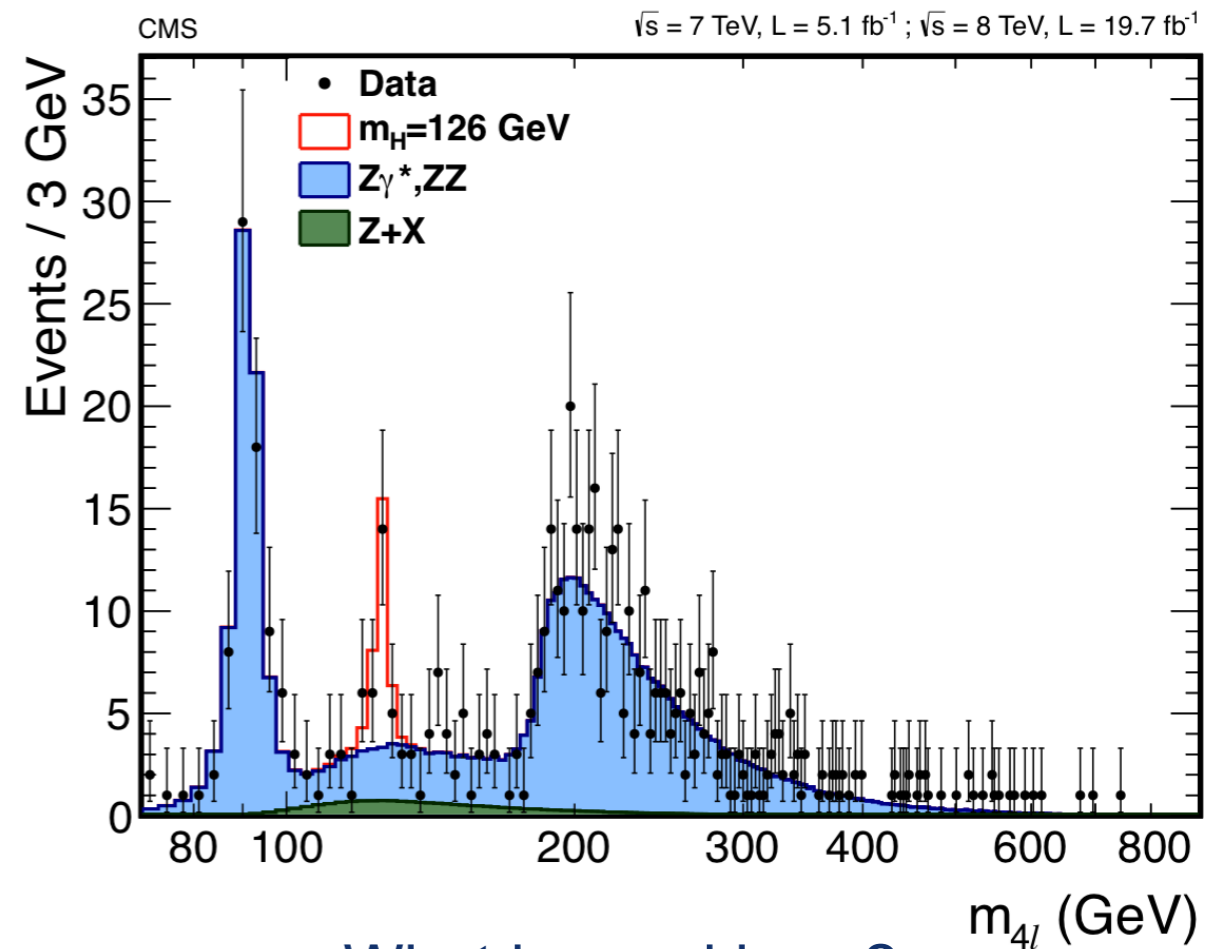
Colors

- <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)
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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