This pie chart shows how much pie I ate while making this chart.
How to get started?

**Step 1:** Identify your audience: this will control the level of your presentation and the amount of background material you need to orient everyone in the audience.

**Step 2:** Determine how much time you have for your presentation: this will control how much time you have to talk about each part of your outline (see below).

**Step 3:** Identify the main points you want to convey: you probably can convey only ~2 main points in a 20- or 30-minute talk.

**Step 4:** Create an outline of your talk: this will build in the logical organization of your presentation and help you decide what figures and other supporting evidence you need to make your points.
The title slide and outline prepares the audience to listen and shows organization of talk

Title slide

- Your names and affiliations
- Paper citation (for JC)
- Venue and date
- Attention-getting graphic

Outline or overview of presentation

- Prepares the audience to listen
- Provides a logical structure for your talk
- Provides motivation and context
- Summarizes key points (limit to two or three for a 20- to 30-minute talk)
Particle Physicists Ask …

Why matter?
- CP Violation

Why mass?
- Higgs field

Why this standard model?
- SUSY or other extensions

Great outline slide, especially for a general audience
Overview

Black holes and star clusters

The galactic center

Intermediate-mass black hole kinematics

Here, we have a VISUAL and WRITTEN outline and it’s not too long!
The “body” of your presentation is the intellectual content of your talk

Problem statement, motivation  
~1–2 slides

Previous work  
~1-2 slides

Methods  
~1–3 slides

Key Results  
~5–6 slides
Provide a “summary” slide

Recap key results and conclusions
Reiterate main critiques (for JC)

Summary

- Non-Gaussianity in the CMB tells about creation of the initial density perturbations in the universe.
- The probability distribution of the nonlinear parameter in our model gives drastically improved constraints on non-Gaussianity.

Next: generalize our method to smaller scale fluctuations and apply to COBE and MAP data

Contact: Michael Schneider  mdschnei@uiuc.edu

This slide will probably stay on the screen during the question period and will thus get the longest audience exposure—make it count!
Summary & Conclusions

- All g-2 data published
  - Systematics lowered again

- Consistent results, consistently above theory
  - ee – tau controversy sill quite active
  - considerably more “ee” type data on the way

- The systematic limit is “far” away …we should go there

Note e-mail and web link

hertzog@uiuc.edu  Copy of talk: www.npl.uiuc.edu/~hertzog/ASPENg2.pdf
Tips for preparing your talk (cont.)

Have only 1 idea per slide

Use the header to state the main idea of the slide, and use the body of the slide to support that idea

Use well-labeled graphs and figures to illustrate your key points...this makes the slide more real and interesting to the audience

Avoid too much text....
Tips for preparing your talk (cont.)

Have only 1 idea per slide.

Use the header to state the main idea of the slide, and use the body of the slide to support that idea.

Use well-labeled graphs and figures to illustrate your key points...this makes the slide more real and interesting to the audience.

....or too many distracting images.
Use figures to illustrate your key points

Figures:
- enliven slides
- promote audience interest
- provide supporting evidence for key points
- help explain complex ideas and relationships quickly
- show how things work, etc.

Myosin “walking” on actin
*Courtesy of P. Selvin*
The Nike laser system uses discharge pre-amplifiers. (Courtesy US Navy)

Sample normalized signals from the two-beam optical drive. (Courtesy C. Michael)
Presenting data can be challenging

- Avoid copying a graph from a formal article – they have a different style, e.g., labels are too small, information too dense
- Remove unnecessary details (reduce information overload)
- Label axes and annotate important points with arrows and add words
- Use tables sparingly – if used highlight important parts
Show equipment only if it helps convey your message

- **Photographs** give scale and reality – but add **labels**
- **Schematics** provide concept
- **Diagrams** strip away unnecessary details
- **ALL OF THESE** can be useful in combination

OK, but could be better
Experimental Apparatus

Here we add detail to picture of the optical bench—much more useful
$a_\mu$ is proportional to the difference between the spin precession and the rotation rate.

\[ \Delta \omega = \omega_a = \left( \frac{g - 2}{2} \right) \frac{eB}{mc} \]

This supports assertion in sentence headline.
BNL Storage Ring

Features:
- Blue/Black circles are part of the physics story
- Diagram allows description of components that enter in the data analysis

incoming muons

Quads
10 nm wires: AuPd on DNA

Make sure you provide something to show scale, and include a short caption to explain what the audience is looking at.
Use equations sparingly

If you use equations
   Slow down
   Talk through step by step
   Explain relevance
   Combine with a picture that illustrates the physical principle involved

If you must use mathematics in your presentation, slow down, and talk the audience through each equation...
The Radiative Transfer Equation

\[
\frac{dI}{ds} = -In(q_a + q_s) + \oint S
\]

- **Number of Photons**
- **Density of Dust Grains**
- **Distance Traveled**
- **Absorption Coefficient** (from geometry and composition of dust grains)
- **Scattering Coefficient**
- **Source Function**

Requirements to solve analytically:
- \( n \) is a constant
- \( qa = 0 \) or \( qs = 0 \)

We want turbulent clouds. \( n \) is not a constant
\[
\frac{\Delta T}{T} = \frac{T(hv, F_0) - T(hv, 0)}{T(hv, 0)}
\]

\[
\Delta \alpha(hv, F_0) = -\frac{1}{L} \ln \left(1 + \frac{\Delta T}{T}\right)
\]

\[
\Delta n(\lambda) = \frac{\lambda^2}{2\pi^2} P \int_0^\infty \frac{\Delta \alpha(\lambda') d\lambda'}{\lambda^2 - \lambda'^2}
\]

\[
\psi(\lambda) = \tan^{-1}\left[\left(\frac{\lambda}{4\pi}\right) \frac{\Delta \alpha(\lambda)}{\Delta n(\lambda)}\right]
\]

What does this mean? Better to provide a physical interpretation in words next to equations.
Avoid distracting text and animation effects!

Don’t overuse PowerPoint animations and sounds!

Make sure there is good contrast between text and background

Use simple (or no) backgrounds on slides

CP
- Parity invariance fails, combine it with charge conjugation to create a new invariant
- Converts the right-handed anti-neutrino into a left-handed neutrino—exactly what we observe in nature
- Neutral kaon experiment
Eschew weird fonts

Don’t use calligraphy or serif fonts

USE THE SAME FONT THROUGHOUT THE TALK

Make all text at least 20 pt
Use “normal” colors

DON’T use red/green or red/blue as contrasting colors
Make sure colors looks the way you expect using an LCD projector!
Avoid neon colors and pastels
Don’t use many random colors; people expect color to mean something

Superconductivity is an electronic state of matter that exists below certain currents, magnetic fields, and temperatures.

I - Current
B - Magnetic Field
T - Temperature
I_c - Critical Current
B_c - Critical Magnetic Field
T_c - Critical Temperature
Tips for giving a scientific presentation

Astrophysics made simple
Pointers for giving the best possible talk:

Maintain eye contact with audience
Don’t stare at screen or monitor

Do not read your talk!

Avoid nervous mannerisms
Pacing, bobbing, waving arms, jingling coins

Use laser pointer or stick directed at screen
Don’t point directly at overhead on projector
Don’t block the screen

Train yourself to speak slowly and distinctly—practice!

Avoid “fillers”: “uh”, “like”, “um”, “okay”

Be enthusiastic!
Act excited by your results!
Pointers for giving the best possible talk:

Don’t show any material on slides (e.g., figures, equations, text, etc.) you can’t explain!!

Rehearse how you’ll end your talk
  Don’t end with “Well, I guess that’s it…”
  Don’t just stop and let the committee guess that you’re done
  Thank the audience!
The best way to prepare for a talk is to Practice

Focus on communicating, not performing
  - Humor is good, but don’t overdo it

Keep it simple

Prepare key phrases
  - It’s okay to write out material first
  - Write the key point to make for each slide

Stay on track
  - Small (planned) digressions fine if motivated, but get back on track (shows you are paying attention to audience)

Try to anticipate likely questions and rehearse answers
More advice…

Bring a copy of your slides if giving a PowerPoint talk
- this will help you practice
- you can distribute these to interested people
- e-mail a copy to yourself so you can download it if needed

Make appropriate use of the screen:
  don’t underfill the screen, and don’t put key information at the edges of the screen.

Have a watch/smart phone handy to check your time

If you’ll use your own laptop, bring necessary adaptors

If you need a laser pointer, bring one yourself!
Preparation is best cure for “Stage Fright”

Know your subject thoroughly
  Practice in a big room in front of real people
  Have all your materials in order
  Arrive early
  Familiarize yourself with the equipment
Remember that your talk should be appropriate for a non-expert audience

Do not use slang or ‘laboratory’ terms

Choose the simplest word

Have a native speaker listen to a rehearsal and review your slides

Speak slowly and distinctly

Keep the density and level of information appropriate for the audience
Handling questions is an essential part of giving a talk

As part of preparing your talk, try to anticipate questions you might get

In each slide, try to identify what the weak points are, what questions you might ask, etc.

Again, don’t put anything on your slides you can’t explain

Repeat the question so all audience members can’t hear it
This will also give you a little time to think about your answer

If you don’t know the answer?
Say “That’s an excellent question. I’m not sure; I’ll have to look into it” or “Let’s talk about it afterward”
Express your thanks

At the beginning of your talk
Acknowledging colleagues and collaborators who contributed to the work

At the end of the talk
Thank your committee (for prelims and thesis defense) or the organizers of the conference/seminar if you were invited