This talk is divided into two parts. In the first part, we’ll talk about the theory of putting together a good talk:

- Why scientists give talks
- Goals for a talk
- How to organize a talk
- Effective figures
- Presenting numerical data effectively
- Handling questions

The second part consists of some practical advice from the veterans—things to do, and not do, when you’re preparing and giving your talk.

DISCLAIMER 1: Do as I say, not as I do. The slides for this talk are standard for an academic lecture. They have way too much text on them for a science talk.

In an effective science talk, you want the audience to look at engaging, visually interesting, instructive images and to think about the concepts being presented—not read words.

Effective public speaking is a practice-based skill; take every opportunity to give talks—your future success as a scientist or engineer will depend on your ability to give good talks.

All images in this talk were purchased from istockphoto.com unless otherwise identified.
Don’t try to write down everything, just listen...

For the “notes,” email cmelliot@illinois.edu.

Printing a hard copy of the “notes” pages in PPT has several distinct advantages for speakers:

1. You can still give your talk if the AV system fails.

2. Improves eye contact and rapport-building with audience—you’re not tempted to turn your back to the audience to see what to say next.

3. Prevents simply reading off the screen.

4. Keeps your narrative in sync with what the audience is seeing.

5. Gives you something to hang onto; prevents nervous flapping around.
**Why give talks?**

**Gets results out to the community faster than formal publications**

**Makes you a better scientist**

*Why science needs talks:*
Publications lag months to years behind discovery—as we learned last week. Talks get ideas out into the community faster to move science forward.

*Why you need to give talks:*
Explaining your ideas—and defending them—makes you a better scientist. The feedback you get from people outside your immediate research group is invaluable.

Embrace every opportunity you have to give talks. Practice your craft. Your ultimate success as a scientist depends on it.
Think about what made a good story when you were 5 years old. The same elements that attracted you as a child still work—interesting pictures, words you understand, simple, direct storyline, a stimulus to your imagination, a logical structure, analogy, an enthusiastic narrator.

For many of the talks you will give or papers you will write as a scientist or engineer, nobody listening or reading will know as much about the subject as you do. You don't have to dumb-down your messages, but you do have to draw your listener in and explain things in terms s/he can understand.

So the first rule of effective scientific communications is understand your audience. Who are they? What do they want to know? What do they already understand? What is going to confuse them? What will engage their interest?

The second rule is tell a good story.
Before you pick up a pencil, answer four strategic questions...

Why?  
Who?  
What?  
Can I?

Why am I giving this talk?
- To disseminate your results to other workers in your field.  
- To test your ideas on other scientists and get their feedback.  
- To establish precedence by announcing your results before your competitors can.  
- To teach the audience something.  
- To achieve fame and fortune; to get noticed or hired; to establish future collaborations; to gain the respect of the community.

Who is the audience for this talk?
- What are their needs, interests, level of knowledge, motivation for listening?

What are the main points I want the audience to take away?
- Reporting original, significant research results.  
- Documenting methods or establishing standards.  
- Warning of a hazardous condition.  
- Examining the feasibility of a project.  
- Reinterpreting previously reported results.  
- Providing an overview of the topic for non-experts.

Can you talk about it at all?
- If you are a member of a collaboration or if the work has any potential commercial applications, you may not be able to talk about your results at all. Check with your adviser about what you can say.
Essentials for preparing your talk

Know your audience!

Determine the style of your talk;
what structure best fits your audience and your message?

Find out how much time you have to speak

Decide on the key points you want to communicate

Determine how best to use figures to illustrate your key points

Allow time for rehearsal and revision

This slide is a horrible example—do not present slides that look like this at your talk. It has way too much text and zero visual interest. It tells your audience “I might be able to be more boring, but I frankly don’t think it’s worth finding out for the likes of you.”
In the next few slides, we’ll look at each of these concepts in more detail, and I’ll present examples to guide you as you craft your own talk.

DISCLAIMER 2: The advice presented here is based on presentation styles for physics; other disciplines may have different expectations of speakers.

As you attend talks in your field, think about how effectively the speaker held your attention and communicated his or her main points. Who is a “good” speaker and why? Learn to recognize and emulate good practitioners.
Rule #1: Know thy audience!
A successful talk is tailored to the listeners’ wants and needs

Informal seminar Report to funders
Scientific conference Job interview

Who are they? What is their level of expertise? How motivated are they to listen?

How large is the group? The size of the group will affect your presentation style—will you need to prepare slides that can be projected in a large room, or will you all be sitting around a table? In general, the smaller the audience, the more likely you’ll be interrupted with questions—allow extra time.

What do you want your audience to do for you?
- Give constructive feedback?
- Learn about what you are reporting?
- Participate by asking relevant questions?
- Give you new ideas or insights?
- Hire you? Give you a grant?
- Buy your product?

If you’re speaking in a large room and everyone is sitting in the back, at the beginning of the talk invite them down front to build rapport. The audience must want to pay attention to you. You want to earn their respect. If you do not build a good relationship with your audience, they will not listen to you, no matter how brilliant or groundbreaking your research is.

What two or three key points from your talk should they take home? What background information do they need to understand these points?

If you can answer these questions, you can achieve your goals and make your audience believe you’re someone worth listening to.
The amount of time you’re allotted determines how much material you can cover in your talk.

It takes about 8 to 10 minutes to adequately introduce, explain, and summarize one major idea or point in a scientific talk.

You cannot present 16 major ideas in a 15-minute conference talk, no matter how fast you talk.

N.B. This equation is also about as complicated as anything you’d want to show in a talk. Think about how long it took you to process and understand the point that was being made in this slide, using an equation. Do you really want to tackle

\[
\frac{\partial f}{\partial t} \bigg|_{\text{coll}} = \int \int g(p - p', q) [f(x, p + q, t) f(x, p' - q, t) - f(x, p, t) f(x, p', t)] \, dp' \, dq.
\]
How do you start—with the ideas!

What are the (2 or 3, at most) main ideas that I want to convey to the audience?

What is the best (easiest to understand, most memorable) way to show them that information?*

*Hint: It’s probably not by written words projected on a screen.

The introductory material flows from these ideas:

- What motivated the work? How does it fit into work that has already been done?
- What background information does the audience need to understand these points?

The body of the presentation also flows from these ideas:

- What supporting evidence and data must be presented?
- How can you most effectively present those data—in text, figures, graphs, equations?

N.B. In most cases, “text” is the worst way to convey scientific data.

For a wonderful introduction to how to present quantitative information, see Edward Tufte’s *Visual Explanations* (Cheshire, CT, Graphics Press, 1997).
Don’t try to tell “the whole story”*
Distill your talk to a few key points (q.v. Eq. 1)
Present only enough data to
Illustrate your main points
Support your conclusions
Demonstrate the originality of your work

*Get the audience interested enough to read the paper

Again, a talk is not your paper projected onto the wall. Your job as a speaker is to thoughtfully select the important points in the paper and convey them in a way that is meaningful and memorable for the audience.
The overall structure of the talk also follows from the key ideas

<table>
<thead>
<tr>
<th>Motivate the key points (Introduction)</th>
<th>Preview your key points (Introduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support your key points (Body)</td>
<td>Show the implications (Future Work)</td>
</tr>
<tr>
<td>Reiterate your main points (Summary)</td>
<td>In other words, don’t let ’em leave without “getting” your key ideas!</td>
</tr>
</tbody>
</table>

Ideally, you’ll convey your main messages to the audience three times during the presentation—first in the overview or introduction, next in the body of the talk, and finally on a summary slide.

Take it from a mother—telling somebody something three times is not overkill.
Write the main ideas as full sentences*

Use the sentences as slide titles

Use the rest of the slide area to explain and support the statements at the top of the slide

*Tip: Read the sentences one after the other. Do they form a logical narrative storyline?

These key sentences encapsulate your whole talk; they provide the motivation, describe the methods, highlight the key results, explain your conclusions.

Arrange the key sentences, one per slide, and move them around until you have a logical, coherent narrative storyline.
Organizing a 20-min talk

**Background and Introduction** (2–4 min)
1–2 slides

**Body** (9–12 min)
Only two or three main ideas (2 slides ea)
5–7 slides

**Summary** (1 min)
1 slide

**Questions** (3 minutes)
(Know thy audience!)
3–4 back-up slides

Follow some simple “rules of thumb”:

If you’d write or draw something on the blackboard or a piece of paper while explaining your ideas to a friend, make a graphic of it.

Allow about 2 minutes per slide.

Allow more time for the audience to “process” slides that present:

- Equations.
- Complicated schematics.
- Numerical data in tables or graphs.

Make some back-up slides; consider likely questions or objections and make a slide to answer each of them. (Knowing your audience includes anticipating what questions they’ll ask.)

Allotted <20 minutes? **Make fewer slides**, don’t talk faster.
The title slide and outline prepares the audience to listen and tells it what to look for

Title slide
- Your name and affiliation
- Venue and date
- Acknowledgment of financial support
- Attention-getting graphic

Outline or overview of presentation*
- Prepares the audience to listen
- Provides a logical structure for your talk
- Summarizes key points

*Tip: An outline isn't necessary for a short talk

The title slide stays up for just a few seconds—its appearance on the screen is the cue to the audience to shut up and listen.

If the moderator has just introduced you and given the title of your talk, don’t waste the audience's time by starting out with “Good afternoon, I'm Anne L. Retentive from the University of New South Amsterdam, and I'm here to talk to you today about “Nanoengineered, Manufacturable, Ion-Implantation Seeded Silica Nanowires for Sensitive BioScreening.” The audience just listened to all that from the moderator. Put up your title slide and get on with your talk.

An outline can be an effective navigational aid for a long talk. One useful way to remind the audience of where they are in the talk is to run a progress bar unobtrusively along the bottom or the side of the screen.
These suggestions for the number of slides to include in a talk are guidelines and are wholly dependent on (1) your purpose for giving the talk and (2) who your audience is.

Have one “Problem Statement” slide that tells the audience why your work is important and why they should listen to you. How does it extend prior work? What important question have you answered?

Method—keep this section short unless the point of giving the talk is to tell people about the exciting new method you’ve developed. If the audience wants to know the exact composition of the samples and where to set the dial, they’ll read the paper.

Results—this section is probably what the audience came to hear (see above). The “results” section should be the longest part of your talk and should provide the most detail.
Most people will remember your images better than your words...

Figures promote audience interest, provide supporting evidence, help explain complex ideas and relationships quickly, and give the audience something to remember, blah, blah...

...and they’ll look at the figures first, too

Use engaging, visually interesting figures to draw a reader in to your story and give them something to remember.

Illustrate each of your main points with an engaging image.

“Graphic excellence is that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest place.” — Edward Tufte
Who can tell me the four reasons to include figures in your paper?

Three reasons?

Two reasons?

Who can describe the image shown on the previous slide?

I rest my case...
Most people will remember your images better than your words...

Figures promote audience interest, provide supporting evidence, help explain complex ideas and relationships quickly, and give the audience something to remember, blah, blah...

...and they’ll look at the figures first, too

If the purpose of this slide was to convey to the audience the four reasons why they should use engaging figures in their talks, it was set up from the beginning to fail, simply by the way the material was presented on the slide.

In the next slide, I’ll show you why and how to fix it.
Figures serve four purposes in talks

1. Engage the audience and capture their interest.
2. Provide supporting evidence.
3. Help explain complex ideas and relationships quickly.
4. Give the audience a visual, memorable “hook” to your key ideas*

*Tip: People remember pictures better than words

First, change the motivating statement at the top of the slide to emphasize the idea that there are four reasons to use figures. In the original slide, the message in the title is “remember the figure,” and the subtitle is “look at the figure first.”

Present the points in a numbered list—easier to process (and remember) than narrative text presented in paragraph style.

English speakers read from top to bottom and left to right. Place your important points strategically—at the top of the slide and along the left margin.
The main advantage of photographs is realism. If you show a photograph or drawing, though, be sure to include something to indicate scale. It’s impossible to tell from the photograph of a) whether the device is something you could hold in one hand or you’d have to haul around on a truck.

A cut-away drawing can show the inner workings of something that a photograph cannot. It also allows control of detail, so that important features are revealed and emphasized.

A diagram can illustrate a process or the flow of a variable through a system.

A plot can reveal relationships among variables.


b) Schematic of a scanning tunneling microscope; Michael Schmid, TU Wein; Creative Commons Attribution ShareAlike 2.0 Austria License.

c) Three-dimensional atomic-force-microscopy image of superconducting Nb islands on a normal-metal substrate. The superimposed cartoon arrows depict fluctuating phases of the superconducting order parameter. Courtesy Serena Eley, University of Illinois.

d) Complementary cumulative distribution functions (CCDFs), or survival functions, of stress drops for samples of \( \text{Zr}_{64.13}\text{Cu}_{15.75}\text{Ni}_{10.12}\text{Al}_{10} \) 2-mm in diameter and 4-mm in length, compressed at various constant strain rates at 298 K. Courtesy James Antonaglia, University of Illinois.
What about captions? Every figure in a paper must have a caption that explains the figure and points out important features. Some scientists say that figures for talks don’t require captions or labels—you’re standing there explaining them, after all.

I, however, think images in talks should have short, explanatory labels that orient the audience. They’re going to look at the picture on the slide first—before you explain it—and they’re going to want to know immediately what is being depicted.

If you’ve used somebody else’s figure, you should at a minimum give credit for it, and perhaps provide a URL or bibliographic reference for where the original may be found.

Another tip for ALL figures—if you show a photograph or drawing of something, provide some sort of visual clue to its scale. The audience may have no idea if the apparatus shown below is 5-cm long or 5-m long from just looking at this image.
The figure on the left could be better; the black background does not offer high-enough contrast, and it is not clear what the white arrows in B are supposed to mean.

(uncondensed and condensed actin filaments; at high multivalent ion concentrations, the ions collectively form a CDW and bundle actin filaments)

I’d also block out the A and B labels—they’re leftovers from the figure prepared for a journal article and are just distracting in this context.
Visual images should inform, explain, or persuade, not merely decorate

Improving the Cooling of Blades and Vanes in Gas Turbine Engines

- To increase efficiency, gas turbine engines have to run at higher power
- Better cooling schemes can dramatically affect the life of blades and vanes in gas turbines

Anybody going to this talk probably already knows what a jet airplane looks like. All this image does is distract the audience from the information the speaker is trying to convey. Who wants to pay attention to the boring, dense text when they can try to figure out what kind of fighter jet this is and how the photographer captured this scary, nose-on photo?
Visual images should inform, explain, or persuade, not merely decorate

Improving the Cooling of Blades and Vanes in Gas Turbine Engines
- To increase efficiency, gas turbine engines have to run at higher power
- Better cooling schemes can dramatically affect the life of blades and vanes in gas turbines

While a spectacular and captivating photo (of a vapor cloud forming around an F-18 Super Hornet as it approaches the sound barrier), this image has nothing to do with cooling schemes for gas turbine engines. Instead of explaining or amplifying the speaker’s points, the photo competes with them.
Visual images should inform, explain, or persuade, not merely decorate

Improving the Cooling of Blades and Vanes in Gas Turbine Engines

- To increase efficiency, gas turbine engines have to run at higher power
- Better cooling schemes can dramatically affect the life of blades and vanes in gas turbines

Again, this photo, while an impressive display of engineering chops, does not explain the concepts being presented and does nothing to inform or persuade the audience.
Choose colors carefully*

*Tip: Avoid using red and green. Between 8 and 12 percent of white males are red-green colorblind—who’s your audience?

Projectors change color appearance; text and background that looks fine on your computer screen may look entirely different when it is projected to an image 1.5-m high and 2-m wide.

In particular, pastel colors “disappear” when projected; use a neutral background with a high-contrast, dark text.

Don’t use color randomly; people expect color to mean something.

Avoid using red and green.

To see what your image will look like to someone with color blindness, there’s a very useful, free emulator at http://asnetresources.com/tools/colorblindness.aspx.

Another good resource is http://www.colourblindawareness.org/colour-blindness/
This slide uses three primary colors to represent the three key physical parameters: current (purple), magnetic field (blue), and temperature (red). I think this particular image would have been improved by reproducing those colors in the arrows.

Inexplicably, about halfway through the presentation, the speaker switched colors, so that now the $B$ field lines were in red and the temperature lines were in blue. People immediately noticed the change, and everybody was confused.

Another problem was that when projected, the deep purple caption was nearly indistinguishable from the both the lighter purple $I$ lines and the red $T$ lines, and I have “normal” vision.
The example on the left shows how you can use a plot to show a trend or reveal an underlying relationship. The actual numerical data is not as important as the slope of the line.

Note also that this plot has axis labels and tick marks that are large enough to be seen.

The example on the right shows how you can present tabular data in a form that people listening to your talk can immediately process. By highlighting the relevant line, you convey the main idea—that UIUC was ranked far down the list. The audience probably doesn’t care that Illinois’s score was 4.66 and Harvard’s was 4.91; they care that Illinois is ranked toward the bottom of its peers, and its percent of women was in single digits. (We’ve improved since 1998.)
Use equations only if absolutely necessary to convey your message

If you use equations...
  Slow down; talk through step by step
  Explain relevance
  Make them large enough to be easily read
  Define your terms!

PowerPoint animations can be useful in presenting equations:

• Highlight relevant terms in different colors
• Drop out terms
• Replace symbols with words
• Blow up parts of the equation or use arrows as pointers as you walk the audience through it
End with a bang, not a whimper

Put up a “summary” slide, reiterate your two or three important points, thank the audience for their attention, and ask for questions.

Don’t trail off with an ineffectual “Well, I guess that’s it…”

Put up a “summary” slide, reiterate your two or three important points, thank the audience for their attention, and ask for questions.
Provide a “summary” slide
Recap key results
Reiterate principal conclusions
Repeat your contact information

Summary and the future
- Post-processed CNT fiber could be a material useful in many applications
- Joule heating was applied to induce cross-linking
- Cross-linking was neither confirmed nor denied
- Tensile strength test results inconclusive
- Future plans:
  - characterize plasma-irradiated fibers with resistance measurements
  - Use pulses of current instead of steady current
  - Strength test more samples

Questions? Contact me!
Thomas Hymel - hymel1@illinois.edu

The summary slide lets you reiterate your key points and cues the audience that you will soon be taking questions. Leave it on the screen during the “questions” period—it will help people review what they’ve learned and remind them of questions they want to ask.

Add your contact information at the bottom of the summary slide; people may not remember it from your title slide.
Make your summary slide count...

\[ \text{witness} \Rightarrow \text{Questions?} \]

It will probably get the longest exposure, and it will be the first thing people see when they wake up again.

This slide will probably get the longest audience exposure—make it count! DO NOT make your last slide an “acknowledgments” list or a contentless “Questions?” slide.
What about acknowledgments?

Tracking nonthermal particles in black hole accretion flow

Alex Ster
University of Illinois at Urbana-Champaign

Put the acknowledgments on the title slide
Reference the grant number(s)—ask your adviser
Use the prescribed language for disclaimers

Just because the “acknowledgments” is the last section of a paper, don’t make it the last slide of your talk.

Use the following language to acknowledge NSF funding: "This material is based upon work supported by the National Science Foundation under Grant No. (NSF grant number)."

I recommend putting it on your title slide; it does not have to be in large font; it just has to be there.

For projects funded by the National Science Foundation, all communications (including interviews, radio and television recordings, video recordings, posters, and talks) except papers published in peer-reviewed journals must also include the following disclaimer:

"Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."
I recommend turning off the “bullet list” format, which is the default in PPT. Presenting ideas in bulleted lists implies hierarchies or relationships that may not, in fact, exist.

“Lists can communicate only three logical relationships: sequence (first to last in time), priority (least to most important, or vice versa), or simple membership in a set (these items relate to one another in some way, but the nature of that relationship remains unstated). A list can show only one of those relationships at a time.” Gordon Shaw, Robert Brown, Philip Bromiley, “Strategic Stories: How 3M is Rewriting Business Planning,” Harvard Business Review 76, 42–44 (1998).
Handling questions is an essential part of giving a talk

Always repeat the question
What if you don’t know the answer?
If the questioner disagrees, don’t argue
Never insult the questioner
If the question is off topic, deflect

Always repeat the question (summarize or paraphrase it) before you plunge ahead with your answer. Not everyone may have heard it, and repeating it not only allows the questioner to clarify if you’ve misunderstood, it also gives you a few precious seconds to think about your answer.

If you don’t know the answer, don’t bluff! Simply say, “That’s an excellent question. We haven’t looked at that.” or “I’m not sure; I’ll have to think about that.” It’s okay not to know the answer; it’s not okay to make something up on the fly.

If the questioner disagrees, or wanders too far off-topic, you can always say, “Thank you for sharing these interesting ideas. Let’s talk about this further after the session...”

Resist the temptation to set a questioner straight, particularly if said questioner is clueless, deluded, or obnoxious. You’ll just look bad. A talk is a forum to share your ideas; it’s not a point-scoring debate.
Advice from a veteran...

Maintain eye contact
Speak naturally, don’t read
Look relaxed (if you don’t feel relaxed, pretend)
Convey your enthusiasm
Use a laser pointer
Turn off your cell phone!
Never ever put anything on a slide that you don’t thoroughly understand

From Professor Lance Cooper:
Maintain eye contact with audience; don’t stare at the monitor or read off the screen. Making eye contact with the audience will build rapport with them and will actually make you feel less nervous.

Do not read your talk! It’s okay to look at notes, but know your material well enough that you can speak about your points naturally. That takes knowing your material thoroughly and practicing.

Avoid nervous mannerisms—pacing, bobbing, waving arms, jingling coins.

User laser pointer or stick directed at screen.

Use the laser pointer as a pointer or underliner; don’t whirl it around like a baton.

Train yourself to speak slowly and distinctly—practice! Avoid verbal “fillers”: “err”, “like”, “um”, “okay.”

Turn off your cell phone—and anything else that could distract you or the audience.

Convey your enthusiasm! If you don’t act excited by your results, don’t expect the audience to be!
Remember, your goal is to convey your ideas, so avoid distracting text and effects!

Use PPT features judiciously and sparingly.
Don’t annoy the audience with cheesy text animations, distracting backgrounds, and obnoxious sound effects.
Replace the content-less PPT “title” with a meaningful motivating statement* for the slide

Instead of a few-word “title,” put a sentence at the top of the slide, which the audience will read first, that explains and unifies the rest of the information presented on that slide.

When you’ve nearly finished your presentation, copy the title statements of each slide into a separate document and read them as a narrative. Does your “story” hang together? Are there obvious gaps? Is any part of the story hard to follow?

*Tip: Write the statement as a sentence and left-justify it.
People read slides from top down, and they’ll look at the statement at the top of the slide first. Make it state one of your key points. People pay the most attention at the beginning of the slide. Keep them engaged and interested by what they look at next. Make it the supporting evidence for your statement.
Slide “aesthetics” are important

Eschew weird fonts

Don’t use calligraphy or serif fonts

USE THE SAME FONT throughout the talk

Avoid distracting backgrounds

Use sans serif (Arial, Helvetica, Calibri) fonts; they show up much better when projected on a large screen.
Choose an easy-to-read font (40 pt)
Make sure your audience (32 pt)
Can easily read (28 pt)
Every one of your slides (24 pt)
From the back of the room (20 pt)
See what I mean? (14 pt)

Tip: Who’s your audience? How many of them are going to have older eyes than yours?

The larger the room, the bigger the font size!

If the room is not full, have the members of the audience come up to the front of the room. You’ll establish an immediate rapport with them if you invite them to come up and be a part of your small, select circle.
To make a line break without starting a new bulleted item, press Shift+space bar.

Use the “Order” command on the “Draw” toolbar in PPT 2003 to arrange text and figures in layers. In PPT 2010, right click on the item you want to arrange and then click on the arrow to the left of the “Send to Back” or “Bring to Front” options to arrange layers.

Extra text boxes don’t cost *anything*. You can use more than one on a slide.
Here’s how I would improve the previous slide.

• Add a motivating statement at the top of the slide.
• Make the obligatory aerial photo of the accelerator smaller and stick it at the lower right of the slide.
• Turn off the bullets and tighten up the prose to reduce the number of lines of text.
• Use the additional space you’ve freed up to show a cartoon of the physical process, a schematic of the beamline, and the energy spectra of the photons, and put those images at the top of the slide to emphasize them.

If you **have** to show the obligatory aerial photo of the accelerator, make it smaller, move it off center-stage, and crop to emphasize the ring, not the surrounding countryside. A scale would be really nice, but although I found 48 different aerial photographs of SPring-8 on the Internet, not one showed how big it is. A label superimposed on the photo that shows where LEPS is located on the ring would be a good addition, too.

Some technical-editing changes:

• A hyphen is required between 8 and GeV in the first line, 351 and nm in the second line, and 1.5 and GeV and 2.4 and GeV in the last line of text. In every case, the number is combined with the unit to make an adjective that describes the size of the following noun; you indicate that it’s an adjective by hyphenating the two components.
• The abbreviation for “ultraviolet” (and infrared) is always written lower case.
• Provide both lower and upper units for numbers in a range.
• Indicate a range by an en dash, not a hyphen.

Critique this slide...

Balance of Physics and Technical Resources

HEP at ANL

2 major “support” groups provide technical innovation, engineering, and experienced technicians, drawn on by all projects
- Electronics
- Mechanical

The work of these groups evolves with time
- ATLAS and MINOS design, prototypes, and then production have been the major focus in recent years
- As production comes to an end (already for mechanical work, after another year for electronic), new priorities take over
  - ATLAS installation and commissioning at CERN
  - MINOS commissioning AND SUPPORT at FNAL
  - R&D for new and exploratory projects

Computer support group operates and configures Division computing, but is not the primary locus of expertise for designing and building software for physics projects
- A dedicated group has been built for ATLAS CORE, Reconstruction, and Grid software
This slide is an example of an “eating the elephant” slide

Balance of Physics and Technical Resources

- 2 major “support” groups provide technical innovation, engineering, and experienced technical staff on projects
- Technical
  - Electronics
  - Mechanics
- The work of these groups evolves with time
  - ATLAS and MINOS design, prototypes, and then production/teams then the major focus in recent years
  - As production comes to an end already for mechanical work, other matters for data taking and analysis
  - ATLAS teleportation and commissioning of QCD
  - MINOS commissioning, AND SUPPORT at PNNL
  - R&D for new and existing projects

Computer support group operates and configures Division computing, but is not the primary focus of expertise for designing and building Division computing.

A dedicated group has been built for ATLAS
- CORE, Reconstruction, and Grid software

Where do you take the first bite??

It’s too busy—what do you look at first? And it’s really, really ugly.
Practice your timing—you will get cut off unceremoniously at conferences.

Ask if the session moderator will give you a two-minute warning if there’s no time-keeper. Put your watch or cell phone on the podium where you can see the time. Do not compensate for having too much material by trying to talk faster—
   Simplify.
   Cover fewer points.
   Eliminate slides.

Think about the importance of each slide. What if, for some reason, your talk must be shortened by five or ten minutes? What slides would you take out? Use the “hide slide” feature in PPT to easily remove slides.

John Witherspoon (1723-1794), the author of the quote at the bottom of the slide, was the sixth president of Princeton, a signer of the Declaration of Independence, and from 1776 to 1782, a leading member of the Continental Congress. He came from Scotland in 1768 to assume the presidency of Princeton and held that office until his death a quarter of a century later.

Although Witherspoon’s advice was no doubt influenced by his experience in the Continental Congress, it remains good advice for scientists. Don’t attempt to give a talk until you are thoroughly prepared, say what you have to say, and then sit down.
The best way to prepare for a talk is to **know** your material*

*Tip: Knowing your material thoroughly is also the best antidote to stage fright.

Practice, practice, practice, practice ...

And don’t just read over your slides. Say what you’re going to say out loud, in front of a mirror.

Focus on communicating, not performing.

Humor is good, but it must be brief, relevant to your subject matter, in “good taste,” and understandable across cultures. (Don’t use American football analogies.)

Prepare key phrases (“Notes Pages”):

  - Okay to write out material first.
  - Write down each slide’s main point.
  - If the slide doesn’t have a point, eliminate the slide!

Stay on track.

  - Small digressions are fine if motivated by a question (shows you are paying attention to audience), but get back on track.
Arrive ahead of your appointed time. Don’t dash in at the last minute, panting and out of breath, in your coat, umbrella, galoshes, backpack, juggling a bag of exhibit-hall geegaws.

Check everything before your talk.

Check the projector:
Make sure you know how to turn it on.

See that it is plugged in and accepting the signal from your laptop.

Adjust the focus.

Check microphones, pointer, other tools.
If a clip-on mike is used, make sure it is fastened securely, check the volume, and then leave it alone.

Arrange your slides, notes, and other materials so you can reach everything without fumbling.

If the battery on your laptop dies or the bulb burns out on the LCD projector, can you still give your talk?

Do not expect the conference organizers to take care of all of your needs if you do not tell them what they are ahead of time. Did you request an overhead projector? Slide projector? An adapter for your Mac?

TURN OFF YOUR CELL PHONE!!
"Embed" special fonts in PPT to avoid unpleasant surprises...

For PPT 2007 and later:
(1). Open the document in PowerPoint.
(2). Click on the "File" menu.
(3). Click on the "Options" link in the left navigation bar.
(4). Click on "Save" to open a dialog box.
(5). At the bottom of the dialog box, click in the "Embed the fonts" check box to turn on the option.
(6). You have to tell PowerPoint to embed the fonts in each presentation; the default is to not embed fonts.

For earlier versions of PPT:
(1). Open the document in PowerPoint.
(2). Click on the "Tools" tab on the top menu.
(3). Click on the "Options" link.
(4). Click on the "Save" tab.
(5). Locate "Font options for current document only" and "Embed TrueType fonts."
(6). Click in the check box to turn on the option.
(7). You have to do this for every presentation; PowerPoint does not automatically embed fonts unless you tell it to—every time.
A word about appropriate dress...

*Tip: Wear comfortable clothes that present a neat, professional appearance

The day of your talk is not the day to try out your new thong underwear or strapless underwire bra.

Wear comfortable shoes.

Wear a shirt or blouse that you can clip a portable microphone to, so that it is positioned about 5–6 in. below your mouth. Turtlenecks and tee shirts should be avoided, because there’s no good place to clip the microphone where it won’t slip.

Wear slacks or a skirt with a waistband or pockets for the microphone’s power supply.
Use minimal hand gestures

Distracts the audience if you’re flapping around
Use a laser pointer, not your arm*
An innocuous gesture in your culture may mean something entirely different in another culture

*And avoid laser-pointer acrobatics

See http://www.cracked.com/article_16335_7-innocent-gestures-that-can-get-you-killed-overseas.html
If English is not your native language (and even if it is!)...use the simplest word

*Tip: Watch for cues from the audience—if they look confused, slow down, back up, solicit a question, explain

Do not use jargon unless you explain it (What is SPH, anyway?).

Choose the simplest words—imagine that you are giving a talk in English to people who don’t speak English as a first or even second language. In science, you probably are!

Do not be embarrassed to ask a native speaker to review your presentation.

Practice speaking slowly and distinctly.
Express your thanks—*briefly*

At the beginning: thank the people that invited you to talk, the person who introduced you, and your collaborators

At the end: thank the audience for their attention

At the beginning of your talk:

- Acknowledge colleagues and collaborators who contributed to the work.
- Thank the conference organizers for allowing you to speak.

At the end of the talk:

- Thank your audience for their attention

Keep your thanks very brief.
Before you leave for the conference, email an editable copy of your talk to yourself, at an address you can get to from the road

Laptops fail
Thumb drives get lost
Files get corrupted
The person who was supposed to load your talk on the seminar room’s computer gets sick or forgets
Sources of good advice:

*The Craft of Scientific Presentations*,
2nd ed., Michael Alley (Springer, 2014)
http://www-writing.engr.psu.edu/csp.html

Any of the Edward Tufte books
http://www.edwardtufte.com/tufte/

Celia Elliott’s PowerPoint Tips:
http://courses.physics.illinois.edu/phys496/
Lectures/PPT_Tips.pdf

Alexei Kaptarev’s *Death by PowerPoint*
http://www.slideshare.net/thecroaker/
death-by-powerpoint

The illustration on this slide could cause problems!
Sources of good advice:

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2nd ed., Michael Alley (Springer, 2014)
http://www.writing.engr.psu.edu/csp.html

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http://www.edwardtufte.com/tufte/

Celia Elliott’s PowerPoint Tips:
http://courses.physics.illinois.edu/phys496/Lectures/PPT_Tips.pdf

Alexei Kaptarev’s *Death by PowerPoint*
http://www.slideshare.net/thecroaker/death-by-powerpoint

Although the “thumbs up” gesture indicates approval to North Americans, it is deeply offensive to many people from the Middle East, West Africa, and South America (q.v. Roger E. Axtell’s book *Gestures: The Do’s and Taboos of Body Language Around the World*).
To recap...

Decide on your goals and analyze your audience

Identify two to three main points that you want the audience to take away with them

Design your talk to make these points clearly, concisely, and memorably

Rehearse and revise (shorten)

Finish on time!

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