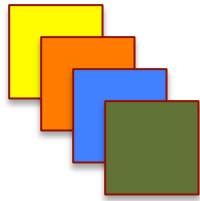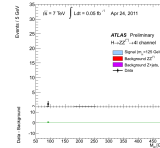# PHY1600
How to Prepare and Give Good Scientific Presentations

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I'm going to work to convince you that you can make very good scientific presentations

Elements of a successful talk

Four issues: speech, structure, visual aids & delivery

Identify 13 critical errors to avoid

Bunch of tips & questions **??**

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A scientific presentation differs in many ways from a written article
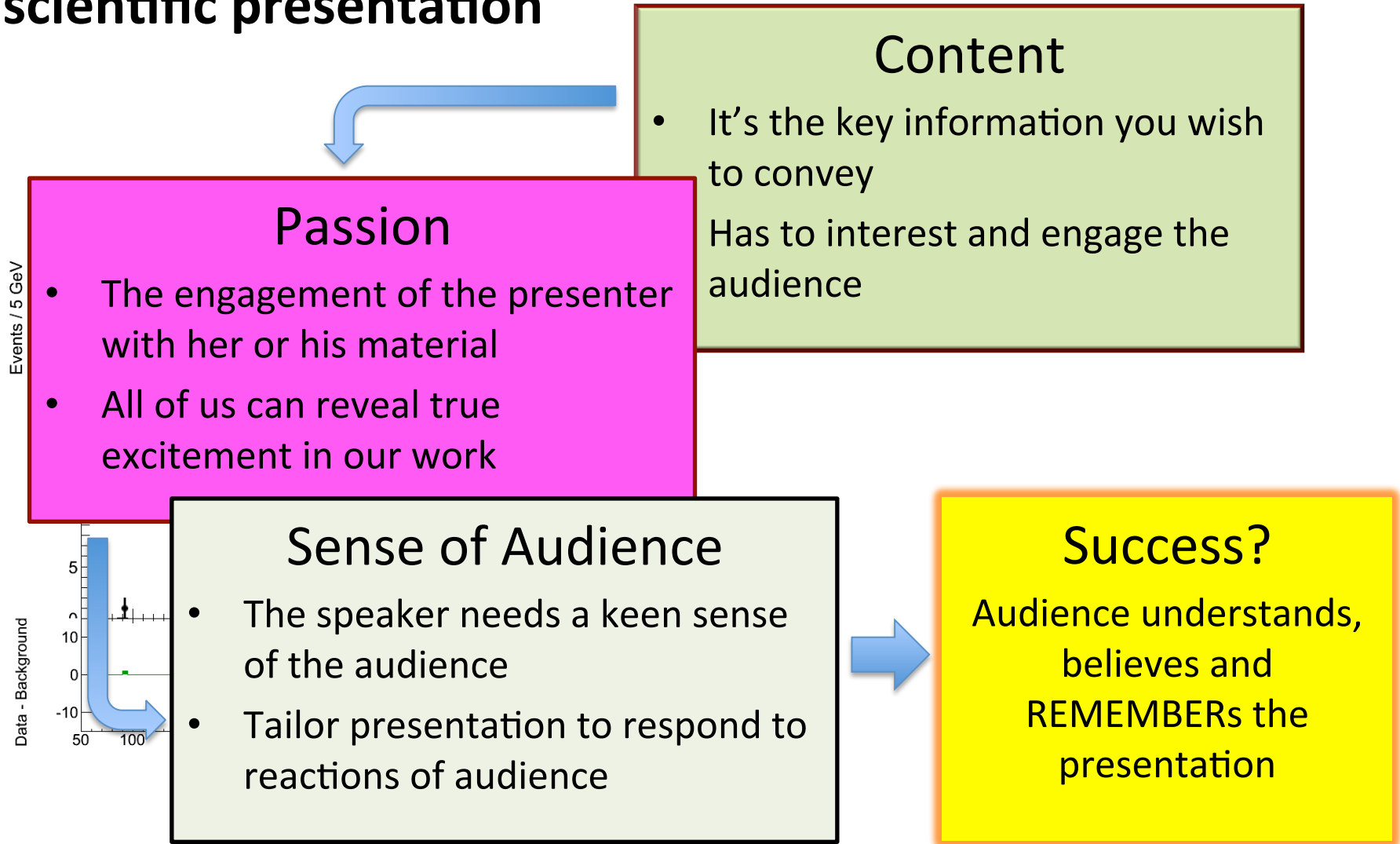
Written article

- Read at any time
- Audience is a set of individual readers

- Has extended time to "soak in" and process
- Limited to written word, tables, figures
- Can't respond to reader's reactions

Presentation

- Very specific timeframe
- Audience is who is in the room, may be difficult to assemble
- Fixed timeframe to deliver and convey argument
- Can use multi-media, including audio and video
- Engage interactively with audience

Murray identifies three ingredients of an excellent scientific presentation

Content
- It's the key information you wish to convey

Has to interest and engage the audience

Passion
- The engagement of the presenter with her or his material
- All of us can reveal true excitement in our work

Sense of Audience
- The speaker needs a keen sense of the audience
- Tailor presentation to respond to reactions of audience

Success?
Audience understands, believes and REMEMBERs the presentation

Events / 5 GeV

Data - Background

5

10

0

-10

50   100

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This presentation is intended to give tools to be able to be a more effective scientific speaker

- Some resources:

  – Michael Alley, *The Craft of Scientific Presentations*, 2nd edition (Springer, New York, 2013)

  – Cigdem Issever and Ken Peach, *Presenting Science: A practical guide to giving a good talk* (Oxford, Oxford, 2010)
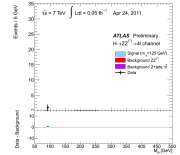
Remember the goals for scientific writing? These are similar for scientific presentations
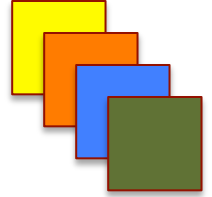
Precise

Clear

Forthright

Familiar

Concise

Fluid

Taken from Fig. 1-1, Pg 12*, The Craft of Scientific Writing*
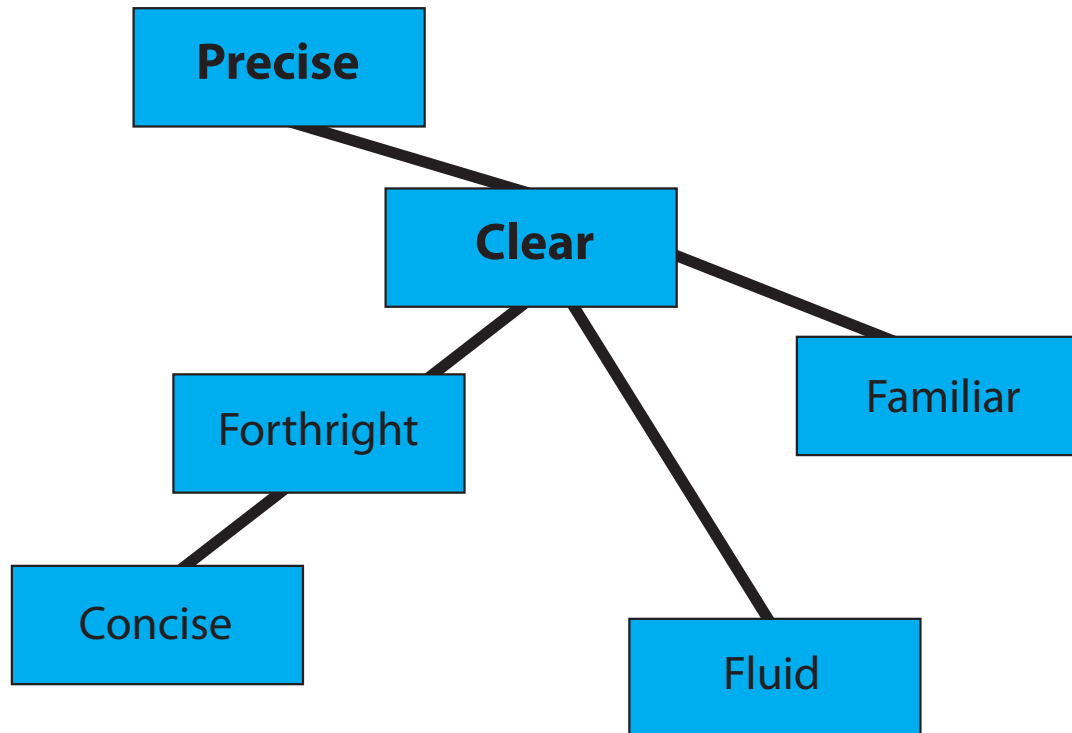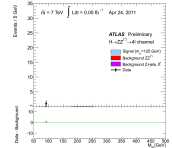
But a presentation offers much more scope for achieving these

Alley analyzes presentations from four stylistic considerations

Speech: The words that you use

Structure: The strategy you choose

Visual Aids: Your supporting cast

Delivery: You, the room and the audience

Each of these can be analyzed separately

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I Speech: the words that you use

Analyze this by looking at the critical errors people make

1. **Giving the wrong talk**
   - **Need to know your audience**
     - **What they know, what they expect to learn**
   - **Talking too long!**

2. **Boring your audience**
   - **Don't read from slides!**
   - **Stories can engage**
   - **Personal anecodotes engage at a personal level**
   - **Humour can be effective**
     - **But it has to fit the occasion**
     - **And if it doesn't work for you, don't force it**

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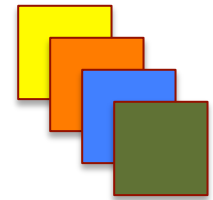
Here is what we tell our colloquium speakers IN WRITING, and well in advance

- The goal of our colloquia is to bring people together to learn about what is happening in the wider world of physics. Colloquia are meant to be informative, enjoyable and appeal to experts and non-experts alike.

- Simplifying a seminar does not turn it into a colloquium - the audience doesn't just want to understand the physics, they want to understand why the physics is interesting and exciting.

- You can assume your audience will mostly be physicists, but almost all of them will not be experts in your field. Your audience will include people from every conceivable branch of physics. We encourage senior undergraduate students, as well as all graduate students and faculty to attend. Depending on the topic, the audience may also include people from related areas of science and engineering as well as the general public.

- Please try to direct your title and abstract to physicists far away from your field. For example, if you are an experimental geophysicist, you might want to think how you could pitch your talk to a high-energy theorist. We encourage you to be informal, even whimsical, in your title and abstract. We will be happy to help you with your abstract to have maximum impact.

- The Department of Physics actively promotes a supportive and friendly environment for all members of the community, irrespective of gender, race, national or ethnic origin, religion, age, sexual orientation, or disability. Please assist us in this endeavour.
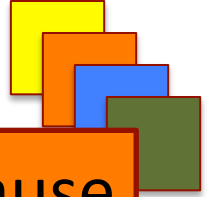
II Structure: the strategy you choose
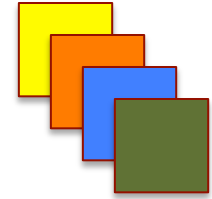
Let's look at Alley's critical errors

3. **Trying to cover too much**

4. **Losing your audience near the start**

5. **Losing the audience on the trail**

6. **Not anticipating audience bias**

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Scope of your talk is one of the most critical decisions you make for a successful presentation

Conflicting demands:

- Cover the material prepared
- Limited time and attention span of audience

A talk usually fails because

- The scope is
  - too deep,
  - too broad,
  - or both

- Two classes of errors:
  1. You thought you had the right scope, but got derailed (by questions, projector failure, difference in expected audience)
  2. Your original scope was incredibly ambitious

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Defining and managing scope…

- First thing to do is know the audience and time constraints
- Then define a talk that you think has the right scope
- Practice, and then iterate
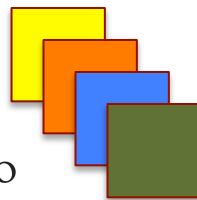- Have a strategy for skipping material

This takes time!

Leave sufficient preparation time

Some personal "rules of thumb"
- Start 2-3 weeks in advance
- I do about 2 minutes per slide, given how I prepare and speak to slides
- Have detailed material in "Back-Up"

Develop your own "rules of thumb"

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Sections of a talk mirror typical structure in a written article

- Introduction

  - What is the work?
  - Why is it important?
  - What is the context?
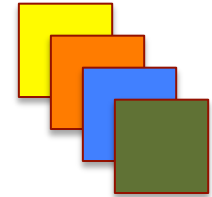 - How will it be presented?

- Clearly defined sections

  - Describes what was done
  - Should have a strategy
  - This is the "trail" that you are leading the audience on

- Conclusions

  - Restates what was done
  - Summarizes key conclusions
  - Implications for future work

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The concluding slide MUST work for you

You can become a good – perhaps excellent – teacher and presenter– make it a professional goal!

- Remember:

  Content, Passion, Sense of Audience

  Tools:
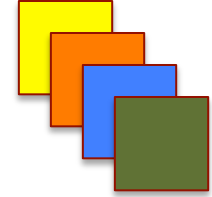 - Speech
  - Structure
  - Visual Aids
  - Delivery

  Audience to understand, believe and remember

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III Visual Aids: The supporting cast

Third set of Alley's critical errors

7. Following the defaults of Powerpoint

8. Following common practices of Powerpoint talks

9. Not accounting for Murphy's Law

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The case against Powerpoint "defaults" is strong

Here are the key
rules for good slides

1. A slide presentation is in fact appropriate
2. Shouldn't be presenting massive amounts of detail
3. It is to aid audience during talk, not the speaker

Evidence is that
Powerpoint defaults
result in weak comprehension:

- Phrase titles are weak
- Bulleted lists too wordy
- Not enough multi-media cognition
- Extraneous information reduces comprehension

Alternatives to a powerpoint approach exist, and Alley makes a strong case for several

Assertion-evidence approach

- Have an uncluttered assertion as slide title
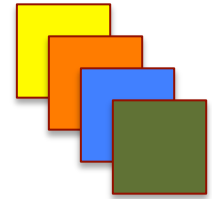- Slide provides evidence

TED Talks

- Large graphics, very few words
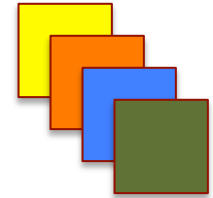- Well rehearsed talk, with strong audience engagement

Pecha Kucha

- 20 slides with 20 seconds per slide
- Could be adjusted – 10 slides with 40 s per slide

Lessig

- About a slide every 3 s
- Requires well-researched presentation, much prep

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IV Delivery: You, the room and the audience

Final look at Alley's critical errors

10. Not preparing enough
11. Drawing words from the wrong well
12. Not paying attention
13. Losing composure

Here are a set of random notes and tips collected* over the years

- "Tell 'em what you're going to say, say it, and then remind them what you have said"

- One set of ideas to each slide

- Rehearse several times

- Have a "Backup" section that provides details

- Leave final slide up with the key conclusions (NOT "THANK YOU")

- Don't sway and appear rooted

- Take time to breath, pause when you need to

- Avoid fillers – "um", "ah", "like", "I mean"

- Make eye contact with people in the room, one at a time through the talk

- Always describe any figure, especially axes and notation

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  Tools:
  - **Speech**
  - **Structure**
  - **Visual Aids**
  - **Delivery**

  Audience to **understand, believe and remember**