Making the most of your 10 minutes of fame

Dave.Barney@cern.ch
I am not going to evangelize!
Presentation skill ≠ soft skill
YOU are the only expert in the room

Don’t assume too much of your audience!
Exercise 1: You have 10 minutes to prepare a 1-minute presentation on your favourite topic (not necessarily particle physics!)

Upload any slides to Dropbox using filename: 

1_<Yourname>..<extension>

I will choose 5 at random for presentation!
Matteo - Silicon

Passionate
Lot of content in 1 minute
Good picture
No text
Non-verbal communication

Tamar - Quantum Entanglement

Structure of slides - like a story
Kept audience wondering
Kept audience involved
Different levels at same time
Good pace
Mateusz - Trackers

Each slide has a caption.

Professional

Pictures were great!

Cartoon was good!

Mareike - Badminton

Nice structure

Personal

Summarised things very well

Every picture relevant

Used text when necessary
Thorben - American Football

Descriptive slides
By pictures - like a movie
Played with expectations

Alessandra - CMS
Brief
Said everything necessary
Self-explanatory picture
Attractive images

Personal
Not enough too fast
Thomas

Focused on what audience needs to know

Looked professional (slides)

No "filler"

Good flow

Passionate!

Nikos - Mass spectrometer

Very happy - passionate

Nikos is a salesman!

Kept it simple

Got the message across
Valerie

No slides! Helps keep attention

Simple plot - understandable

Right amount of information

Irene - languages

Essential & artistic

Not overloaded

Learned things!

Kept attention

Incomplete information
What are the most common problems with presentations?

**Bad presentation**
- lots of text & bullet points
- complicated diagrams
- talking to the board
- monotonous slides
- distorted logos, poor quality images
- not loud enough, too fast
- monotone

**Problems with presentations**
- People reading slides
- Monotone
- Too much text
- Too much information
- Monochrome — inability to find important stuff
- Strange fonts — too often
- Fancy animation
- Incomplete information
- Boasting
- Poor flow
- Use slides as documentation
Why do people put too much information into a presentation?
GUIDELINE #1:
THE PRESENTATION IS FOR THE AUDIENCE
What is the purpose of a presentation?
What is the purpose of a presentation?

For the audience to understand one or more messages
And possibly act upon those messages
message ≠ information
Supercars of Geneva (1/3)
Koenigsegg Agera in Geneva
The only Koenigsegg Agera in Switzerland is the official CMS taxi!
What is a message?

It is **not** the “what”

It is the “so what?”

Including the “so what?” explicitly on your slides is a basic redundancy

Even if the “so what?” is the only text on your slide, an offline reader will be able to understand the important points of the presentation
The “title” part of your slide is perfect for putting the “so what?”
HGCAL Beamtest 2017

Si + Pb ECAL
Si + Fe front HCAL
CALICE AHCAL

Nearly 2 tonnes, 3m long
Full prototype HGCAL is at the limit of what can be placed on the CERN SPS H2 moving table

Nearly 2 tonnes, 3m long
Omitting the “so what?” or not being clear can have serious consequences...

For a pretty extreme view, take a look at:  

And a nice response:  
http://web.mit.edu/5.95/readings/doumont-responds-to-tufte.pdf
Review of Test Data Indicates Conservatism for Tiles Penetration

- The existing SOFI on tile test data used to create Crater was reviewed along with STS-107 Southwest Research data
  - Crater overpredicted penetration of tile coating significantly
    - Initial penetration to described by normal velocity
      - Varies with volume/mass of projectile (e.g. 200ft/sec for 3cu. In)
    - Significant energy is required for the softer SOFI particle to penetrate the relatively hard tile coating
      - Test results do show that it is possible at sufficient mass and velocity
    - Conversely, once tile is penetrated SOFI can cause significant damage
      - Minor variations in total energy (above penetration level) can cause significant tile damage
  - Flight condition is significantly outside of test database
    - Volume of ramp is 1920cu in vs 3 cu in for test
Exercise 2: Decoding NASA

Look at your handouts. Work in pairs! You have 5 minutes to determine the three most important conclusions from this slide

Some context & glossary:
This concerns a **US Space Shuttle**
- **Tiles** = the special foam tiles covering the Space Shuttle
- **Crater** = simulation program
- **SOFI** = spray-on foam insulation, used on the separate fuel tanks of the space shuttle
- **ramp** = piece of debris
- **cu in** = cubic inch
1) The “Crater” simulation is not a realistic representation of what happened

2) A penetration of the tile cannot be ruled out

3) If this happened, the consequences could be catastrophic
Bullet lists have their uses, but don’t overdo it!

Good examples:
- Pros vs cons
- Checklists
Beam monitoring in charged particle therapy

**Parallel-plate ionization chambers**

**PROS:**
- Robust, stable, radiation resistance

**CONS:**
- Slow response time
- Limited sensitivity
- Measurement of number of particles from the produced charge depends on energy
- Daily QA and calibration measurements.

**Silicon detectors**

**PROS:**
- Good sensitivity (single particle detection)
- Small signal duration (direct count of number of particles)
- Fine segmentation -> beam profile
- Time resolution (measurement of beam energy with time-of-flight techniques)

**CONS:**
- Pile-up effects at high frequencies
- Radiation resistance.
Practical Aspects in irradiation test organization

- Ensure that **facility is compliant with your requirements** (energy, flux, etc.)
- Ensure that your **system is compliant with facility requirements** (dimension, operation, safety, etc.)
- Respect instructions of the facility about **positioning and alignment of your samples**. Get this checked by facility staff before going, if possible
  - spare devices can be useful if re-test needed
- Dosimetry usually (but not always) done by facility staff. When this is available, it is likely to be accurate typically ±10%
  - dosimetry may be complex
  - possibly **bring your own reference dosimeter**. This is even more important when the experimental team is not present during irradiation
- Inform the facility about the need of maintaining equipment **for post-irradiation measurements** (annealing tests, etc.)
- **Personnel Dosimetry**: always required when working with ionizing radiation

Federico Ravotti, "Dosimetry Techniques and Radiation Test Facilities for Total Ionizing Dose Testing", Short course RADECS2017
GUIDELINE #2: FOCUS ON YOUR MAIN MESSAGES & USE BULLET LISTS APPROPRIATELY
Plots

The following is taken from the excellent “Traditions, templates, and group leaders” by Jean-Luc Doumont

http://www.treesmapsandtheorems.com/barriers
Efficiency of adiabatic frequency conversion

- Maximum pump intensity available experimentally: 160 MW/cm²
- \( \lambda_1 = 1530 \text{ nm}; \ \lambda_2 = 1064 \text{ nm} \) (Q-switched Nd:YLF)
- The maximum demonstrated conversion efficiency was 75 percent
- Periodically poled crystal can get damaged from 500 MW/cm² of pump intensity
The conversion approaches 100% for high enough pump intensity.
Global Reconstruction - Full Simulation
Reconstruction and Detector Performance: Photons

Figure 11.6: Photon efficiency versus photon-misidentification probability in simulated $\gamma+$ jets events for the BDT training. Signal photons are matched within $\Delta R(\eta, \phi) < 0.1$ to isolated photons generated within the kinematic phase space $p_T^\gamma > 25$ GeV and $1.6 < |\eta^\gamma| < 2.8$. Misidentified photons are defined as reconstructed photons found in the same kinematic phase space but not matched to an isolated generated photon. The performance of a Run 2 cut-based ID is also presented, evaluated on a similar sample of $\gamma+$ jets produced using the Run 2 conditions (average pileup of 25 pp collisions at $\sqrt{s} = 13$ TeV).
Exercise 3: You have 10 minutes to simplify the slide on DropBox called “Exercise3.pptx”

Upload any slides to Dropbox using filename: 3_<Yourname>_<extension>

I will choose 3 at random to show
GUIDE LiNE 3: DON’T MAKE THE AUDIENCE WORK TOO HARD TO UNDERSTAND PLOTS/FIGURES
Maximize your signal to noise ratio!
Trigger Concentrator Cards (TCCs) receive FE card trigger primitives. TCCs send trigger tower energy sums to Regional Calorimeter Trigger (RCT) at 40 MHz.

Data Concentrator Card (DCC) reads FE data and TCC information upon L1 accept; performs data reduction and transfers to DAQ.

**Clock & Control System Card (CCS)**

**Trigger Concentrator Card (TCC)**

**Selective Readout Processor (SRP)**

**Data Concentrator Card (DCC)**

TTC: Trigger and Timing Card

TTS: Trigger Throttling System

mFEC: mezzanine Front End Controller card (connects to FE card via token ring)

SLB: Synchronization and Link Board

mezzanine

---

Basics
Technology
Data Acquisition
Construction
Issues
Performance
Long-term
Organization

---

CMS Induction Course - Calorimetry

D. Barney, P. de Barbaro
Only 70% area can be used for something useful!
Do these photos actually bring anything useful?
Trigger Concentrator Cards (TCCs) receive FE card trigger primitives. TCCs send trigger tower energy sums to Regional Calorimeter Trigger (RCT) at 40 MHz.

Data Concentrator Card (DCC) reads FE data and TCC information upon L1 accept; performs data reduction and transfers to DAQ.
So many abbreviations - need a glossary! People will read this and perhaps miss the main message!

**TTC:** Trigger and Timing Card
**TTS:** Trigger Throttling System
**mFEC:** mezzanine Front End Controller card (connects to FE card via token ring)
**SLB:** Synchronization and Link Board mezzanine
Where should the audience look?
What is important?
Where is the message?

Trigger Concentrator Cards (TCCs) receive FE card trigger primitives.
TCCs send trigger tower energy sums to Regional Calorimeter Trigger (RCT) at 40 MHz.
Data Concentrator Card (DCC) reads FE data and TCC information upon L1 accept; performs data reduction and transfers to DAQ.
Images and cartoons:
Can be great, but be careful not to decrease your S/N and lose your main message(s)!
If I have a novel idea, how do I navigate?

- Numerous discussions, several levels many stages,
- Long process: "how can it be known to the outside world, that the idea was mine" particularly to pertinent committees
- Options and metrics to get individual recognition.
- Motivations to seek more new ideas and/or help career promotion?

**Challenge #6**
What we do at CERN:
Smash things together, see what happens!

Okay, ready? One, two, three, THROW!

Before the particle accelerator
Photos – especially from beam areas
(with special thanks to Clara Nellist)

Do they add something useful to the presentation?
If so, make them look good!
1. Select the eye-dropper tool.

2. Select a neutral grey or white part of your image.
GUIDELINE 4: MAXIMIZE YOUR S/N RATIO & DON’T BE AFRAID TO USE MORE SLIDES!
Content ordering: dare to be different?

Most presentations follow a standard format:
- title
- overview of talk
- what we did
- what we found
- what this means
- what do we do next

This is the exciting stuff!

e.g.
https://indico.cern.ch/event/197461/contributions/1478916/attachments/290953/406672/ATLAS_Higgs-CERN-seminar-2012.pptx
But compare to a newspaper...

Trump back-pedals on Russian meddling remarks after outcry

Republicans and Democrats attack president’s comments in press conference with Putin

- Headline – get attention!
- Image – get attention!
- overview of article
- details
- links to more information

Donald Trump sought to partially reverse course on Tuesday in the face of furious, bipartisan criticism of his public undermining of US intelligence agencies during a press conference with Vladimir Putin in Helsinki.

The US president sought to bring closure after more than 24 hours of bitter recrimination by saying he had simply misspoke when he said in Finland that he saw no reason to believe Russia had interfered in the 2016 US election.
So how *could* the Higgs discovery have been announced?
And what about posters?

Even more important to grab the attention as you do not have a captive audience!

A poster is essentially an abstract for a paper: summarize main points and show reader where to get more information
The CMS ECAL Upgrade for Precision Crystal Calorimetry at the HL-LHC

SCINT2017
Chamonix - France

Arash Jofrehei
on behalf of CMS Collaboration
arash.jofrehei@cern.ch

Physics Motivation
Mass resolution with ~1% precision crucial for discovery of Higgs boson.
Analyzing di-Higgs production will shed light on vacuum stability of universe.
many other beyond standard model studies

ECAL Legacy
5x5 arrays of crystals
APDs in barrel
Vacuum Photo Triodes in end caps
5 identical Very Front End readouts
one Front-End (FE) card for transmission
separate readout per channel, triggered by overall sum
40 MHz sampling ADC with 3 gains

Barrel Electronics Upgrade
faster optical links (4 fibers needed) – No buffer
single crystal trigger primitive
160 MHz sampling with two gains
mitigate dark current, out-of-time pile up, spikes
precision timing is possible

Spike Rejection
energy deposit in the APD bulk
EM-shower-like but faster
currently rejected by topological cuts
single crystal triggering + pulse shape
discrimination will be added

Precision Timing
higher sampling rate
measuring time-of-flight from vertices
precise vertex discrimination
precise angle between di-photons
enhancing mass resolution

For further details, please refer to TDR 17-402 which will come soon.
Fragmentation of jets into $J/\psi$ with CoMicS

Botoul Diab

Once upon a run, $J/\psi$ of $p_T$ larger than 3 (3.5) GeV, in forward (mid-) rapidity, were clustered in jets of $25 < p_T < 55$ GeV.

Nonprompt data and MC have similar trends. Due to the decay kinematics, the prompt $b$ hadrons have a gate different $z$ distribution.

The results for the fraction of $J/\psi$ that are in jets showed a difference between prompt and nonprompt $J/\psi$. This fraction is less than 7% in all cases but it is bigger in data than MC.

This is really interesting. Do we want to study this further? Maybe?

The end.
GUIDELINE 5:
DON’T BE AFRAID TO BE DIFFERENT
How to finish a talk?
Thank you for your patience...

... unlikely many many issues not covered:

signal formation and digitization
readout
buses
hw configuration
hw control
sw configuration
sw control
monitoring

24 January 2017
How to finish a talk?
Guideline #1:
the presentation is for the audience

Guideline #2:
focus on your main messages
spend 70% of your time in planning; 30% in using ppt

Guideline 3:
don’t make the audience work too hard to understand plots/figures

Guideline #4:
maximize your s/n ratio & don’t be afraid to use more slides!

Guideline #5:
Don’t be afraid to be different
Exercise 4: Working in pairs, you have 15 minutes to modify and simplify a presentation you have made in the last six months, to max. 5 slides (3 minutes)

Upload any slides to Dropbox using filename: 4_<Yourname>._<extension>

I will choose some at random for presentation!
Guideline #1: 
the presentation is for the audience

Guideline #2: 
focus on your main messages
    spend 70% of your time in planning; 30% in using ppt

Guideline 3: 
don’t make the audience work too hard to understand plots/figures

Guideline #4: 
maximize your s/n ratio & don’t be afraid to use more slides!

Guideline #5: 
Don’t be afraid to be different