How to give a good talk

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To effectively communicate your work and promote yourself.
Public speaking is a lifetime skill
Tell a compelling story
Preparation and practice!
Form and content are both important
Speak with conviction
Objectives

Motivate people to appreciate your problem, its applications and your contributions

Motivate people to pay attention to your work, cite your papers, and to use your ideas

You rarely need to explain all the mathematics or coding issues you faced
Mainstreaming Interethnic Inclusiveness

Martin Luther King Jr.
28 August 1963
Lincoln Memorial
Washington D.C.
Track record on interethnic inclusiveness

- Dreams
- Implementation

<table>
<thead>
<tr>
<th>Year</th>
<th>Dreams</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1776</td>
<td>1.2</td>
<td>0.1</td>
</tr>
<tr>
<td>1863</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>1963</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(Proposed)
Operationalizing best practices

- Nation’s creed should be implemented more inclusively
- Descendants of former slaves and of former slave owners should synchronize sitting at same table
- Primary evaluation criterion for children should be content of character
Review of Test Data Indicates Conservatism for Tile Penetration

- The existing SOFI on tile test data used to create Crater was reviewed along with STS-87 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 3cu in for test

Here “ramp” refers to foam debris (from the bipod ramp) that hit Columbia. Instead of the cryptic “Volume of foam debris” referring to. A model to estimate damage to the tiles protecting flat surfaces of the wing.
Anatomy of a Talk
The Story is King

A good talk is good story-telling

- know your audience
- design one story around one key idea
- every element should help develop the story (you can’t say everything you know)

Find your story now. Think big!

- how could your research change the world?
- how could it be used by others?
Know your audience

Tell the right story

- for students, faculty, practitioners, lay, specialists, ...
- seminar, conference, job talk, elevator, colloquium, ...

Don’t assume they know too much!

- resist the temptation to go too deep too quickly
- what would you understand the first time you met with your supervisor?
The basic story

Motivation and problem
Development of an approach
Results and conclusions
Motivate the listener

Provide context: Why should someone care?

- your problem is fascinating
- there are myriad practical applications (be careful)
- your approach is widely applicable to other problems (that are relevant to the people in your audience)
- impressive empirical results are always good to show

Don’t be afraid to spend a few minutes on the motivation
Motivate the listener
Problem statement

Inputs
Outputs
Concrete examples
Assumptions
Flow

Signposting

Logical development of ideas

Alternate general-particular. Give a concrete example for each abstraction

Reiterate important points
Outline

- Motivation
- Outline slide
- Related Work
- Our approach
- Experimental Results
- Future Work
- Conclusions

**Conclusion:**

An outline slide is usually a waste of time
Instead of an outline

Tell the story well, and the flow will be clear. (few novels or movies begin with an “outline slide”).

Signpost to keep the flow clear

Use the overview to provide an outline, e.g., ...

There are three key elements to our formulation:

- Mathematical model
- Objective function
- Optimization algorithm
Related Work

Background that you build on

Summary of what people are doing

Only cite what is necessary for your story

- For each citation, what is the purpose? How does it enhance the story?

Cite related work throughout the talk in context rather than just on one or two slides at the beginning.
Conclusions and Future Work

Summarize briefly

Be honest about limitations

Future work: what does it add to your story?
Delivery
Scripting

You must plan what you are going to say

- the introduction is absolutely critical. Plan carefully.
- plan the first two or three sentences for each slide
- goal is not to memorize the words but rather to get the story straight, and be familiar with at least one way of saying what you want to say clearly, without search for words on the fly.
Punctuate Transitions

Clear pauses and recap between sections

- helps people follow through changes in direction
- helps people rejoin the talk after they get lost
Keep it simple and consistent

Nomenclature

- Avoid jargon and expressions not all people know
- Use the same terms consistently throughout
  (e.g., choose one of: parameter, variable, unknown, ...)

Practice, Practice, Practice!

- alone
- to the mirror
- to friends
- to colleagues
- use video
Voice

Project

Enunciate

Make sure you are heard
Calm Conviction

Dress well, stand calmly and address audience, and don’t distract audience with um’s and ah’s, or any unnecessary nervous movement.

Other points:

▷ laser pointers - be careful
▷ speak to the audience, not the slide
▷ arrive early, and test the projector
▷ finish on time or early

Get feedback: You often don’t realize what you’re doing unintentionally until someone tells you.
Questions and Answers

When you are asked questions during or after a talk:

‣ think before answering (if possible)
‣ repeat question so people know which question you are answering (it may not be what was asked)
‣ when you are not sure... say so!
Design
What are slides for?

Slides are useful, ... but less is often more.

- **visualization**: diagrams, equations, videos, ...
- **emphasis**: to ensure that key aspects of your approach and contributions are highlighted
- **roadmap**: where are we? why are we here?

Visual language:

- Design appearance to effortlessly guide attention
- **WYPIWYG**: What you perceive is what you get.
Inference

\[ p(X_1, X_2, ..., X_{10} \mid I) = \prod_i \phi_i(I \mid X_i, V_i, \hat{V}_i) \prod_{(i,j) \in E_k} \psi_{ij}^K(X_i, X_j) \prod_{(i,j) \in E_0} \sum_{V_j} \sum_{\hat{V}_j} \psi_{ij}^O(X_i, V_i, \hat{V}_i, X_j, V_j, \hat{V}_j) \]

**Likelihood**

**Prior**

**Message Passing:**

\[
m_{i \rightarrow j}^O(X_j, V_j, \hat{V}_j) = \int \sum_{X_i} \sum_{V_i} \psi_{ij}^O(X_i, V_i, \hat{V}_i, X_j, V_j, \hat{V}_j) \phi_i(I \mid X_i, V_i, \hat{V}_i) \prod_{k \in \Lambda_{i \rightarrow j}} m_{k \rightarrow i}^O(X_i, V_i, \hat{V}_i) m_k^K(X_i)
\]

\[
m_{i \rightarrow j}^K(X_j) = \int \sum_{X_i} \sum_{V_i} \psi_{ij}^K(X_i, X) \phi_i(I \mid X_i, V_i, \hat{V}_i) \prod_{k \in \Lambda_{i \rightarrow j}} m_{k \rightarrow i}^O(X_i, V_i, \hat{V}_i) m_k^K(X_i)
\]

**Belief:**

\[
b_i(X_i) = \sum_{V_i} \sum_{\hat{V}_i} \phi_i(I \mid X_i, V_i, \hat{V}_i) \prod_{k \in \Lambda_i} m_{k \rightarrow i}^O(X_i, V_i, \hat{V}_i) m_k^K(X_i)
\]
Motion Model: Control Loop

Executed for every hypothesis in our multi-hypothesis tracking framework

- Pick the control policy $\pi$
- Using the selected control policy, generate the next intended kinematic pose $q_d$
- Kernel Regression: from database of MoCap
- Motion Planning
- Motion Control
- Establish motion constraints $m$ to implicitly generate motor forces that would drive the figure towards $q_d$

Initialization
- $q_0$
- $\dot{q}_0$

Motion Planning
- $\pi : A \rightarrow q_d$
- $\text{Kernel Regression}$

Motion Control
- $q_d$
- $m$

Dynamics
- $\text{Crisis Physics Engine}$
- $\begin{bmatrix} q_{t+1} \\ \dot{q}_{t+1} \end{bmatrix} = \int f_{eom} \left( \begin{bmatrix} q_t \\ \dot{q}_t \end{bmatrix}, m \right) \frac{dt}{\Delta t}$
- $\text{Newton's second law}$
- Numerically integrate and update dynamic pose
Simple slide with three points shown all at once
Simple slide with three points shown in succession

Slide with two columns: items and a graphic
Use of text

One idea per slide
- clutter on slides is dangerous -
- don’t worry about “1 slide per minute”

Text should not duplicate what you plan to say
- summarize main points and use words sparingly
  (don’t expect people to read sentences)
- avoid unnecessary bullets (esp. multiple levels)

(Note: These slides are for teaching, not a talk)
Fonts

Fonts must be legible

- use plain readable fonts
- large (but not too larger) - at most 8-10 words / line
- line spacing is as important as font size
- use italics and bold sparingly

Colour

- use (good) colours sparingly
- contrast

Consistency in font type, size, colour, ...
Figures

Visibility is critical: lineweight, axes, labels, ...

- often these must be redone from figures in your paper

Use text to help guide interpretation

- e.g., “lower energy is better”

Display only what you plan to talk discuss
Baselines: “Frozen” and Emission (IPCC WG III AR4, Ch.3, p.220)

Figure 3.33: Impact of technology on global carbon emissions in reference and climate mitigation scenarios.

Note: Global carbon emissions (GtCO₂) in four scenarios developed within the IPCC SRES and TAR (A2, B2 top and bottom of left panel; A1FI and A1B top and bottom of right panel). The grey-shaded area indicates the difference in emissions between the original no-climate policy reference scenario compared with a hypothetical scenario assuming frozen 1990 energy efficiency and technology, illustrating the impact of technological change incorporated already into the reference scenario. Colour-shaded areas show the impact of various additional technology options deployed in imposing a 550 ppmv CO₂ stabilization constraint on the respective reference scenario, including energy conservation (blue), substitution of high-carbon by low- or zero-carbon technologies (orange), as well as carbon capture and sequestration (black). Of particular interest are the two A1 scenarios shown on the right-hand side of the panel that share identical (low) population and (high) economic growth assumptions, thus making differences in technology assumptions more directly comparable.

Source: Adapted from Nakicenovic et al. (2000), PCC (2001a), Rehi and Rowki (2001), and Edmonds (2004).
After

Breakdown of IPCC B2 scenario

Courtesy of Midori Hyndman
The Imperative

- Increasing pressure on our air quality
  - population growth
  - vehicles
  - urbanization
  - industrial development
  - transboundary pollution
- Canadians are concerned about air quality
  - 88% of those polled were concerned about quality of air we breathe in Dec. 2008 Environics survey
- Governments need to work together for health and environmental benefits and best use of air management resources – current economic situation makes this more important

Courtesy of Midori Hyndman
The Imperative

88% of Canadians are concerned about air quality
Dec. 2008 Environics survey

industrial development
transboundary pollution
vehicles
urbanization
population growth

Courtesy of Midori Hyndman
Equations

Use with caution - nothing gratuitous

Ensure equations are readily visible

- large font size
- well formatted (\textit{latex} or \textit{texpoint})
- define all notation (on slide and verbally)

Repeat equations from slide to slide where appropriate (don’t ask people to remember that equation from a previous slide)
Polynomials for StVK-Tet-FEM

- **Strain Energy (quartic)**
  \[ \Pi^e(T_e) = \sum_{j,k} U_j^j \left[ \sigma_{j,k}^e \right] U_k + \sum_{j,k} \left( U_j \cdot C_{j,k}^e \right) (U_k \cdot U_l) + \sum_{j,k} D_{j,k}^e (U_j \cdot U_k) (U_l \cdot U_m) \]
  \[ \text{(Picard et al., 93)} \]

- **Vertex Force (cubic)**
  \[ \Pi^f(T_e) = 2 \sum_j U_j \left[ \sigma_{j,k}^f \right] \]
  \[ \text{5x slower than linear FE} \]
  \[ \frac{\partial V}{\partial q_0} = 2 A_1^q q_0 + A_2^q q_0 + B^q q_0 + 2 q_1 \left( q_1 \cdot C_1^q \right) + \left( q_1 \cdot q_0 \right) C_0^q \text{ } \text{[Capell et al., SIGGRAPH'92]} \]
  \[ + q_2 \left( q_2 \cdot C_2^q \right) + q_0 \left( q_0 \cdot C_0^q \right) + C_0^q + q_0 \left( q_0 \cdot q_0 \right) \]
  \[ + q_1 \left( q_1 \cdot q_0 \right) \]
  \[ f_{\eta}^{(e)} = \frac{\text{vol}}{2} \sum_{j=1}^4 D_{j,k}^e \sum_{k=1}^3 \sum_{l=1}^3 \beta_{j,l} \beta_{k,l} \sigma_{\eta}^{(e)} \text{ } \text{[O'Brien & Hopkins '99]} \]

- **Stiffness Matrix (quadratic)**
  \[ \frac{\partial^2 V}{\partial q_0 \partial q_0} = 2 A_1^q q_0 + A_2^q q_0 + B^q q_0 + 2 \left( q_1 \cdot C_1^q \right) + 2 q_0 \circ C_0^q + 2 C_0^q \circ \sigma + 1 \left( q_0 \cdot C_1^q \right) \]
  \[ + q_2 \circ C_2^q + 1 \left( q_2 \cdot C_2^q \right) + q_0 \circ C_0^q + C_0^q \circ q_0 + C_0^q \circ q_0 + 1 \left( q_0 \cdot q_0 \right) \]
  \[ + 2 \left( q_1 \circ q_0 \right) D_1^q + 1 \left( q_1 \cdot q_0 \right) D_2^q + 1 \left( q_0 \cdot q_0 \right) D_2^q + 1 \left( q_0 \cdot q_0 \right) D_3^q \]
Other Points

Talk about everything on your slides

Avoid placing material near the bottom

Don’t waste time creating fancy animations

Slide numbers, caned templates, logos, names, etc are generally just a distraction
Public speaking is a lifetime skill
Tell a compelling story
Preparation and practice!
Form and content are both important
Speak with conviction