How To Give a Talk

Tammy Kolda
Sandia National Labs
July 3, 2007

Planning for a Talk

Before it’s time to interview, Look for opportunities to get experience

- Internships
  - End of summer presentation
- Student seminars **
  - Graduate student seminar series
  - Journal clubs (present others’ work)
- Local & national meetings
  - Contributed poster or talk
- Toastmasters Organization
  - General public speaking help
  - http://www.toastmasters.org

** This is an opportunity you may need to create yourself!

Your technical talk should have a central message

- Not the same as a classroom lecture
  - E.g., leaving out details can improve it!
- It’s an advertisement (or sorts)
  - For your work (read the paper!)
  - And you (hire me!)
- Even in an hour-long seminar, it’s impossible to cover all details
  - Focus on big ideas and major impact
  - Use simplifying assumptions
- Avoid a chronological description of your work!
Plan how you can convey your message in the allotted time

- Avoid too much background
- Estimate 2-3 minutes per slide
  - 15-minute talk = 5-7 slides
  - 50-minute talk = 15-25 slides
- Prioritize the details
  - If main message is a faster algorithm, focus on method and numerical results rather than theory
- Audience has only allocated a certain amount of time for your presentation
  - Don’t go over!

Tune your message and your timing to your audience

- Who will the audience will be? (Ask!)
  - Students or not?
  - Technical or not?
- Don’t assume their knowledge overlaps with yours
  - Know less about your specialty
  - May know more about related areas
- Set the context (in plain English)
  - How does this help save the world?
  - Exactly how is the science, engineering, or mathematics advanced?

User Tuning of Simulations can be Inefficient

- Run Simulation
- Evaluate Result
- Determine New Inputs

Optimization tunes parameters automatically!

- Run Simulation
- Evaluate Result
- Determine New Inputs

You slacking off while the optimization algorithm does your work automatically.
Components of a Talk

“Tell ’em what you’re gonna say, tell ’em, and tell ’em what you said.”

There are Typical Components to Technical Talks (e.g., CS&E)

- Outline
- Background & Motivation
- Experiment / Algorithm Description
- Theoretical Results
- Experimental / Numerical Results
- Conclusions
- Future Work

Avoid Outline Slides (Generally)

- 99% of outline slides are identical, so they don’t add anything to the presentation
- Alternative: Substitute “transition slides”
- The exception is outlines that don’t fit the typical mode and support the thesis of the talk; see Kelly Dickson

Outline Slides that support the thesis are Good!

- Background
- Numerical continuation and natural parameterization
- Pseudo-arclength continuation (PAC) for simple folds
- Results
- NEW THEOREM: a condition estimate for PAC applied to paths containing simple folds
- Sketch of proof
- Summary

From: Kelly Dickson, SIAM Annual Meeting, 2006
**Background & Motivation < 33%**

- Minimize background to leave time for your contributions
- Do cite related work by the authors' names
  - Sets the context (and shows you understand it)
  - Big-time brownie points if you mention folks in the audience
- Too much background? Work it into the middle of the talk
  
  Oooh, He's spent more than half his talk on background! When will I hear about his work??

---

**Experiment/Algorithm Description: Highlight Newness**

- Use simplifying assumptions
  - E.g., no constraints for an optimization problem
- Keep notation simple and standard
- Focus on what’s new in your version
- **Challenge:** Try to describe the experiment or algorithm in words in addition to (or rather than) technical jargon
- **Challenge:** Ditto for pictures

---

### Making Pattern Search Asynchronous

- **Trial Point Generation:**
  
  \[
  Y = \{ x + \Delta d_i : d_i \in \text{Search Pattern} \}
  \]

- **Trial Point Evaluation:**
  
  For each \( y \in Y \), evaluate \( f(y) \)

  Main Idea: Don’t wait!

- **Decision:** If there is a trial point \( y \in Y \) such that \( y \) is “better than” \( x \), then the iteration is successful; otherwise, it is unsuccessful.

- **Successful:** \( x \leftarrow y \)
- **Unsuccessful:** \( \Delta \leftarrow \frac{1}{2} \Delta \)
- **Stop:** When \( \Delta < \text{Tolerance} \)

---

### Making Pattern Search Asynchronous

- **Trial Point Generation:**
  
  \[
  X = \{ x + \Delta d_i : d_i \in \text{Search Pattern and inactive} \}
  \]

  Submit \( X \) to evaluation queue

- **Trial Point Evaluation:**
  
  Collect a set of evaluated points, \( Y \)

- **Decision:** If there is a trial point \( y \in Y \) such that \( y \) is “better than” \( x \), then the iteration is successful; otherwise, it is unsuccessful.

- **Successful:** \( x \leftarrow y \), reset \( \Delta \)’s, and prune evaluation queue
- **Unsuccessful:** \( \Delta_i \leftarrow \frac{1}{2} \Delta_i \) for evaluated directions
- **Stop:** When \( \Delta_i < \text{Tolerance for all } i \)
Theoretical Results: Help Audience Untangle the Science

- Theoretical results tough to follow
  - Especially for non-specialists
- Explain impact as well as the results themselves
- Only present proofs if key to central message
- Idea: Highlight key variables/idea/etc. in color

From: Computing the best rank-$(r_1, r_2, r_3)$ approximation of a tensor, Lars Elden, Workshop on Algorithms for Modern Massive Data Sets, June 2006.

Experimental/Numerical Results: Make it Clear What’s What

- Avoid showing tables of numbers
- Idea: Use bar charts and graphs
- Clearly label the axes & provide a legend
- Make sure it’s clear which method is yours!

Conclusions & Future Work: Tell ‘Em What You Said

- Succinctly restate your main points
- Remind the audience of the...
  - Motivation for the research
  - Supporting evidence
- Future work (maybe its own slide)

Be sure to also include a slide at the end with your name, email, and URL.

Creating Your Slides

Make Your Slides Readable

- **Do:** Make fonts large (use at least 14pt font)
- **Do:** Use lots of pictures, including general pictures
- **Do:** Use titles that say something (e.g., “Experimental results show new technique is more accurate”)
- **Don't:** Use yellow on a white background (or green text on blue, or blue on black, etc.)
- **Don't:** Forget to check grammar and spelling
- **Don't:** Overcrowd the slide

Load Balancing Makes a Difference

In 3 different groundwater problems, the asynchronicity improved the overall run time.
My recommendation: PowerPoint + TexPoint

- Pros (versus LaTeX)
  - No compilation (except TexPoint)
  - Easy to add pictures
  - Easy to add animation
  - Easy to add equations
- Cons (versus LaTeX)
  - No Linux support
  - TexPoint costs $25
  - Hard to make PDF
- Other
  - PowerPoint is ubiquitous
  - Management requirement!

Colors and Animations: Be Wary

- Use color for emphasis and connections
- Avoid more than 4 colors
- Use animations for emphasis and clarity
- Avoid all gratuitous animation
  - Including page transitions, which PPT likes to sneak in
- Avoid the “strip tease”
  - Generally best to put all information up at the front

Generating Pictures for Slides

Tools for generating pictures: MATLAB, Excel, bargraph.pl (*), LaTeX picture env.

- Be sure that the axes are labeled and the legend is clear
- Use thick lines and colors that show up well

Presentation Tips

“Every talk is an interview talk” – JC Meza
Before the talk: prepare, practice, and get organized

- Prepare your talk at least one week in advance
- Practice! Practice! Practice! (that means 3 times)
- Choose a professional outfit
  - Can it accommodate a microphone?
- Make backups (USB stick)
- Bring a pointer & water

During the talk: Speak clearly, stay calm, look at the audience

- Speak slowly, clearly, and loudly
  - Avoid um, ah, so, and, ...
- Nerves are natural
  - Take a deep breath or a drink of water
- Face the audience, not the projection
  - Trick: Look at the laptop screen
- Avoid reading the slide
  - Think of why you added that slide!
- Don't block the audience view
  - Try to stand next to the screen

Tips and Tricks for Q&A

- Repeat the question
- Take the question seriously, even if it seems stupid
  - May not fully understand the true question
- It's okay to say you don't know the answer
  - But this is a last option!
- Write down the questions during or immediately after the talk
- Don't be surprised if you get a comment that your work has already been done
  - But ask for a reference!

Wrapping Up
Closing Works of Wisdom

- Objective: Maximize conveying a key idea
  - Subject to time and audience constraints
- Preparation is key and practice makes perfect
- For an interview talk, do more than educate me about a subject – tell me what you did!
- Consider the larger context of your work – how will help solve global warming or cure cancer?

Please Contact Me With Questions

- Tammy Kolda, tgkolda@sandia.gov, http://csrm.ca.sandia.gov/~tgkolda/
- Speakers who teach me (very different styles): Dianne O’Leary, Juan Meza, Margaret Wright, Nick Higham (see his Handbook of Writing), Rosemary Chang, Ilse Ipsen, Pete Stewart, Philip Kegelmeyer, Tim Kelley, etc.

Thank You!