



How To Give a Talk


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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.





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!



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Planning for a Talk


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!




What's your elevator speech?
2-3 sentences at most!

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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!



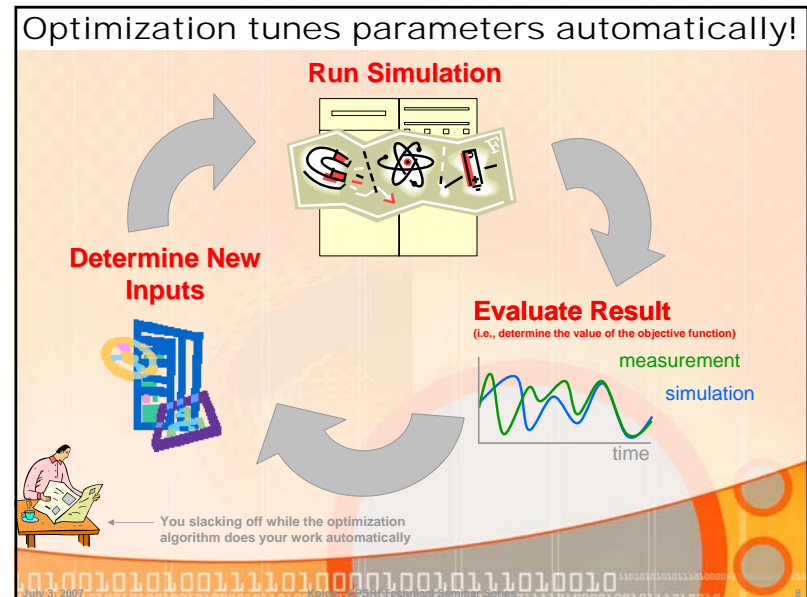
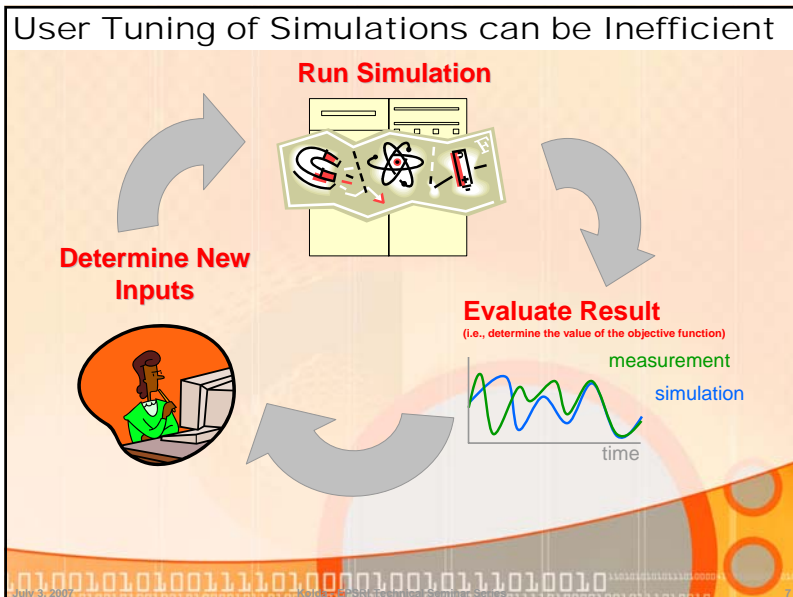
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Tune your message and your timing to your audience

- Who will the audience 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?




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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


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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

- Background & Related Work
- Motivation for Investigation
- Algorithm Description
- Theoretical Results
- Numerical Results
- Conclusions
- Future Work





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Outline Slides that support the thesis are Good!

Overview


- ▶ Background
 - ▶ numerical continuation and natural parameterization
 - ▶ pseudo-arclength continuation (ΨAC) for simple folds
- ▶ Results
 - ▶ **NEW THEOREM:** a condition estimate for ΨAC applied to paths containing simple folds
 - ▶ sketch of proof
- ▶ Summary

A good example of a useful outline slide.

From: Kelly Dickson, SIAM Annual Meeting, 2006

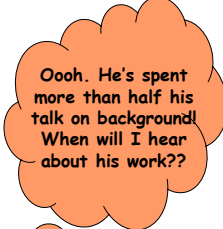



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Background & Motivation < 33%

- 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

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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

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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

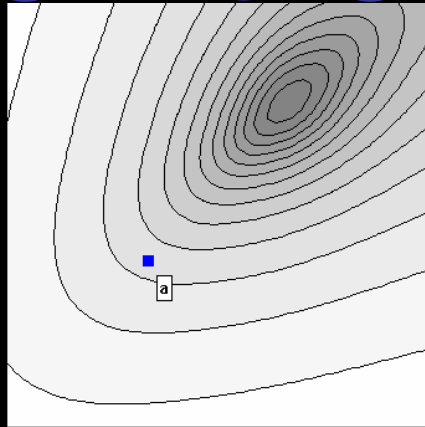
- **Trial Point Generation:**
 $X = \{ x + \Delta_i d_i : d_i \in \text{Search Pattern and inactive} \}$
 Submit X to evaluation queue
- **Trial Point Evaluation:**
 Collect a set of evaluated points, Y
- **Decision:** If there is a trial point $y \in Y$ such that y is "better than" x , then the iteration is successful; otherwise, it is unsuccessful.
- **Successful:** $x \leftarrow y$, reset Δ_i '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

APPSPACK Example

Workers



Waiting



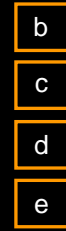
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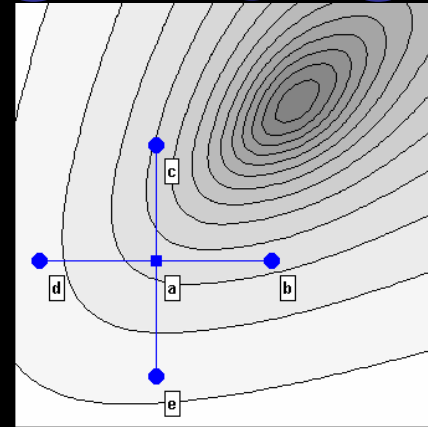
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APPSPACK Example

Workers



Waiting



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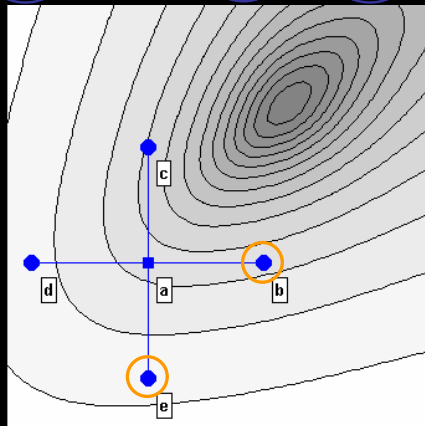
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APPSPACK Example

Workers



Waiting



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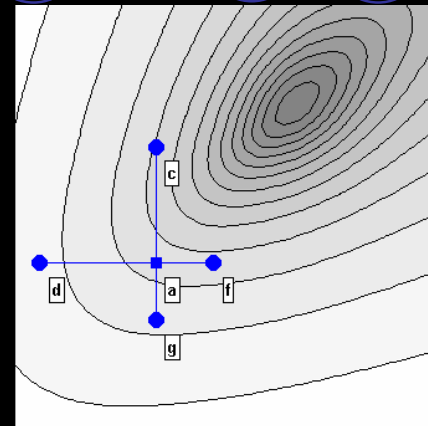
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APPSPACK Example

Workers



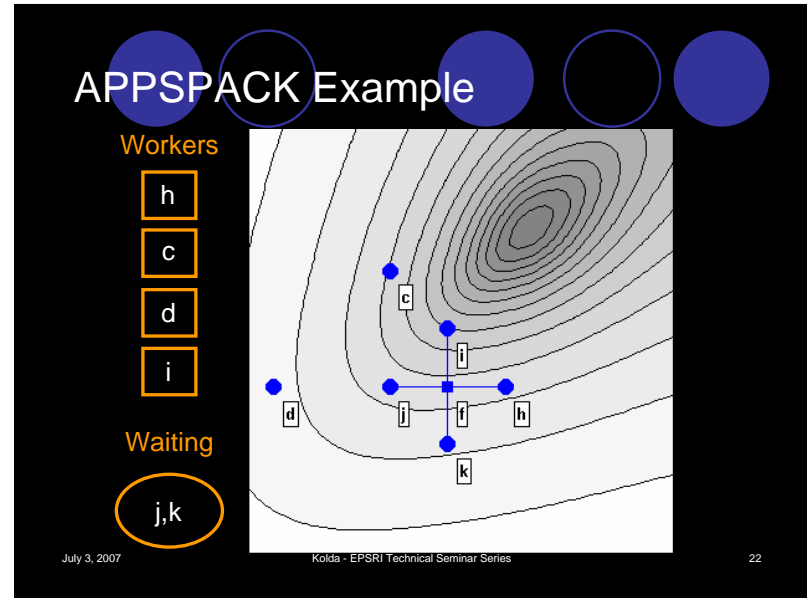
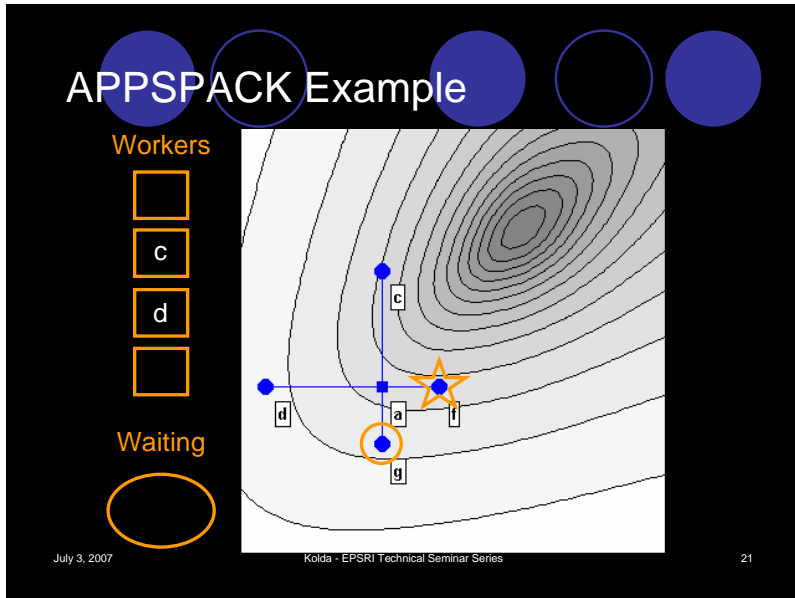
Waiting



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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/ideas/etc. in color

Tensor-matrix-products

Matricization and vectorization obscure the structure.

Basic rule: **Matricize and vectorize as late as possible!**

Lemma 1. Let B and C be 3-tensors of conforming dimensions.

$$\langle B(X_1)_{(1)}, C(X_2)_{(1)} \rangle = \langle X_1, (B \otimes C)(X_2)_{(1)(23)} \rangle$$

$$= \langle X_1, (B \otimes C)_{(23)}(X_2)_{(1)} \rangle$$

Matrix factors can be "pulled out" of the inner product.

From: *Computing the best rank-(r1, r2, r3) approximation of a tensor*, Lars Elden, Workshop on Algorithms for Modern Massive Data Sets, June 2006.

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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!

Data set	ALS-Direct Line-Search	ALS Simple Line-Search	Levenberg-Marquardt	SWATLD
PP1	~12	~5	~1	~1
PP2	~32	~20	~1	~1
Fluor 1	~5	~5	~5	~1
Fluor 2	~2	~2	~2	~1
Fluor 3	~2	~2	~2	~1
Chrom	~10	~5	~5	~1

From: *Computational Tools for PARAFAC models*, G. Tomasi, Workshop on Algorithms for Modern Massive Data Sets, June 2006.

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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



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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



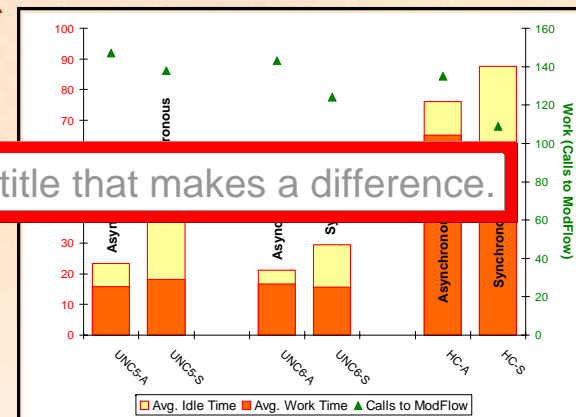
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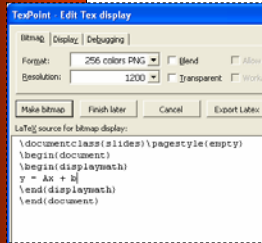
Load Balancing Makes a Difference

A title that makes a difference.



In 3 different groundwater problems, the asynchronicity improved the overall run time.

My recommendation: PowerPoint + TexPoint



$$y = Ax + b$$

- 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(!)



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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



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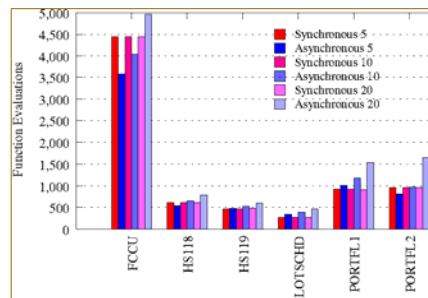
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Generating Pictures for Slides

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



(*) <http://www.burningcutlery.com/derek/bargraph/>



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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



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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



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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!



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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?



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Please Contact Me With Questions

- Tammy Kolda, tgkolda@sandia.gov, <http://csmr.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!



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