How to give a good research talk

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Dear all,

in our Master Seminar this week, I will give a presentation on how to give a good research talk. The presentation features Steve Jobs, Don McMillan, Lawrence Lessig, Mickey Mouse, as well as researchers from the University of Washington. The most frequent word is "chicken".

See you on Wednesday at 16:15 in Room 328 (our seminar room),

Andreas

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Goals of the Seminar

- Find your way into *scientific challenges*
- *Structure and present* scientific material
- Train your social and communication skills

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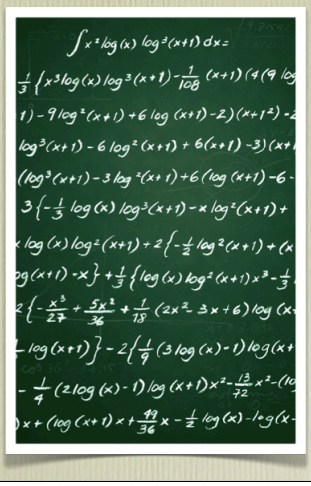
The Purpose of your Talk



You may wish to
* impress people with your brainpower
* tell them you know all and everything
* tell them how you went in there and back

All this is wrong.

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The Purpose of your Talk

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The Purpose of your Talk

- Make the audience read your paper *(and talk about it)*
- Give them an *intuitive feel for your idea*
- Engage, excite, provoke them
- Make them glad they came

From Simon Peyton Jones, "How to give a great research talk"

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Preparation

- Check the material
- Identify central topics and claims
- Outline the talk
- Make a detailed sketch

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Ask Yourself

- Do the claims hold?
- Are the examples illustrative?
- Can I do better in presenting?
- What are the central claims, anyway?
- And how are they supported?

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Ask Yourself

- If someone remembers *one thing* from my research talk, what should it be?

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The Perfect Talk

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Your Audience

- ~~Have read all your earlier papers~~ have never heard of you
- ~~Thoroughly understand Computational Complexity of Bio-inspired Computation in Combinatorial Optimization~~ have heard of it, but wish they had not
- ~~Are eagerly awaiting your latest and greatest~~ could not care less
- ~~Are fresh, alert, and ready for action~~ just came back from lunch and are ready for a nap

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Wake up!

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Organizing Your Talk

- Motivation
- Solution (including failures)
- Results
- Conclusion

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Motivation

- Present the general topic
  A village in the woods
- Show a *concrete problem*
  (and make it the *audience's problem*)
  Wicked dragon attacks the peasants
- Show that the state of the art is not enough
  Peasants' forks can not pierce dragon armor

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Solution + Results

- Show new approach and its advantages
  Hero comes with vorpal blade and fights dragon
- Show how approach solves concrete problem
  Vorpal blade goes snicker-snick; dragon is slayed
- Does the approach generalize?
  Would this work for other dragons, too? Why?

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Examples: Your main Weapon

- Motivate work
- Convey basic intuition
- Illustrate idea in action
- Use *examples* first, *generalize* afterwards

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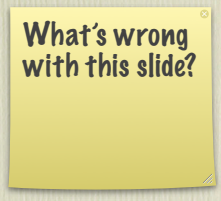
Outline

- Tell a story
- Make slides invisible
- Use examples, lots of examples
- Connect to the audience
- Hope for questions and feedback



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Outlines

- Don't use talk outlines *at the beginning*
- Don't use talk outlines *in between*
- Actually, don't use talk outlines *at all*
- Better: Use a diagram after 5 minutes
- Think of this diagram as a *memorizable image*

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Model Mining

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1. Collect input data

Bug Database

Version Database

Code

2. Map post-release failures to defects in entities

Entity

Entity

Entity

3. Predict failure probability for new entities

Entity → Predictor → Failure probability

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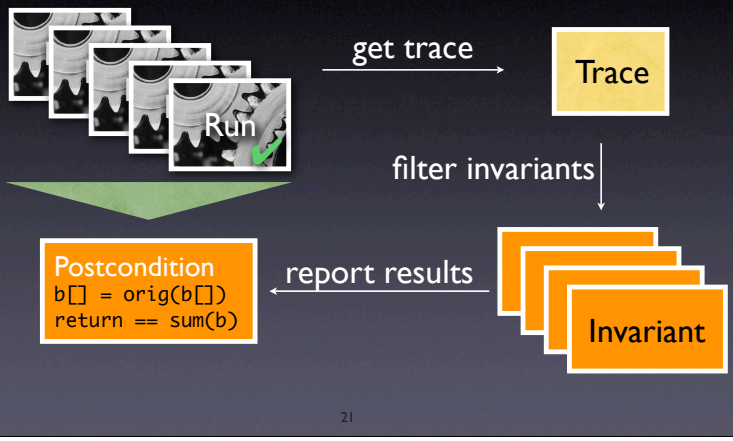
Daikon



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Slide Contents

- Concentrate on the bare necessities (e.g. at most 5 bullets per slide)
- Do not present full sentences on a slide, because these are far too long and hard to read; also, they may tempt you in reading the

Read full sentence aloud

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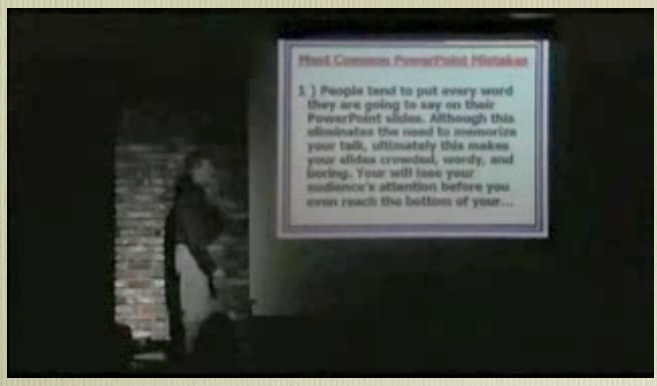
Death by Powerpoint



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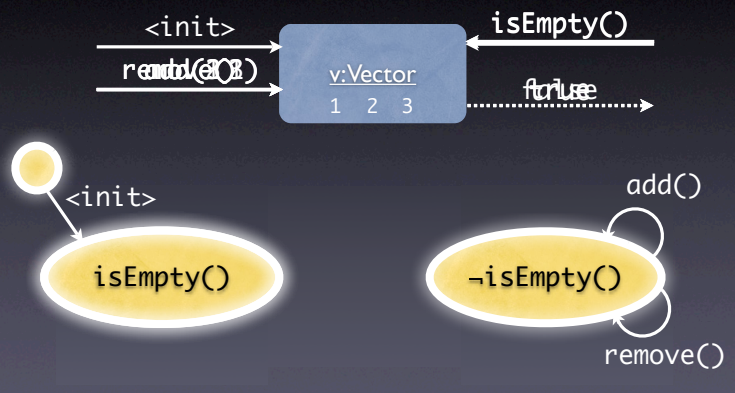
Building Models



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Slide Layout

- Focus on *clarity*
- Avoid all that distracts from the message
- Slides should *support* your (spoken) word
- Always prefer diagrams over text
- Avoid bullet lists (like this one)

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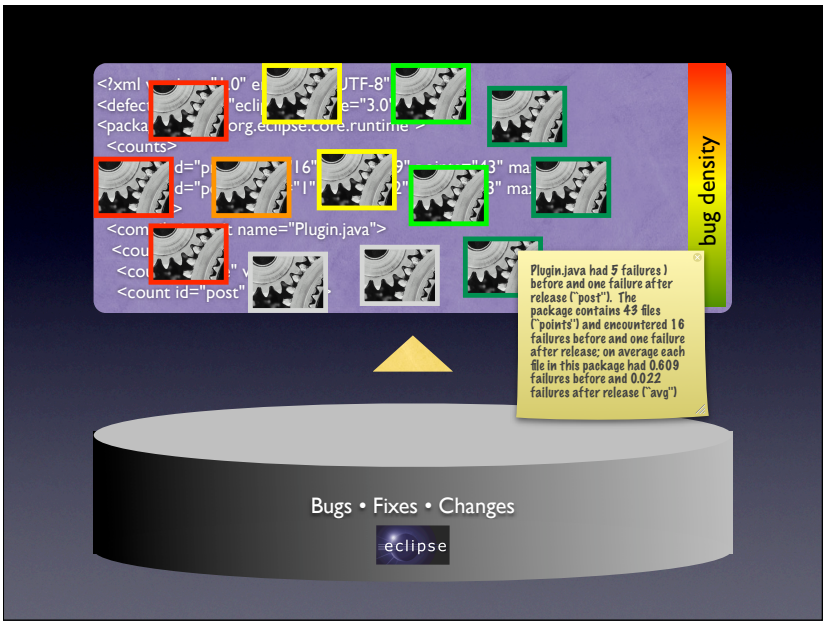

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Maths

$$
\begin{aligned}
f_{h,\varepsilon}(x,y) &= \varepsilon \mathbf{E}_{x,y} \int_0^{t_\varepsilon} L_{x,y_\varepsilon(\varepsilon u)} \varphi(x)\, du \\
&= h \int L_{x,z} \varphi(x) \rho_x(dz) \\
&\quad + h \Bigg[\frac{1}{t_\varepsilon} \Big(\mathbf{E}_y \int_0^{t_\varepsilon} L_{x,y^x(s)} \varphi(x)\, ds - t_\varepsilon \int L_{x,z} \varphi(x) \rho_x(dz) \Big) \\
&\qquad + \frac{1}{t_\varepsilon} \Big(\mathbf{E}_y \int_0^{t_\varepsilon} L_{x,y^x(s)} \varphi(x)\, ds - \mathbf{E}_{x,y} \int_0^{t_\varepsilon} L_{x,y_\varepsilon(\varepsilon s)} \varphi(x)\, ds \Big) \Bigg] \\
&= h \widehat{L}_x \varphi(x) + h \theta_\varepsilon(x,y)
\end{aligned}
$$

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Formal Background

Concrete state $v \in V$ with $v = (x_1, x_2, \ldots, x_n)$
x_i – Return value of an inspector

Trace $t = [(v_1, m_1, v_1'), (v_2, m_2, v_2'), \ldots]$
with $v_i \in V$ and m_i – name of a mutator

State abstraction $abs: V \to S$

Model with transitions $s \xrightarrow{m} s'$ and states $s, s' \in S$

Transition condition $s \xrightarrow{m} s'$ with $s, s' \in S$ iff
$\exists (v, m, v') \in t \cdot abs(v) = s \wedge abs(v') = s'$

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Maths

- Avoid maths.
  - Formulae are for papers, not slides
  - Few people can read + understand complex formulae in 30 seconds
- Demonstrate that the formal foundation can be presented on demand
- *Examples are more important than maths*

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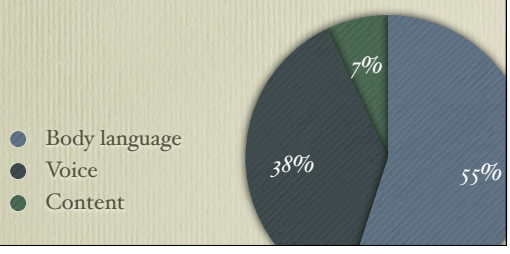
Diagrams

- Use simple, clear diagrams
- Convey exactly *one* message per diagram



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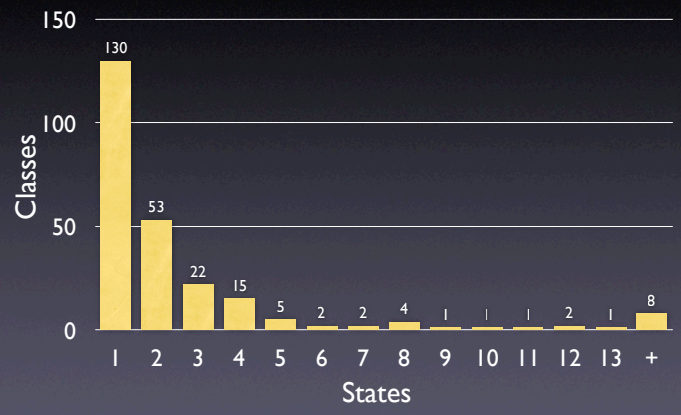
Model Sizes



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Visuals and Animation

- Visuals and animations are ok in *diagrams*
- Every other use should be well motivated
- Do not use them as decorations
- Do not use them as distractions
- Avoid overused graphic clichés

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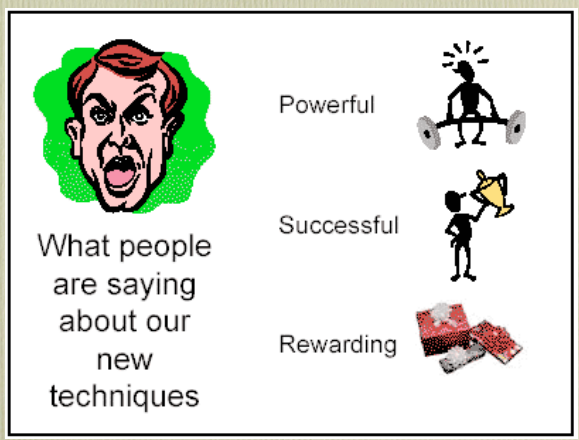
What's Wrong?



http://www.indezine.com/articles/slidesfromhell2.html

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Death by Powerpoint

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Strive for Simplicity

- Simple *messages* get across easier
- Simple *examples* fit on one slide
- Simple *slides* make the audience listen
- Simple *claims* tend to be general, too
- Simple = Hard!

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The Talk

- Do not *read your slides* (from paper or slides)
- Speak slowly, loudly and clearly
- Speak *personally* (Use "I", not "one")
- Change your *tone* – and use *pauses*

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The Jelly Factor

- Every presenter is nervous (and so am I)
  - Legs start shaking
  - Need for air
  - Brain goes into stand-by mode
- ... but nobody will notice, let alone worry

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The Jelly Factor

Before the talk:

- Wash your hands
- Sit down
- Go through your slides
- Memorize the first sentences (no brain required)

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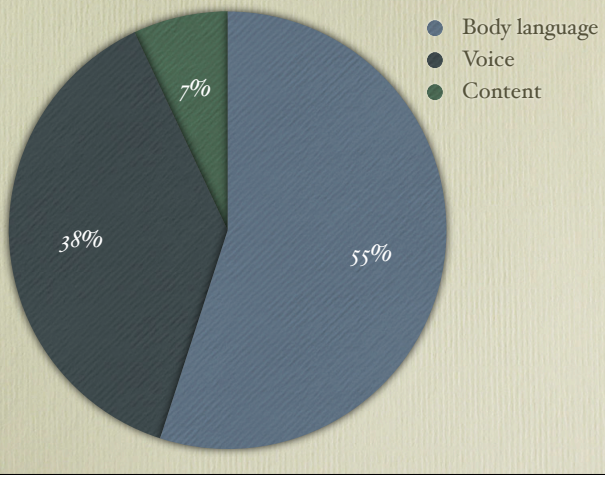
Your Impression



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Connecting to the Audience

- Talk *directly* to the audience
- Ask *rhetorical questions* *("What should the poor peasants do?")*
- Search *eye contact* to audience (not to slides, not to professor)
- Convey your own *enthusiasm and excitement!*

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Some Great Presenters

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Steve Jobs

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Lawrence Lessig

London publishers:
"copyright is forever"

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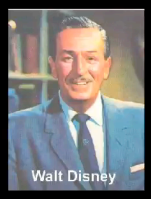
Lawrence Lessig



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The Conclusion

- Refer to the beginning
  ...and they lived in peace henceforth
- Summarize
  ...and the key point is:
- Open issues
  ...but there are more dragons that loom in the dark
- Consequences
  If you ever see a dragon, ...

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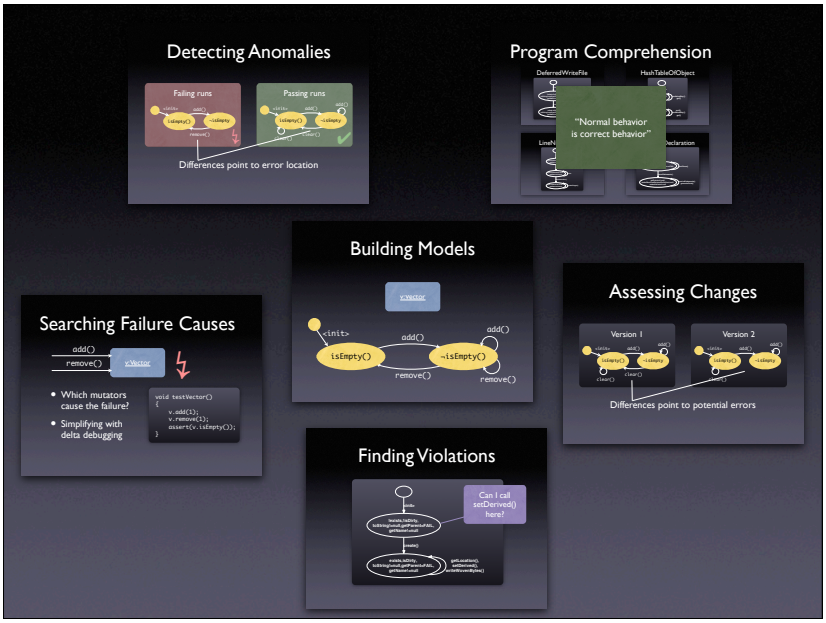

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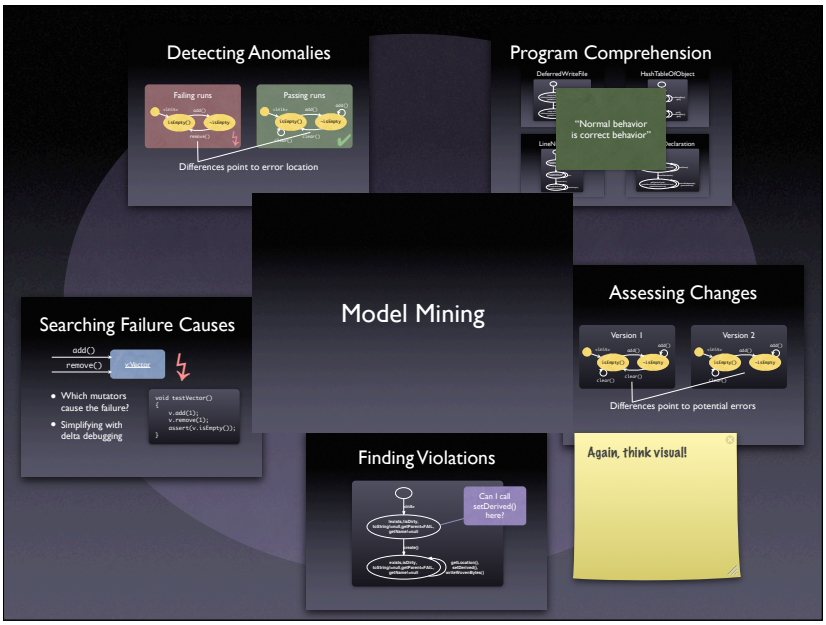

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Any Questions?

- Good research raises lots of questions!
- Questions are great to connect to the audience and to direct and shape own work
- The worst embarrassment is to *have no questions at all*

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Dealing with Hard Questions

- Repeat question (helpful for audience + gives time for preparing an answer)
- In doubt: "I don't know, but I'll look into it"
- Or: "Let's just take this offline"
- Be respectful to the audience – no punching in the lecture room

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Summary

- Tell a story
- Make slides invisible
- Use examples, lots of examples
- Connect to the audience
- Aim for questions and feedback

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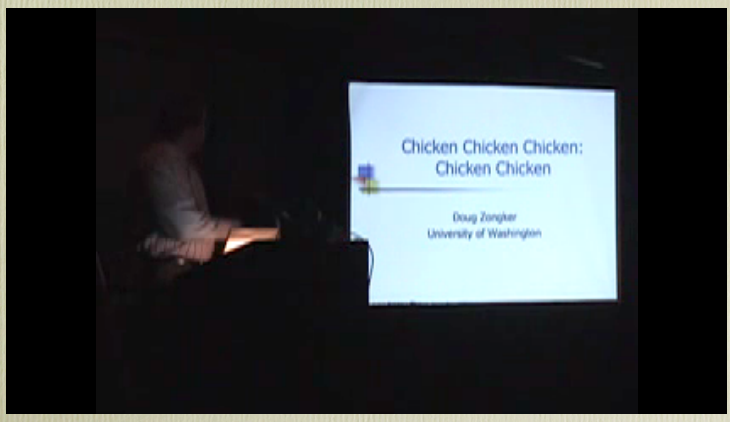
Doug Zongker



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Annals of Improbable Research 12(5), 2006
http://isotropic.org/papers/chicken.pdf