

Workshop #4: Giving a Talk.

Dan Larremore

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Some talks are **amazing**.

fascinating content + clear presentation + fun
→ “airplane-mode talk”

Other talks are **literally the worst**.

unclear what is content + bad presentation + not fun
→ “collective marginal politeness”

Today: Get them to clap because **they loved it.**
Not because they’re glad it’s over.

Tips for giving good talks.

1. Philosophy, structure, and strategy.
2. Slide rules so your slides rule.
3. How to improve efficiently.
4. Game-day tips.

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A talk is **information transfer & a performance**. It can...
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- teach** the audience a new idea or result,
- excite** people about working in your area.

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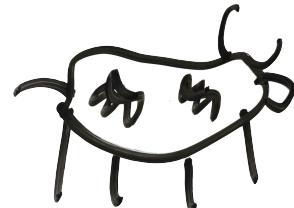
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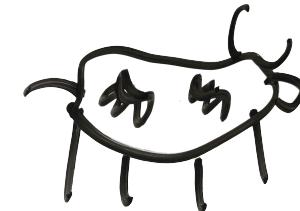
for science

entice someone to read your paper,
bring you that job/data/collaborator/respect,
teach the audience a new idea or result,
excite people about working in your area.



Step 1: decide what you want *and write it down*.

Ex: I want you to think of this talk first, the next time you prepare a presentation.



Step 1: decide what you want *and write it down.*

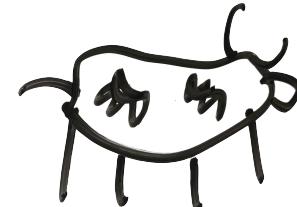
Second, identify **the idea**.

A talk should focus on **an idea, not a paper.**

Compare: “I want to tell you about a finding.” vs “I want to tell you about my paper.”

The idea is the cargo of the talk. The thing they take home.

What will they say when asked what your talk was about?



Step 2: identify your cargo and *write it down.*

Third, identify your audience.

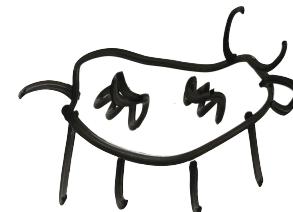
Try to put yourself **in their position**.

What are their brains going to be like, *when you give the talk*?

Estimate their knowledge, opinions, mood, fatigue, etc.

Consider audience variance, not just mean.

And, err on the side of *overestimating* variance.



Step 3: model your audience, and *write that down*.

Fourth, set your slide budget.

1 slide = 1 minute.

Start with this unit conversion.

Give 5 talks. Only *then* adjust.

Filler slides count.

A 10-minute talk.

1.

2.

3.

4.

5.

6.

7.

8.

9.

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1. Title Slide
- 2.
- 3.
- 4.
- 5.
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- 7.
- 8.
- 9.
10. Thx & Acknowledgements

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General Structure:

Tell ‘em what you’ll tell ‘em.

Tell ‘em.

Tell ‘em what you told ‘em.

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2. Intro. Entice audience.
3. Intro. Hook audience.
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Tell ‘em what you’ll tell ‘em.

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1. Title Slide
2. Intro. Entice audience.
3. Intro. Hook audience.
4. Outline. What you’ll tell ‘em.
- 5.
- 6.
- 7.
- 8.
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10. Thx & Acknowledgements

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A **10-minute talk.**

General Structure:

Tell ‘em what you’ll tell ‘em.

Tell ‘em.

Tell ‘em what you told ‘em.

1. Title Slide
2. Intro. Entice audience.
3. Intro. Hook audience.
4. Outline. What you’ll tell ‘em.
5. [Result]
6. [Result]
7. [Result]
8. [Result]
9. What you told ‘em. + 1 Q
10. Thx & Acknowledgements

Fourth, set your slide budget.

1 slide = 1 minute.

Start with this unit conversion.
Give 5 talks. Only *then* adjust.

Filler slide

A 10-min

General Structure:

Tell 'em what you'll tell 'em.

Tell 'em.

Tell 'em what you told 'em.

1. Title Slide
2. Intro. Entice audience.
3. Intro. Hook audience.

Only four slides of content.

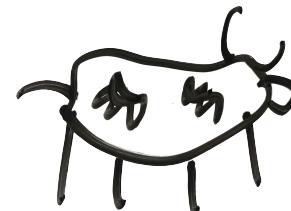
The rest is [important] narrative.

4. [Result]
5. [Result]
6. [Result]
7. [Result]
8. [Result]
9. What you told 'em. + 1 Q
10. Thx & Acknowledgements

Fourth, set your slide budget.

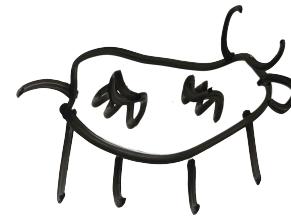
Write **1 sentence** for each slide,
that **explains what the slide will do**
or **chooses a figure** for the slide.

1. Title Slide
2. Intro. Entice audience.
3. Intro. Hook audience.
4. Outline. What you'll tell 'em.
5. [Result]
6. [Result]
7. [Result]
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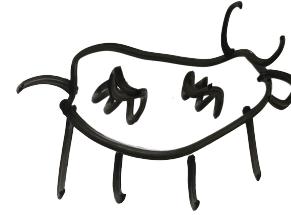


Step 4: budget + topic sentence for each slide.

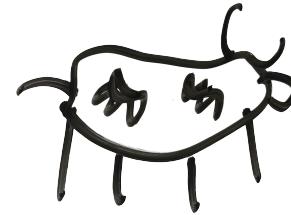
Recapping the strategy so far:



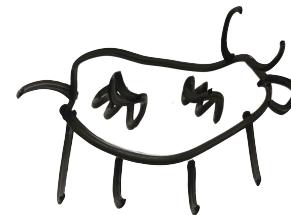
Step 1: decide *what you want* and write it down.



Step 2: identify *your cargo* and write it down.



Step 3: model *your audience*, and write that down.



Step 4: budget + topic sentence for each slide.

Finally, refine & enhance your outline.

People like stories.

Coherent narratives. The story of the problem.

Personal puzzles. The story of the research & you.

Plot twists. Surprises. Confusion. Resolution.

People like to feel smart.

Take one hard thing and help the audience get it.

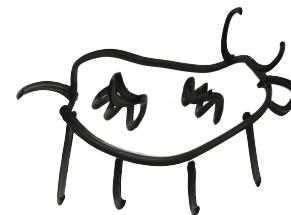
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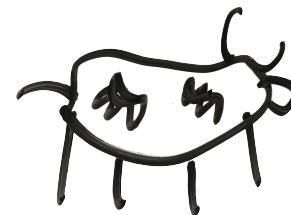
People like to feel smart.

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3. Intro. Hook audience.
4. Outline. What you'll tell 'em.
5. [Result]
6. [Result]
7. [Result + Aha! moment]
8. [Result]
9. What you told 'em. + 1 Q
10. Thx & Acknowledgements

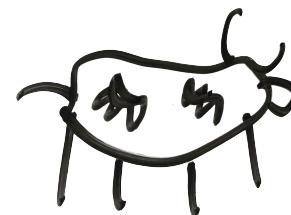
Philosophy, structure, and strategy.



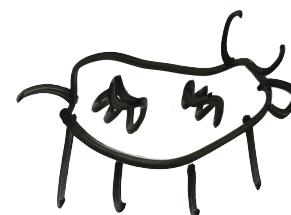
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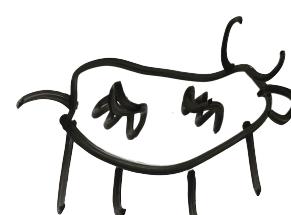
Step 2: identify *your cargo* and write it down.



Step 3: model *your audience*, and write that down.



Step 4: budget + topic sentence for each slide.



Step 5: refine & enhance with narrative & “Aha!”

Observation: at this point, you don't have any slides.

Tips for giving good talks.

1. Philosophy, structure, and strategy.
2. **Slide rules so your slides rule.**
3. How to improve efficiently.
4. Game day tips.

Slide rules.

Aspect ratio: widescreen only. It's 2020.

Slide rules.

No unexplained figures.

And no unexplained axes.

[Literally no point in figures if people don't get them.]

And also:

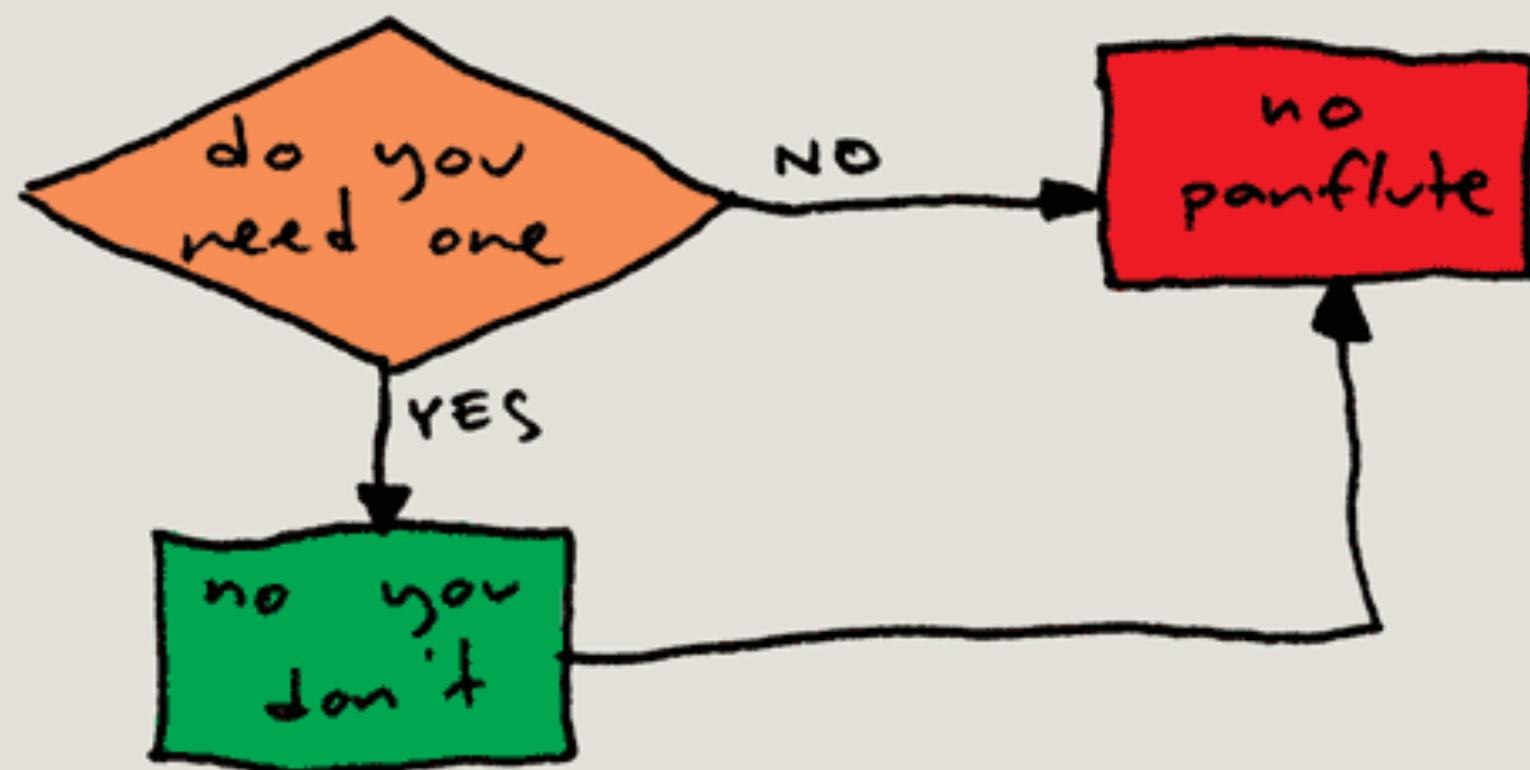
1. Say “horizontal” and “vertical”, not x and y.
2. Consider putting up the axes before the content, and set expectations or ask for speculation [budget this]. What do we expect this plot will show? [\[Example\]](#)
3. Remake labels from the PDF version of figures in larger fonts for your talks. [\[Example\]](#)
4. Annotate your figures with arrows, highlights, etc. [\[Example\]](#)

Slide rules.

No unexplained equations or notation.

“Yes, but I *need* this notation.” lol ok, but do you really?

PANFLUTE FLOWCHART



Slide rules.

No unexplained equations or notation.

They cost attention but provide precision. Consider the tradeoff.

Exceptions:

Audience affects the tradeoff. Physics department vs Sociology department.

Use in “job talks” where you *need to signal* credibility and rigor.

Use to combat “lightweight” bias* of audience. Do not overcompensate. [\[Example\]](#)

Slide rules.

No small fonts.

Except for footnotes and citations.

Slide rules.

Put mini-figures on the conclusions slide.

Particularly useful for long talks. [\[Examples\]](#)

Slide rules.

Use a consistent theme and fonts.

“What would Sam Way do?”

Slide rules.

No unexplained figures.

No unexplained equations or notation.

No small fonts.

Use a consistent theme and fonts.

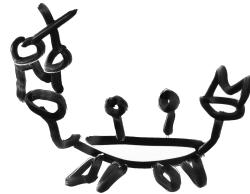
Put mini-figures on the conclusions slide.

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What should you say?



Step 1: List what you *need* to say for each slide.

Then review your list.

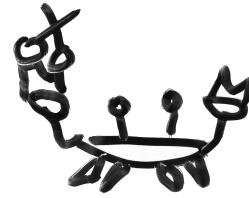
Each slide is a story. **Revise each slide** till you naturally link its plot points.

If you think you'll forget something, **place a cue** on the slide. [\[Example\]](#)

If there is key wording, **write exact wording** on the slide. [\[Example\]](#)

Note: figures are a prepackaged story: **tell figures start to finish**.

Transitions are as important as content



Step 2: Plan every transition.

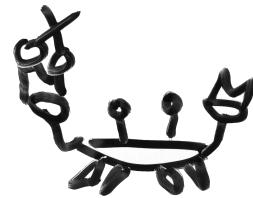
What will you say before clicking “next”?

Set audience expectations, and then meet or defy them.

Say it before clicking! Never talk through a transition.

Fun experiment: watch people’s eyes at slide transitions. They’re *never* on the speaker!

Practice and revision are fundamental.



Step 3: Talks don't get worse with practice. Ever.

- A. Make the slides, talk them through, solo, start to finish.
- B. Edit the slides, rehearse the talk. Time it. [Repeat]
- C. Present it like you mean it to video or a friend. Time it.

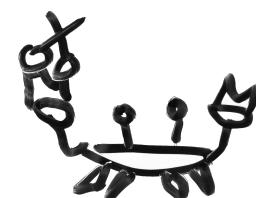
Note: Giving a first-draft talk is disrespectful. Don't do it!
- D. Listen to the feedback. Make changes. Hit step B again.

Asking for feedback and then ignoring it is wasteful. Don't do it!
- E. Apply extra polish to the intro, conclusions, and transitions.

Equip yourself with delivery tools

No. Not laser pointers. Don't use a laser.

- Speed.
- The pause.
- Loud vs medium.
- Warmth vs authority*.
- Eye contact (and intentional looking away).
- Pitch—consider mean & variance. [beware uptalk]
- Body movement. Head, hands & arms [the box], and legs.
- Turn it up to 11.
- Special effects**. The echo. The slow walk. The double pause.

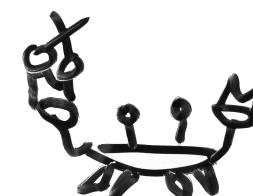


Step 4: Plan a couple delivery tools.

Equip yourself with delivery tools

No. Not laser pointers. Don't use a laser.

- **Speed.** Finishing under time at 1000 words/minute can be as bad as running over time at a regular pace. Experiment with speed.
- **The pause.** Try a pause to let your last statement sink in. Doubles as built-in water break. Feels longer to you than to audience!
- **Loud vs medium.** Again, experiment, but err on the side of more volume, not less.
- **Warmth vs authority***. Next conference, notice how speakers tend to fall somewhere on an axis between warm & authoritative.
- **Eye contact (and intentional looking away).** More is better, generally. As with the others: experiment!
- **Pitch—consider mean & variance. [beware uptalk]** Opinions vary re uptalk. I suggest avoiding.
- **Body movement. Head, hands & arms [the box], and legs.** Experiment! Try a new move!
- **Turn it up to 11.** Enthusiasm is fun for you and the audience. Record yourself and cringe at how your 11 is IRL a 4.
- **Special effects**.** The echo. The slow walk. The double pause. Advanced moves. 😎

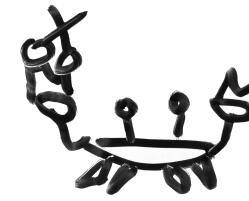


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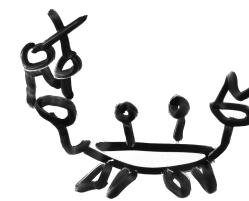
How to improve efficiently.



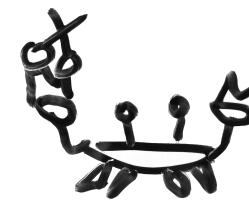
Step 1: List what you *need* to **say** for each slide.



Step 2: Plan every **transition**.



Step 3: Talks don't get worse with **practice**. Ever.



Step 4: Plan a couple **delivery tools**.

Recommendation: hit step 4 before the day of the talk.

Tips for giving good talks.

1. Philosophy, structure, and strategy.
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Things to do before you stand up.

Take 10-15 mins of time to yourself.

Look at the ocean.

Flip through your slides.

Review your transitions.

Breathing exercises.

Pushups.

Epic music. Chill music.

Whatever. You do you.

Upload your slides as a PDF to an easy URL.

It's 2020 (basically). No excuses. Always have a backup.

Things to do when you stand up.

Always use the mic.

“Do I need the mic?” produces more false negatives than false positives.

Keep the lights on.

You are exciting and beautiful but people *will* fall asleep if it's dark.

Finish early but not too early.

Do not run over time. Just do not.

[And if you do, have an exit strategy: know ahead of time what to skip, & don't mention that you're out of time. Just finish victoriously as soon as you coherently can.]

Things to do *after* you sit down.

Debrief

What worked well and what didn't?

[Suggestion: do not ask other people. They'll lie or you'll be upset. Answer these questions *for yourself*, with a "getting better takes work!" attitude.]

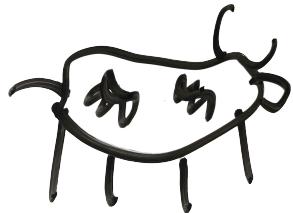
Learn from the greats

If you ever see a talk you like, reverse engineer it.

Workshop #4: Giving a Talk.

Step 1: decide **what you want** and *write it down*.

Step 2: identify **your cargo** and *write it down*.



Step 3: model **your audience**, and *write that down*.

Step 4: budget + topic sentence for each slide.

Step 5: refine & enhance with narrative & “Aha!”

Step 6: List what you need to **say** for each slide.

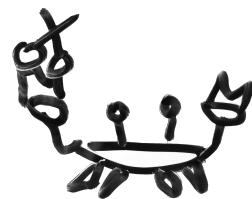
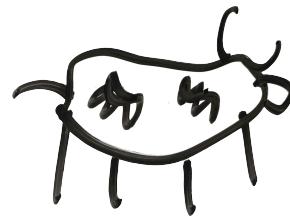


Step 7: Plan every **transition**.

Step 8: Talks don't get worse with **practice**. Ever.

Step 9: Plan a couple **delivery tools**.

Workshop #4: Giving a Talk.



Further Reading:

- LeeAundra Keany is wonderful. <http://thecontrarypublicspeaker.com/>
- Paul Edwards' fantastic notes: pne.people.si.umich.edu/PDF/howtotalk.pdf
- [Your suggestions here. Email me daniel.larremore@colorado.edu]

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More from this series in PDF at <http://danlarremore.com>

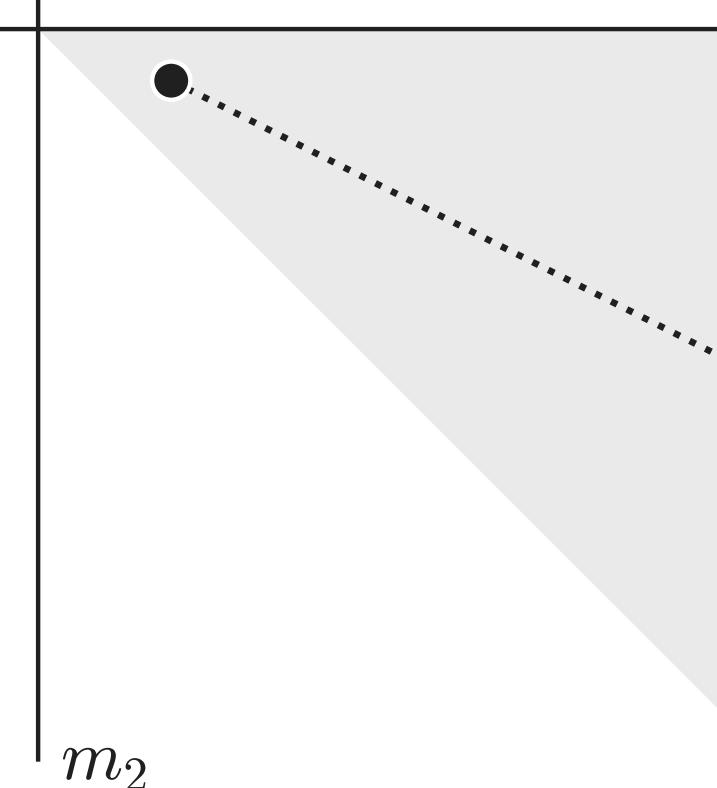
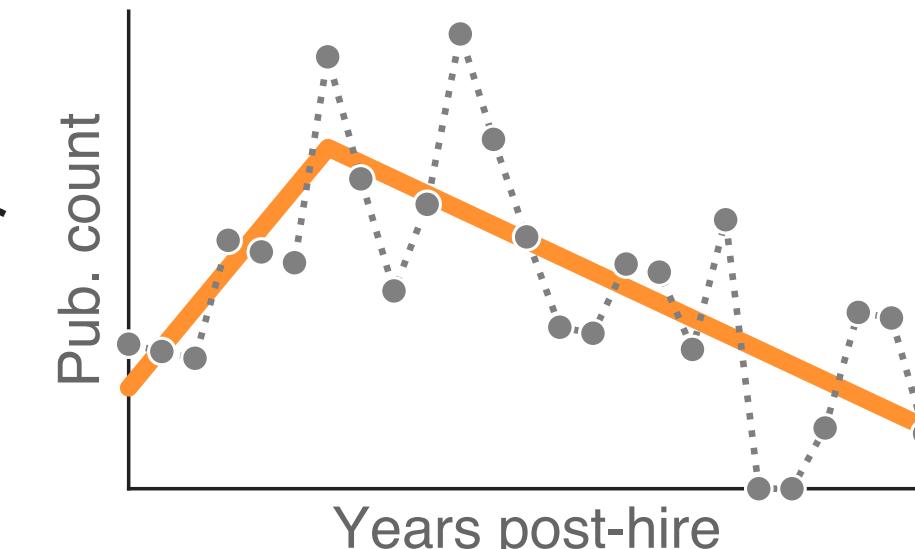
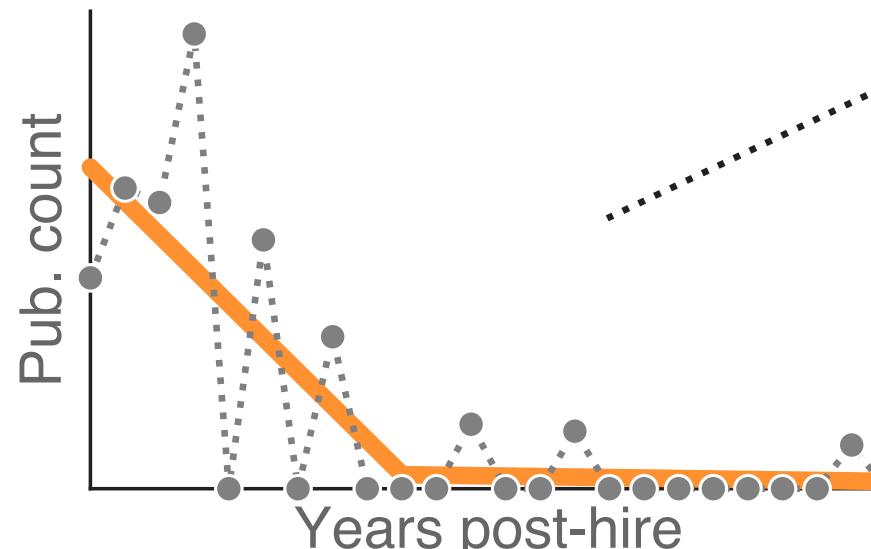
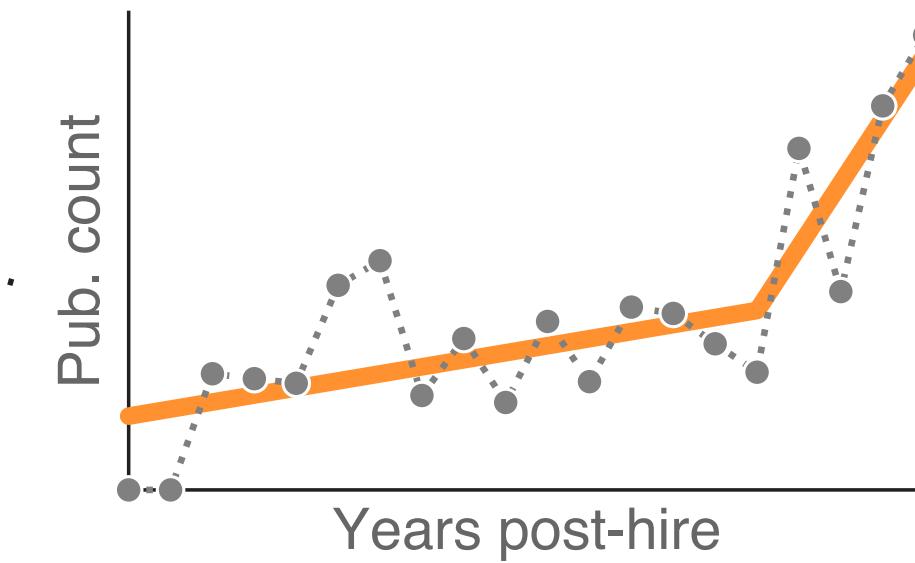
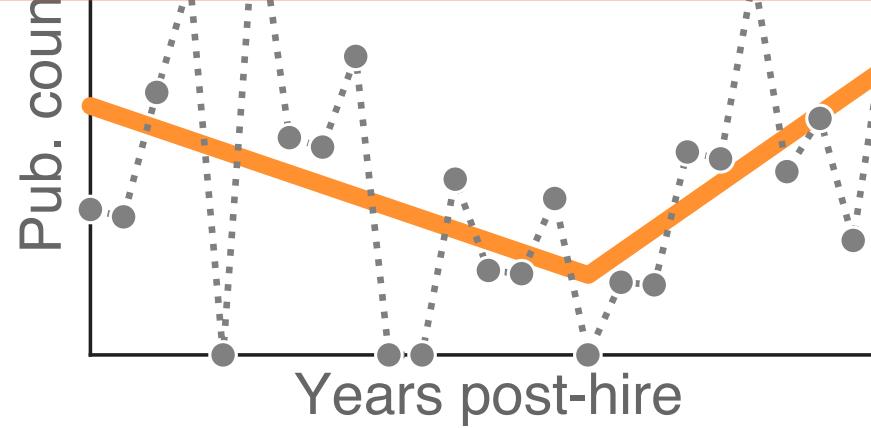
Workshop #3: **Data Visualization.**

Workshop #4: **Giving a Talk.**

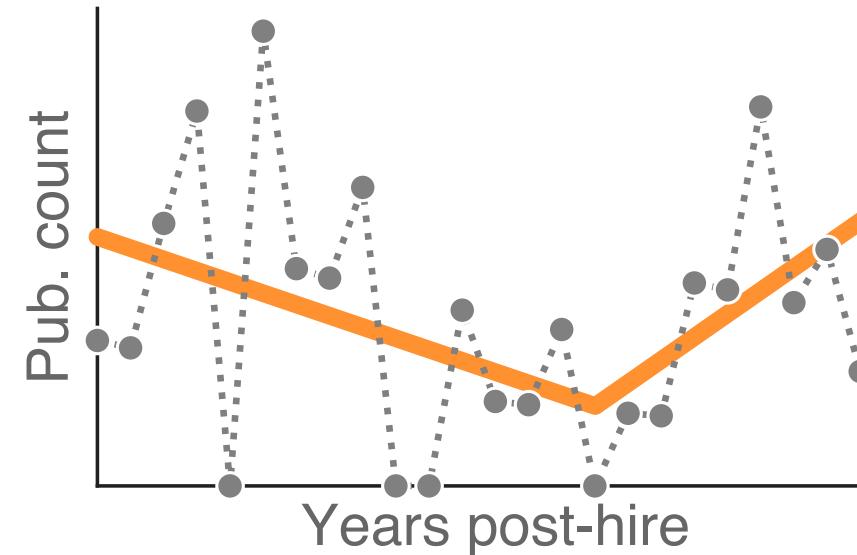
Workshop #5: **Clean Code.**

Workshop #6: **Peer Review.**

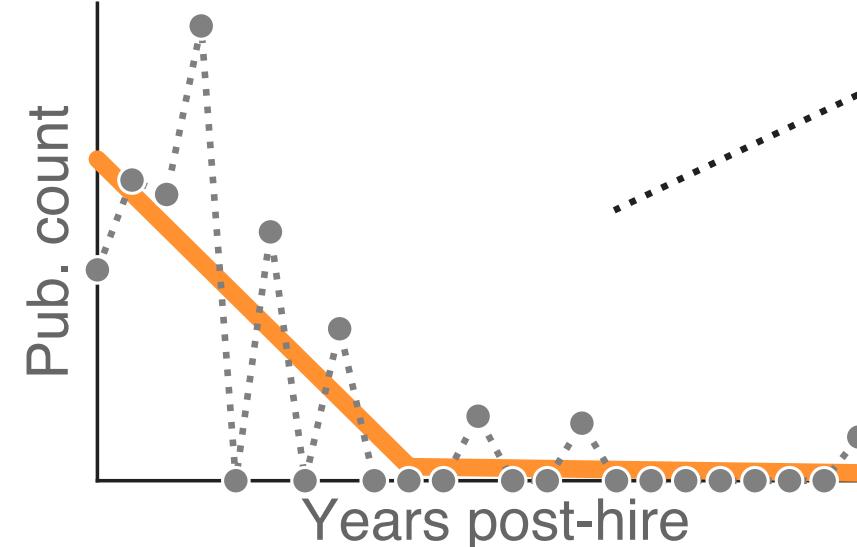
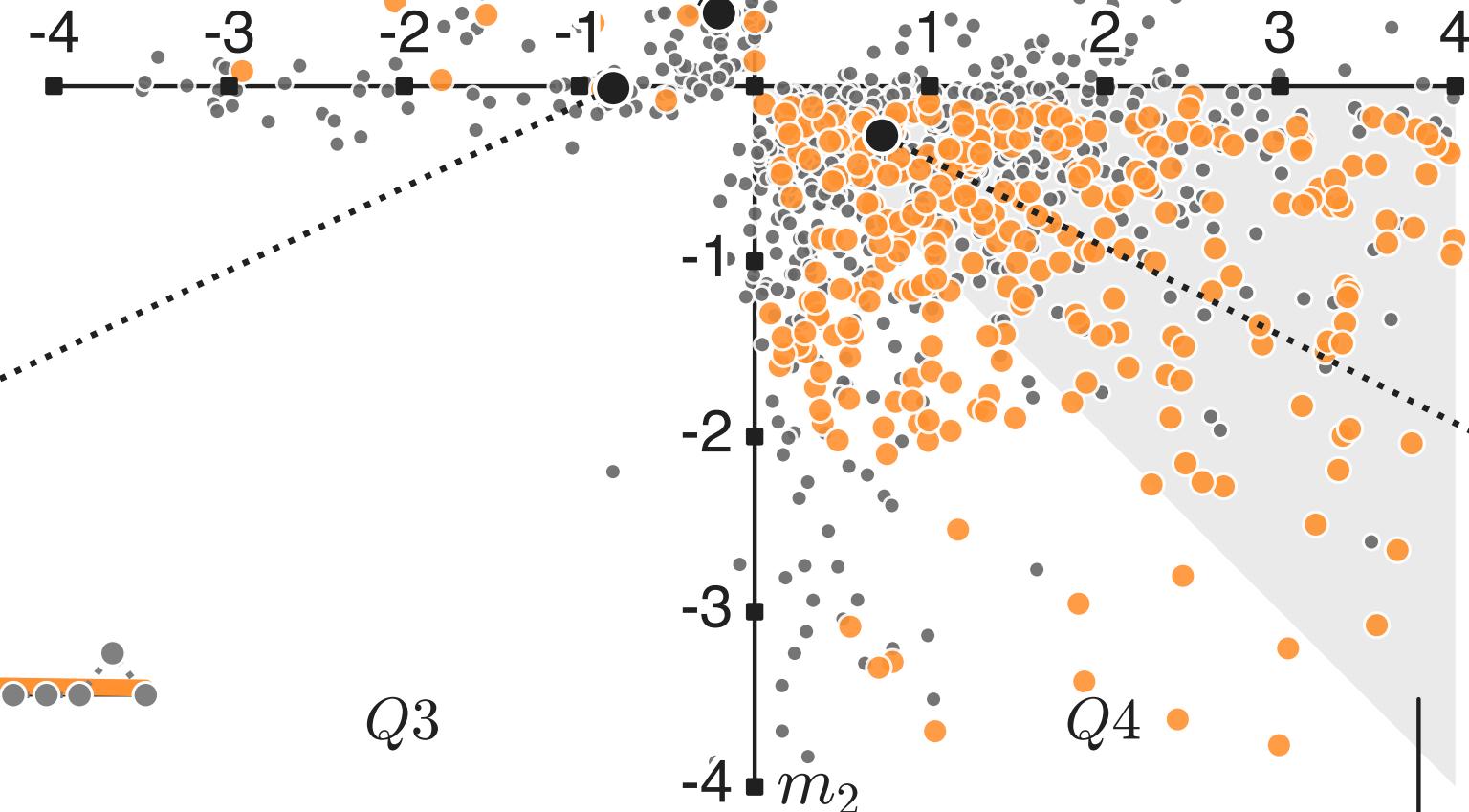
Example of putting up naked axes first. Spoken: explain horiz. & vert. axes' meaning. Then: what do we expect to see when the data show up on the next slide? Then, see next slide. (See next slide!) NB: This required creating this new naked fig in matplotlib. Worth it!



Conventional narrative

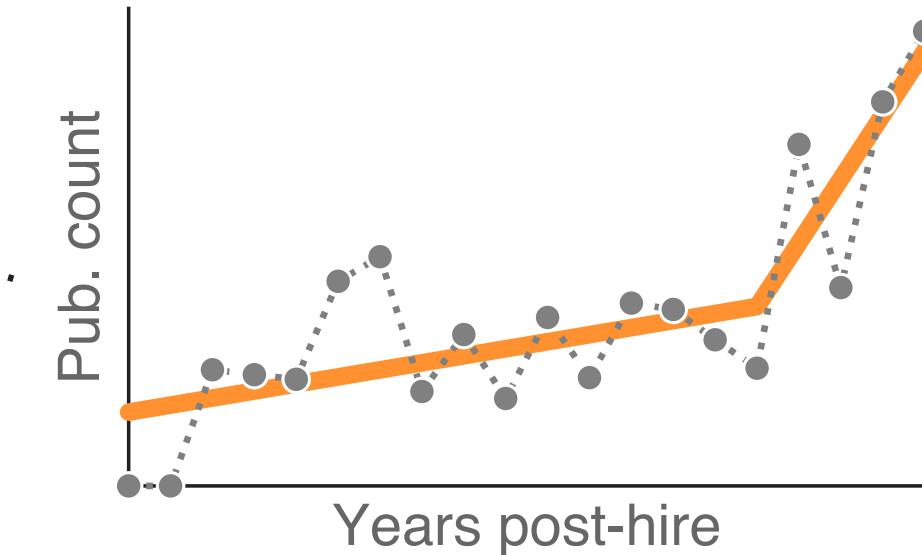


Q2



• Stable, non-linear (32.3%)

• Unstable and/or linear (67.7%)



Conventional narrative; $N=222$ (20.3%)

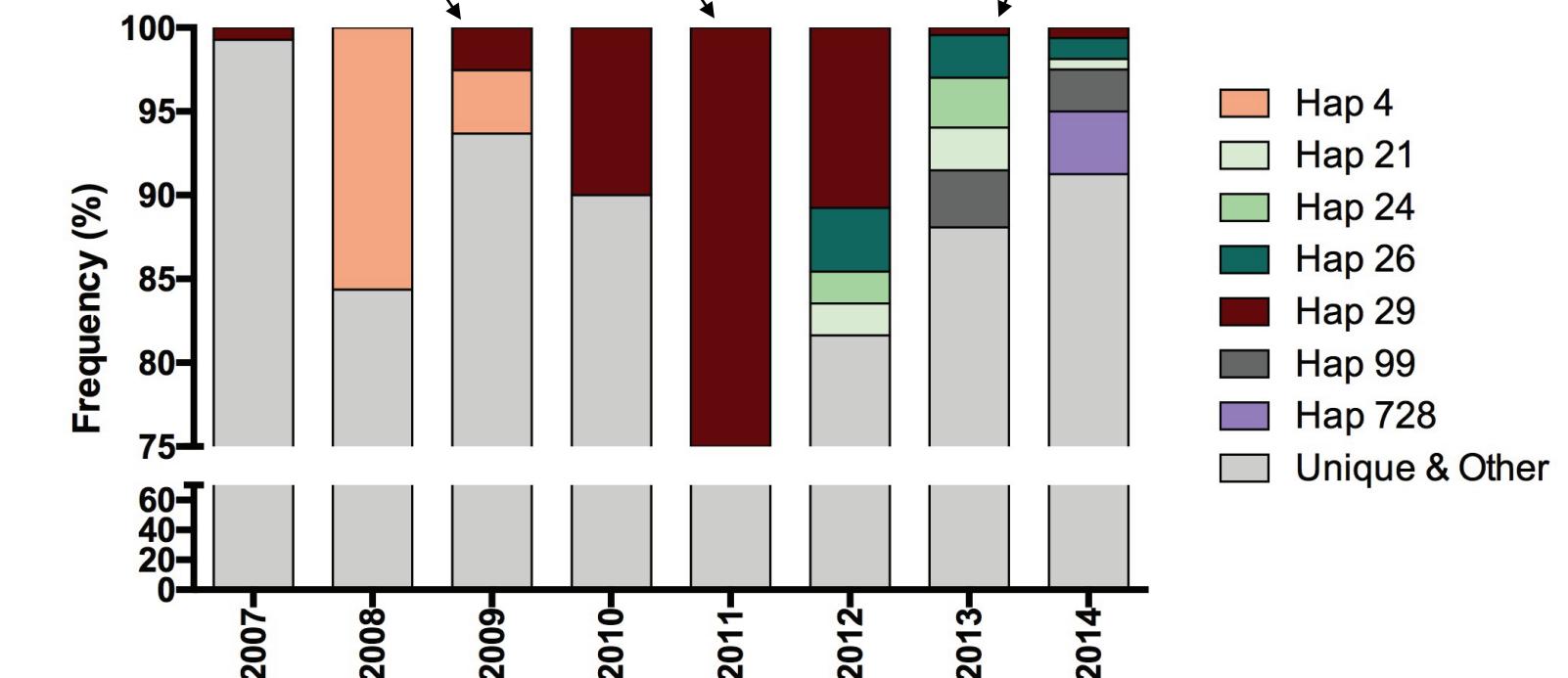
Example of annotating a figure. These annotations, like the ones on the previous slide (for remaking axes) are helpful for the audience but also for me, the speaker, so that I remember what the story of the figure is supposed to be. They remind me of what I want to say, the story I want to tell.

Back to linking slide 

haplotype 29 adapts,
using a var repertoire
unknown to human pop.

human population's immune
landscape adapts, clearing Hap. 29.

haplotype 29 fully exploits var
accounting for 25% of cases.

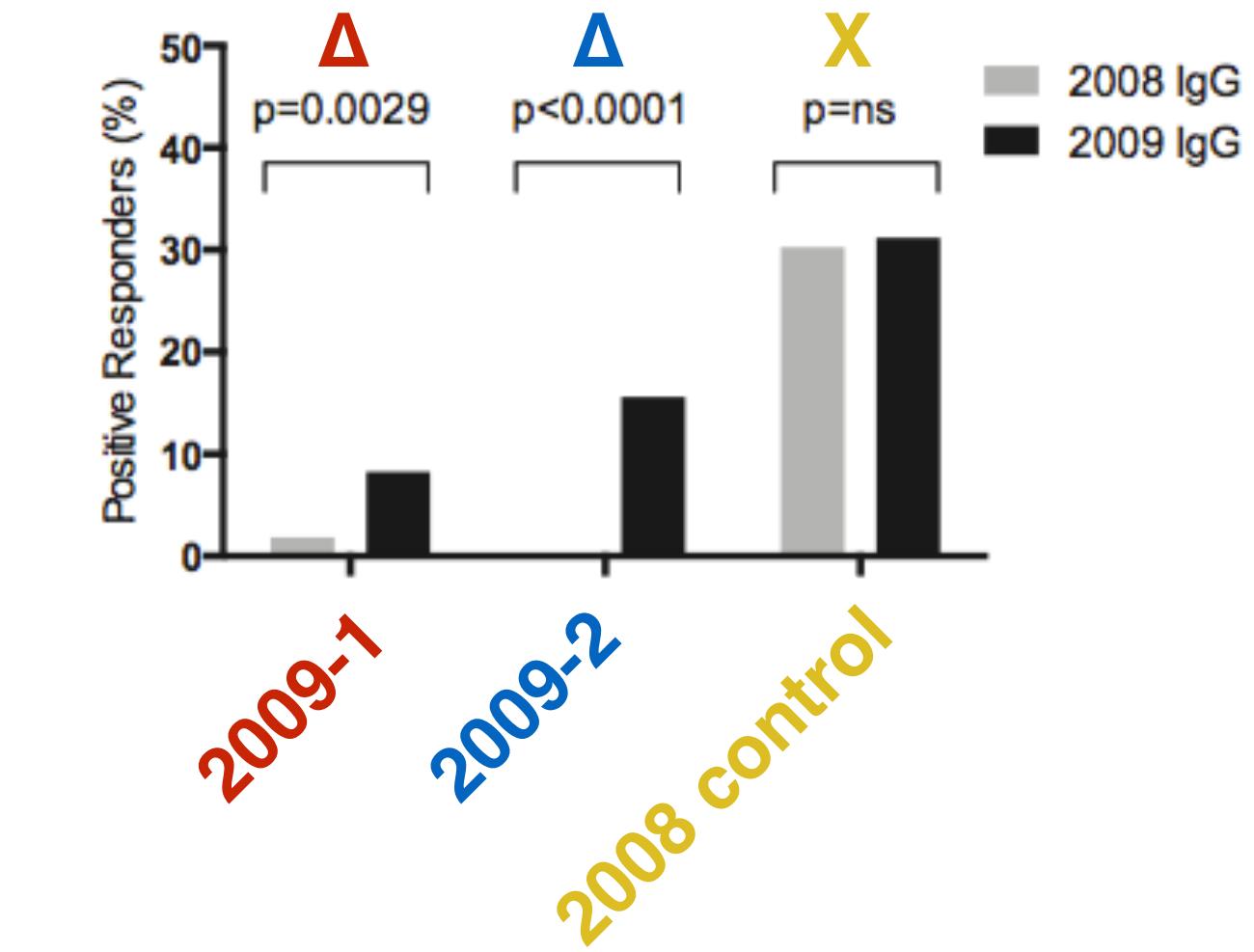
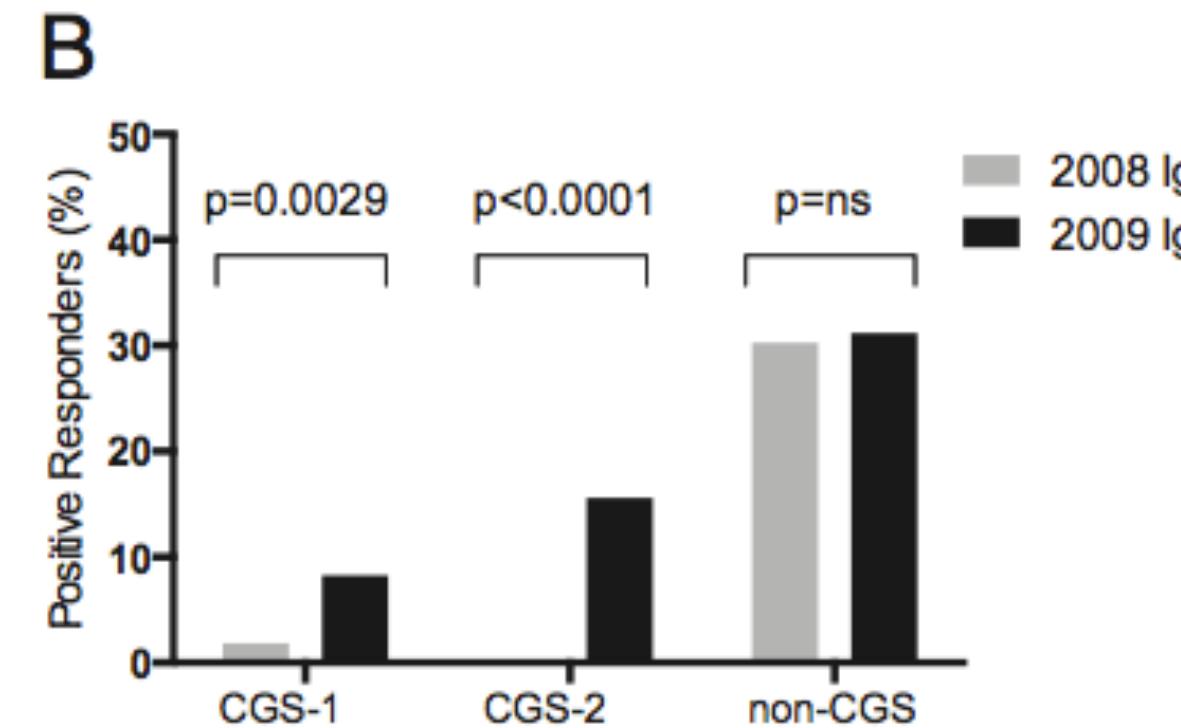


Example of remaking axes of figs from the paper.

Here's a before (left) and after (right). This figure features three parasites that had already been introduced and tied to the colors red, blue, and gold. So:

- * Remade horizontal axis labels with bigger font & colors.
- * Covered the big B because who cares which subfig it is?
- * Annotated with Δ and X to assist the audience *and myself while speaking* with what the intended interpretation is.
- * Added a caption.

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Immune responses jump between 2008 and 2009 (plasma IgG) for the two 2009 isolates. Not so for control.

Relax and let the springs decide the ranks

$$H(s) = \frac{1}{2} \sum_{i,j=1}^N A_{ij}(s_i - s_j - \ell)^2$$

SpringRank Hamiltonian: energy of the system, given the positions s .

Because the springs are linear, the potential is quadratic.

The SpringRank Hamiltonian is convex in s .

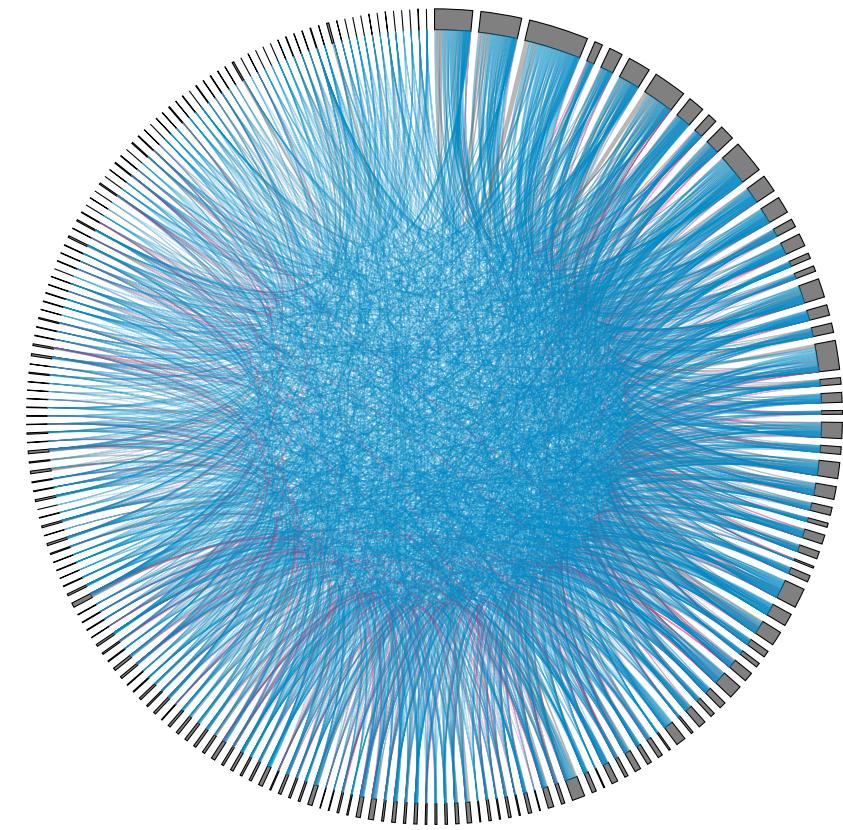
$$\nabla H(s) = 0$$

unique + constant.

Example of equations and language for credibility.

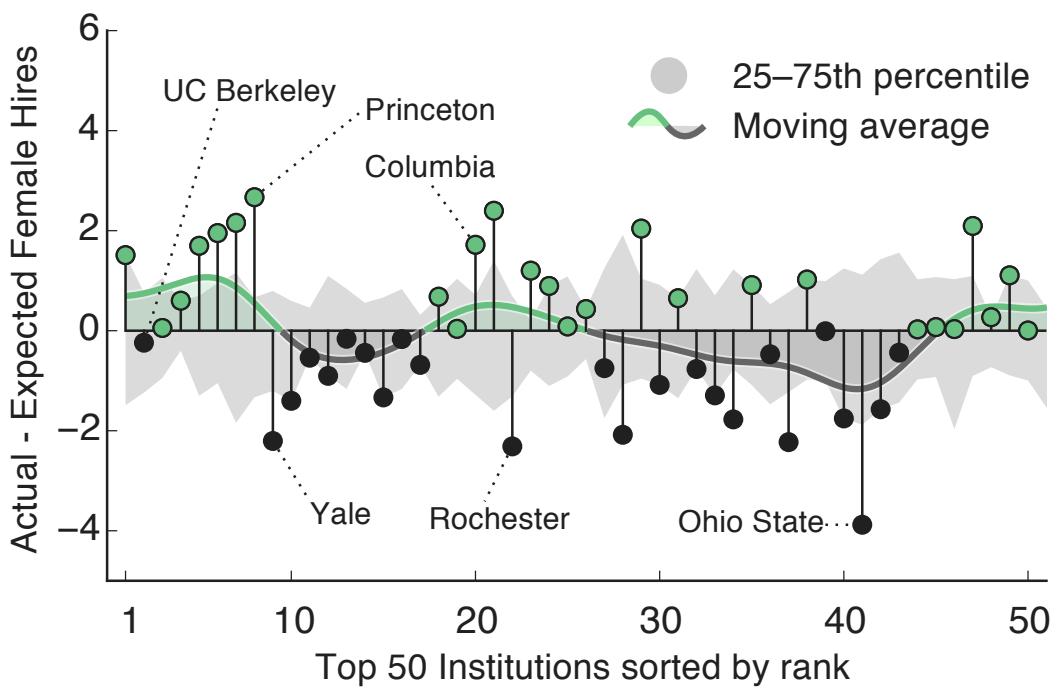
This is a case where I was giving a physics colloquium, and there was an opportunity to include more equations and also the word “Hamiltonian.” This word has a meaning for physicists but no one else. Physics talk? Leave it in. Same content, but in the language of the audience. A student literally told me after the talk that he started paying attention when I said “Hamiltonian.” That’s great! Also lol. But great!

Conclusions

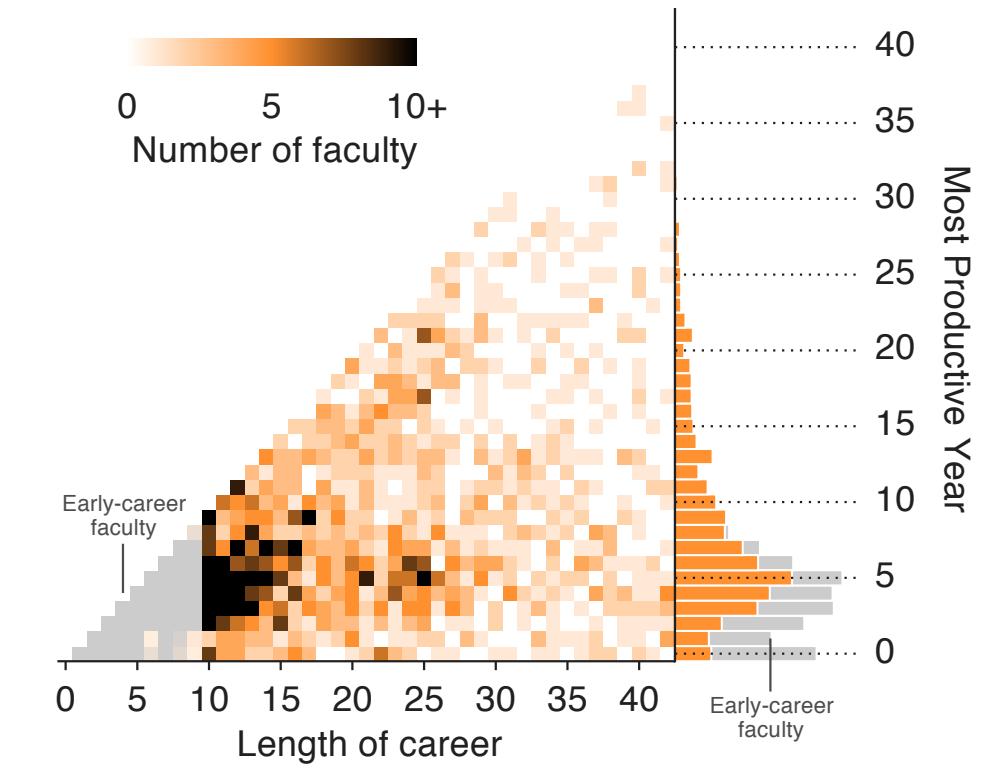


systematic inequality and hierarchy in hiring.

Example 1 of putting key figures on the conclusions slide. This was from a 60 minute talk that had 3 main sections. Each section (thanks to Sam Way) had distinct color theme. This made the conclusions slide easy, and these three “flagship” type figures bring the science, color, and punchlines all together nicely for the viewer. See next slide for a job-talk example.



entanglement of prestige, productivity, gender.



misleading narrative of “traditional” career trajectory.

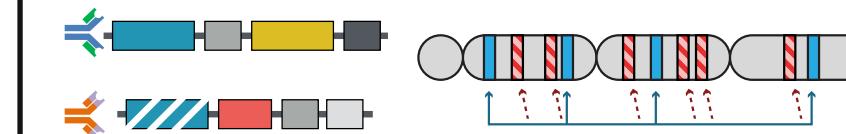
Example 2 of putting key figures on the conclusions

slides. These two were the two conclusions slides from a job talk. I think they're less clean than the previous example, but my pitch to the audience was: *if you hire me, you get a scientist who does science but who also builds new methods*. The work I was presenting had not, thus far, ever been explicitly divided into "results" and "methods" so I put all the pretty and appropriate figures here.

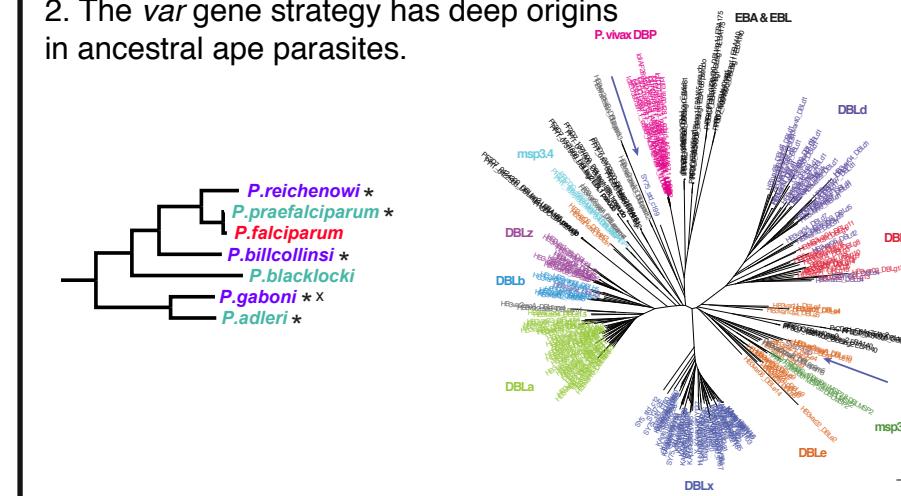
[Back to linking slide](#) 

Key insights into malaria...

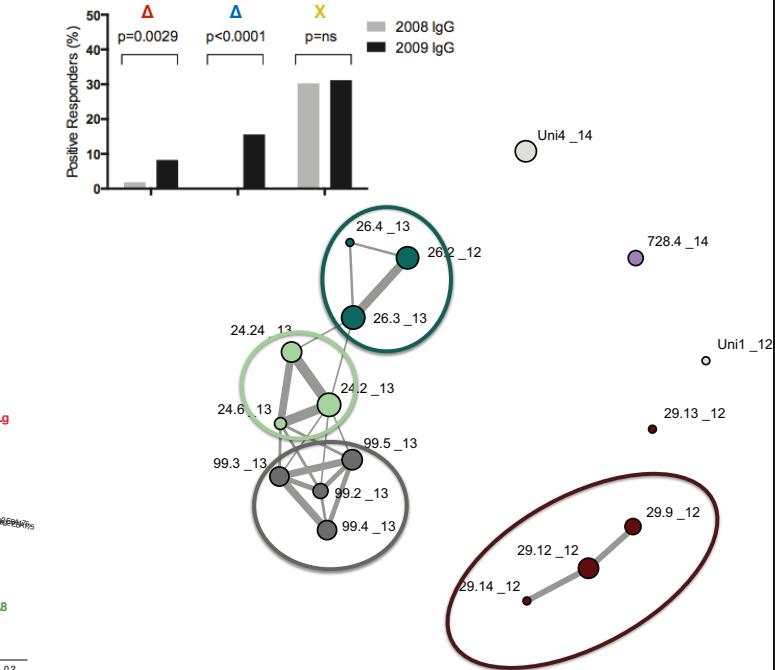
1. var genes evolve under highly structured yet heterogeneous constraints.



2. The var gene strategy has deep origins in ancestral ape parasites.

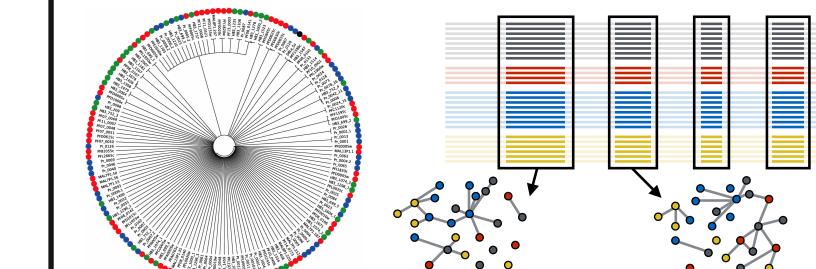


3. Parasites are evolving at the level of genes and repertoires *with* the human immune landscape.

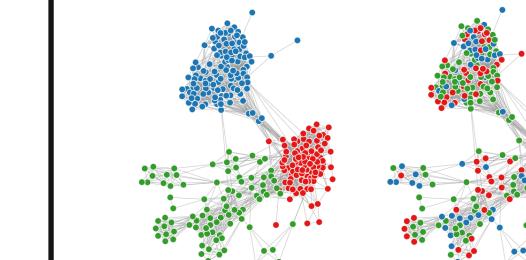


Key insights into malaria, driven by new methods

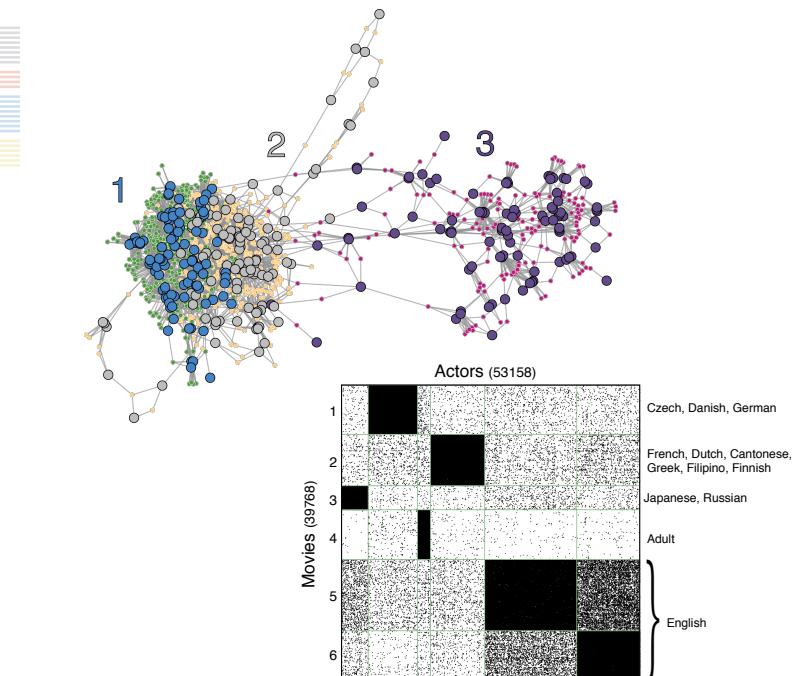
1. Network-based methods open recombinant gene families to detailed analysis.



3. Compressibility statistical tests measure relevance of node metadata to network structure.



2. Statistically principled methods enable bipartite community detection.



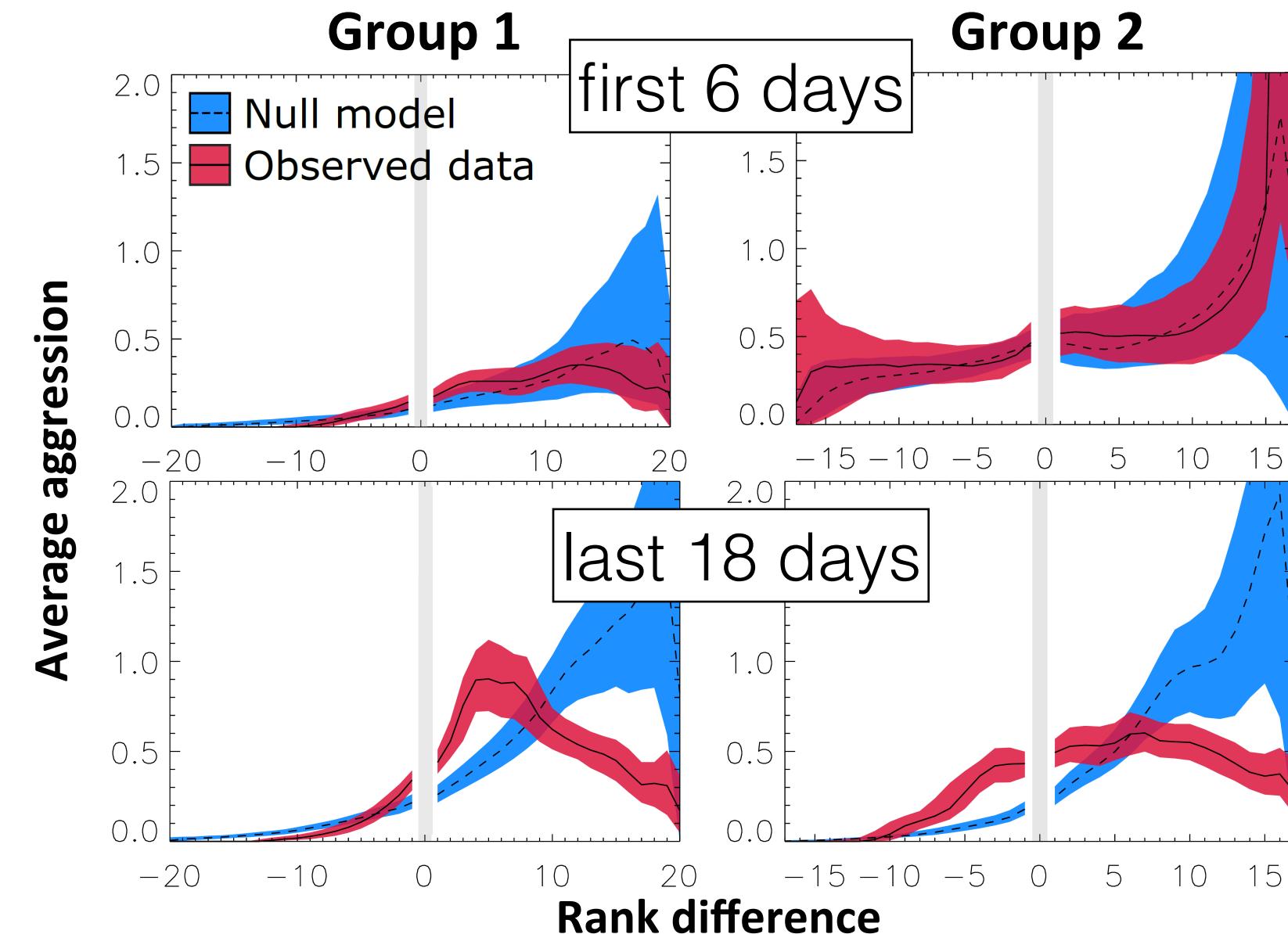
Example of putting verbatim text on a slide.

Here's a slide from a broad-audience talk where I presented Liz Hobson's work. I just can't get the wording straight unless I write *on the slide* what I am supposed to say.

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Parakeets know which individuals are ranked above and below themselves.

Parakeets know their own rank and the ranks of others.



Confronting models, which incorporate different complexities of bird-knowledge, with meticulous data, reveals clues about mechanisms of hierarchy formation.

Solve the bipartite C.D. problem

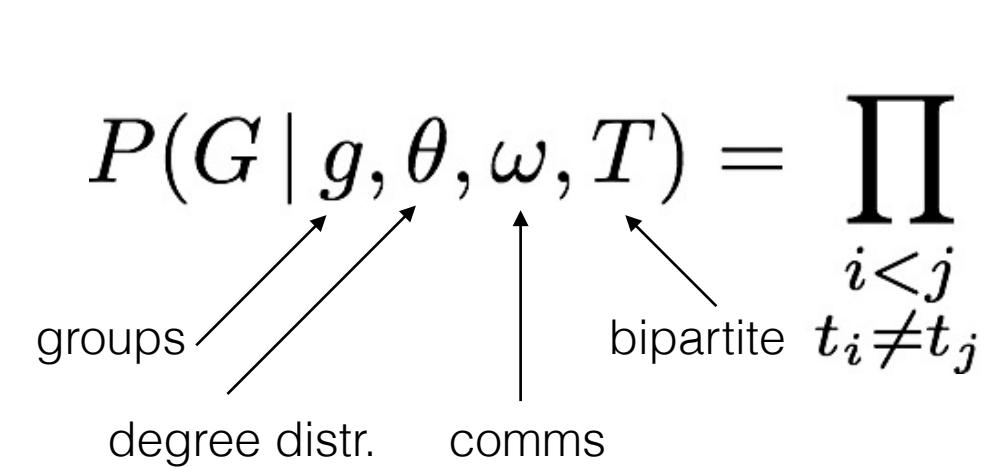
Gap in the literature: no statistically sound bipartite community detection.

→ **bipartite SBM**

Example of putting things on the slide so you remember what to say. I love talking about math! But this was for a (job) talk in which I 100% could not get sidetracked and had to move on quickly. (Broad audience; more interested in the science and vision, not the details of a likelihood function.) So I put a clock in the bottom right corner to remind myself to say “I wish we had another few minutes to talk about this, because I think it’s really interesting, but I’ll run out of time if I do.” Then I moved on.

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The probability of observing a network G with adjacency matrix A is:

$$P(G | g, \theta, \omega, T) = \prod_{\substack{i < j \\ t_i \neq t_j}} \frac{(\theta_i \theta_j \omega_{g_i g_j})^{A_{ij}}}{A_{ij}!} \exp(-\theta_i \theta_j \omega_{g_i g_j})$$


Find the parameters that maximize the likelihood of the data

- directly compute maximum likelihood point estimates for all parameters except groups g
- use local search strategy to search partition space for optimal groups

