How to give a good (research) talk

Henri Casanova
Univ. of Hawai`i at Manoa
henric@hawaii.edu

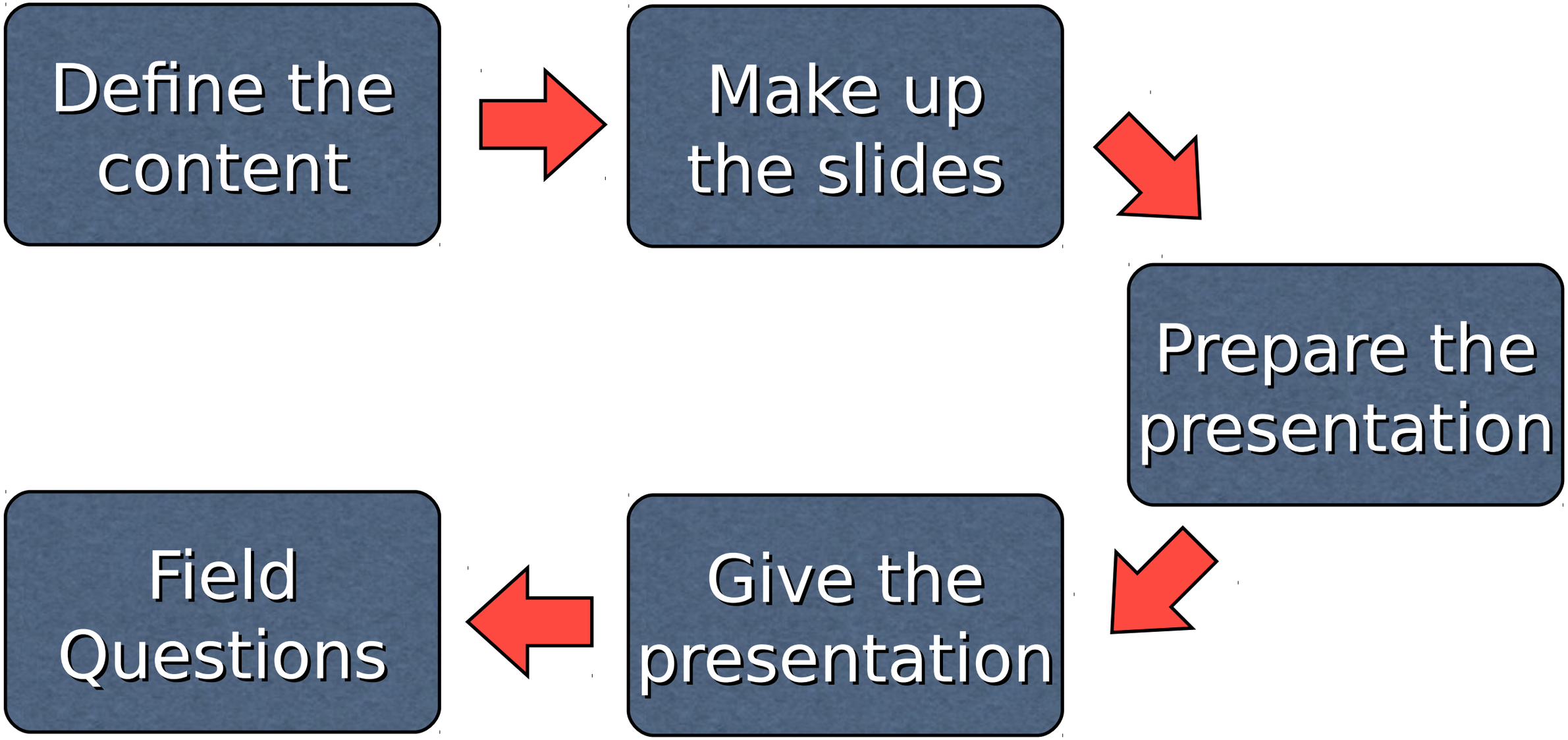
Disclaimers

- Many of the views in here are biased by my own ideas/experience
- Many of the views in here are inspired by others who have put together various “how to give a good research talk” presentations
- Some of the content is applicable only to some of several possible situations
  - e.g., conference presentation vs. public defense
- Some of the content is applicable not necessarily to research talks, but to all technical presentations
- This is not a research talk, and thus doesn’t follow its own advice :)
- Great speakers can break all rules and give fantastic talks
  - But likely not you (or me)

Why?

- You have done research work
  - research article, thesis, dissertation
- Now you have to present it to an audience
  - Often a requirement to get “credit” for your work
- Or you want to present it to an audience
  - Job interview, helping your career, etc.
- In all that follows I’ll use the “presenting a research paper at a conference” scenario
  - It should be clear how to adapt the content to other scenarios

The Process


Define the content
Make up the slides
Prepare the presentation
Give the presentation
Field Questions

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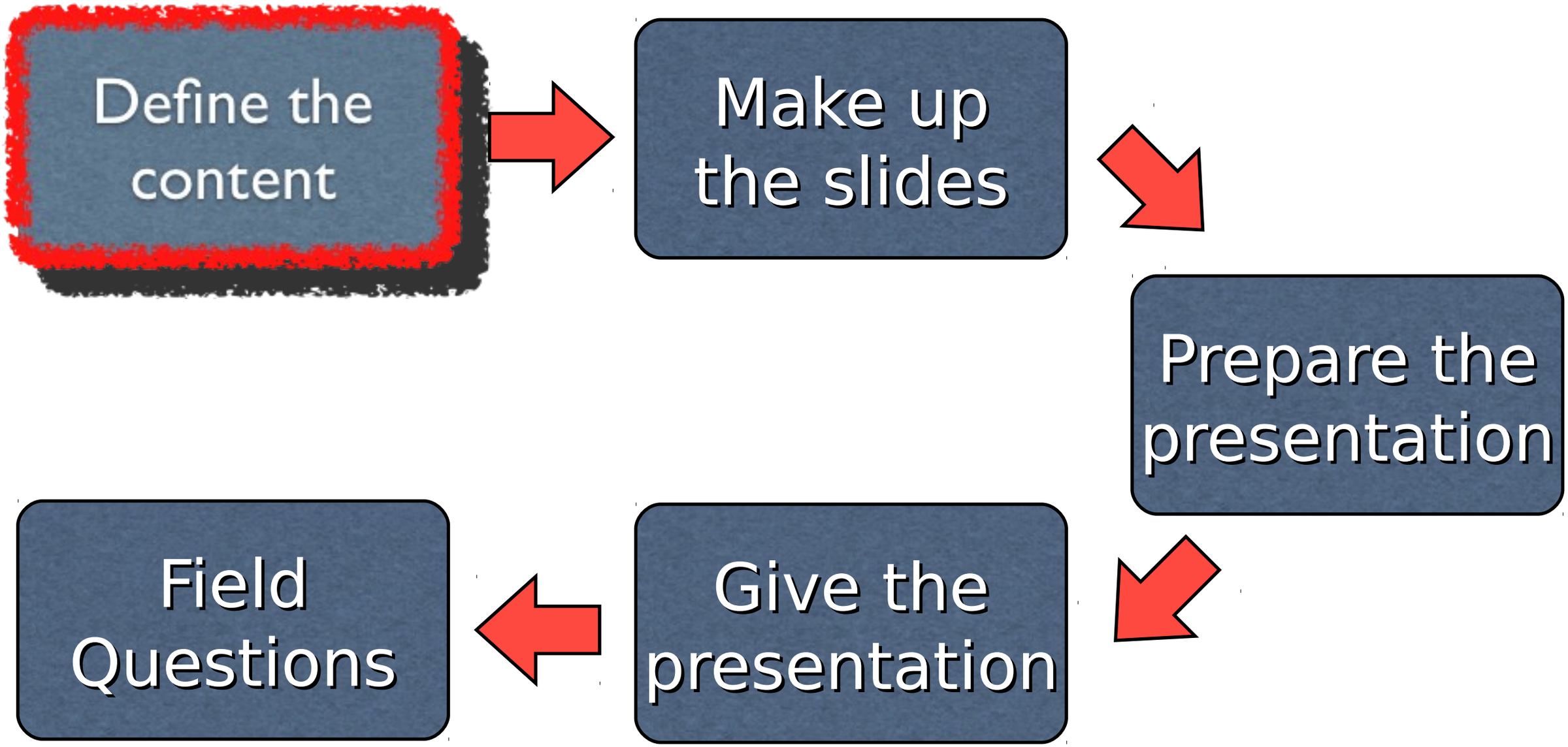
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Defining Content

- If you keep a single idea from this: Your talk should be an advertisement for your paper, not a replacement
  - After your talk, will I want to read your paper?
- Or: the talk is *about* your paper, it is not your paper
- Confusing the two leads to terribly boring talks
  - Why should I listen to this, when I could instead be lounging on the beach reading the paper
    - I did this at the IPDPS conference in 2011 :)
  - Cut-and-pasting paper sentences into slides is death
- Your talk should even complement your paper
  - If I've already read your paper, would I enjoy the talk?

The Audience

- Your ideal audience would
  - have read all your previous papers
  - understand all relevant theories
  - be dying to hear what you have to say
  - have a sustained 30-min attention span
- But in fact they
  - don’t know who you are and likely care little to find out
  - are a very heterogeneous bunch with people who don’t know anything underlying theory for your work
  - just had lunch, have their laptop ready to be opened, and can’t wait to go sight-seeing after this session is over

The Audience

- Common mistake: overestimate your audience
  - Too much technical content, not enough context setting
    - Fallacy: “I should show the audience that I’ve done a lot of complicated and difficult work!”
      - In fact, they’ll think you can’t synthesize anything and don’t have any perspective, and that likely you just did all the stuff that your advisor told you to do!
- Good objective: give the audience an intuitive feel for your research
  - Intuitions behind an idea are almost always better than the details of the idea in a talk

Black-boxing Concepts

- Your work likely uses “known” techniques, tools, concepts
- What you should do:
  - Mention the concepts by their standard names
    - “In this work, to deal with high dimensionality, I use PCA”
  - “Remind” the audience of what the concept is for
    - “Principal Component Analysis (PCA): a standard technique for reducing dataset dimensionality”
  - “Remind” the audience of how the concept works
    - “Essentially, PCA groups together correlated components, so that one is left only with uncorrelated, and thus individually meaningful, components”

Wait, No Technical Details?

- “So, should I give no technical details?”
  - “Am I nothing but a car salesman? :(”
- One good approach for a “non-short” talk:
  - Pick the most interesting technical aspect of your work (hopefully there’s one)
  - Go into details for that one aspect, showing that there is depth to your work
- This is particularly useful strategy for a thesis/dissertation defense
- For a “short talk”, you cannot do this unless the audience is highly specific/specialize

A talk is a story

- Before making up any slides or writing down a talk outline, practice telling the story of your talk
  - Yes, aloud, to somebody perhaps
  - From the story, you should get your content
  - Caveat: some people are great at telling stories, others are not
    - As a researcher, you have to become good at telling stories
    - How do you think we get funding???

What must be included

- WHY you're doing the research
- WHAT your research is

What must be included

- WHY you're doing the research
  - What the problem is
  - Why the problem is worthwhile
  - Why the problem is hard
- WHAT your research is
  - What (the intuition for) your approach is
  - How your work differs from previous work
  - How your work is better than previous work

The Content

- All the key points that contribute to accomplishing what's on the previous slide
- AND NOTHING MORE!!!
- It is OK to leave part of your work out
  - Even if it's frustrating to leave out a part on which you worked like crazy for 2 months
  - You can mention that you're leaving things out
    - "In the paper, we also deal with the xyz case, and the take away from that part of the research is that our algorithm is great"

Having a Crux

- It’s always a good thing to have a crux
- What is ONE key idea that you wish the audience will walk away with?
- You should even be explicit:
  - “This is the most important idea in this talk: …”
  - “If you leave this room remembering only one thing, it should be: …”
- For this presentation: Your talk should be an advertisement for your paper, not a replacement for it

On the Use of Examples

- Typical ways to teach an audience about a concept
  - Talk about the general case
  - Show an example for a particular case
  - (not necessarily in this order)
- In a technical presentation, if you have to do away with one of the two, it’s almost always better to omit the general case
  - While just mentioning that the example can be generalized

Overdoing the Context

- After giving a few unsuccessful talks in which the audience had no idea what it is your research was, you start overdoing the context part
  - ICS690 is actually a good test audience
- Providing lengthy shallow overviews of tons of topics is not a good idea
- Pick only a few topics for which you'll have more than once sentence of context-setting
  - Those most important for understanding your talk, others are simple one sentence

One Provoking Thought

vs.

The Card Castle

- Slides build on each other
- So as to achieve a beautiful monu
- Problem for the audience:
  - Miss a slide, and you're lost
  - Get sleepy toward the end and m
    the most important points
- Yet, **99% of talks are card castles**
- There are ways to remedy this of course:
  - e.g., provide "where are we?" signpost statements throughout the presentation
    - ABSOLUTELY NECESSARY

The Onior

- Start with the main message
- Add depth in successive layers so as to build the onion
- Advantages:
  - Every audience member will leave the room with something worthwhile, no matter when their attention span ended
  - If you run out of time, no big deal
- More challenging to build a presentation in this way, but something to keep in mind

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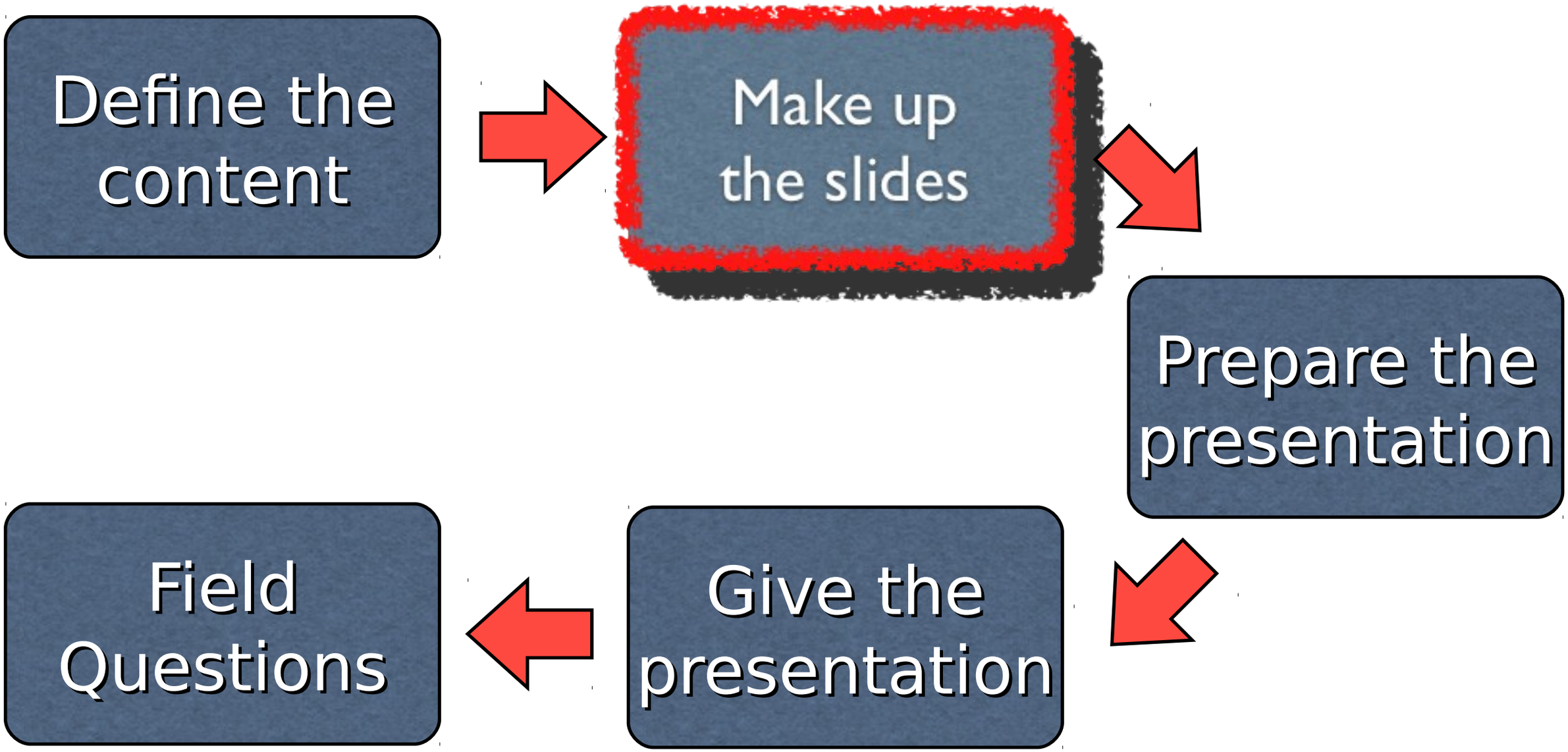
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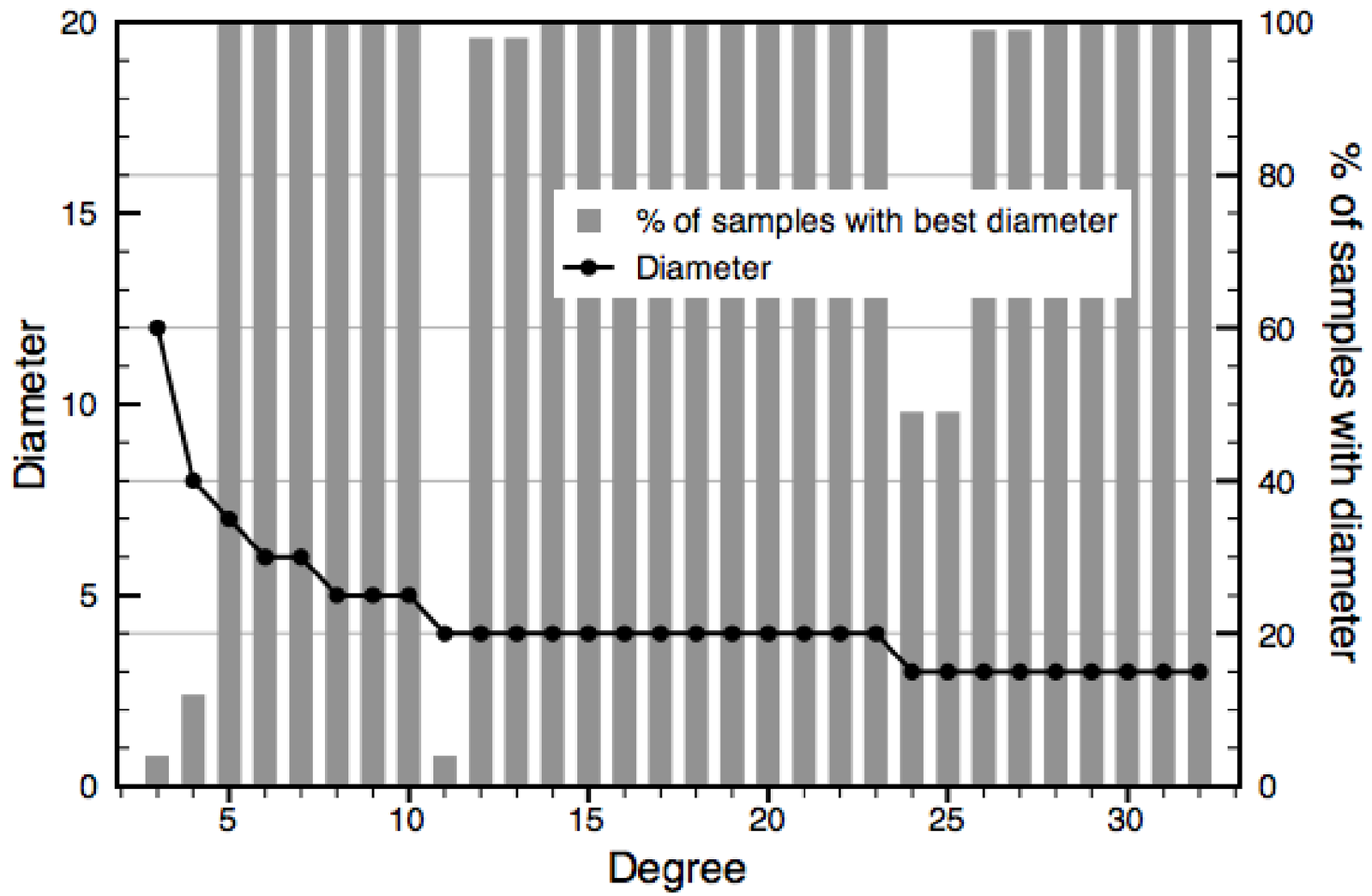
How Many Slides?

- Slides take between 1 and 2 minutes each, depending on the speaker/content
- Slides with graphs take longer (and than you think!)



The Title Slide

- Should have the same title as your paper/thesis if applicable
- Should acknowledge all co-authors and their institutions
- Should make it clear who the presenting author is (i.e., you)

The Dreaded Outline Slide

- NEVER HAVE AN OUTLINE SLIDE AS YOUR SECOND SLIDE
  - It's **boring**
  - It's too early
  - It's almost always the same ("what the problem is", "current solutions", "my approach", "my results", "my conclusion")
  - It steals your own thunder
    - And yet, it's done in 90% of conference talks!
- If the talk is short (15 minutes), no outline whatsoever
- If the talk is longer, then you may show the outline 1/3 of the way in or before major sections
  - Use "grayed out" outline items for what you've already presented
- Beamer has nice themes for outlines with progress markers

The Conclusion Slide

- Do not end with Future Work
  - Makes it look like you've done little
- Ending with "The End" or "Question?" or "henric@hawaii.edu" isn't great
- Question: what do you want the audience to have burned into their mind after your talk
  - They'll see that slide for several minutes
  - Perhaps seeing "The End" for 5 minutes isn't such a great idea?
- Answer: end with a slide with key take-away points that you have the audience to remember

The First Slides

- The first 2-3 minutes of your talk are the most important
  - Make or break it in terms of capturing the audience's attention
    - "Why should I lift my eyes from my laptop?"
- Next time you go to a conference, look at the numbers of laptops that flip open 3 minutes into each talk!
- Your first slides are thus very important
- Using a brain-teaser, image, analogy, even a joke can be a tremendous help
  - But if it fails, then it really backfires badly
  - A bad joke is bad, a *written* bad joke is terrible
- Once your slides are done, think hard on how the first 2-3 slides can be made more compelling

Text on Slides

- Use a LARGE sans-serif font!!!
- Too much text is bad
  - 2 lines of text per bullet point max
- Ways to reduce text:
  - Don’t have full grammatically complete sentences
  - Good test: If you can just read your slides when you present, then your slides are too verbose
- Example:
  - Our experiments show that the state-of-the-art approach is not as efficient as our proposed approach with respect to all metrics used in the literature
  - Experimental result: our approach > state of the art
    - For all popular metrics

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- Example:
  - Our experiments show that the state-of-the-art approach is not as efficient as our proposed approach with respect to all metrics used in the literature
  - Main result: our approach > state of the art
    - For all popular metrics

Text Animations

- “Peek-a-boo” revealing is not cool
- It forces the audience to read along with you, which is often annoying and can even seem patronizing
- Many people will simply wait until all has appeared
- Speakers often hit “next” multiple times anyway
- You can perhaps do it on one slide in your presentation when it’s justifiably useful

Text Animations

- This version of “Peek-a-book” revealing isn’t as annoying
- The audience can read ahead if they want to, so it’s not as constraining
- Beamer has a nice way to do this automatically in a way that looks pretty nice
- Still, is till gets annoying if done for the whole presentation

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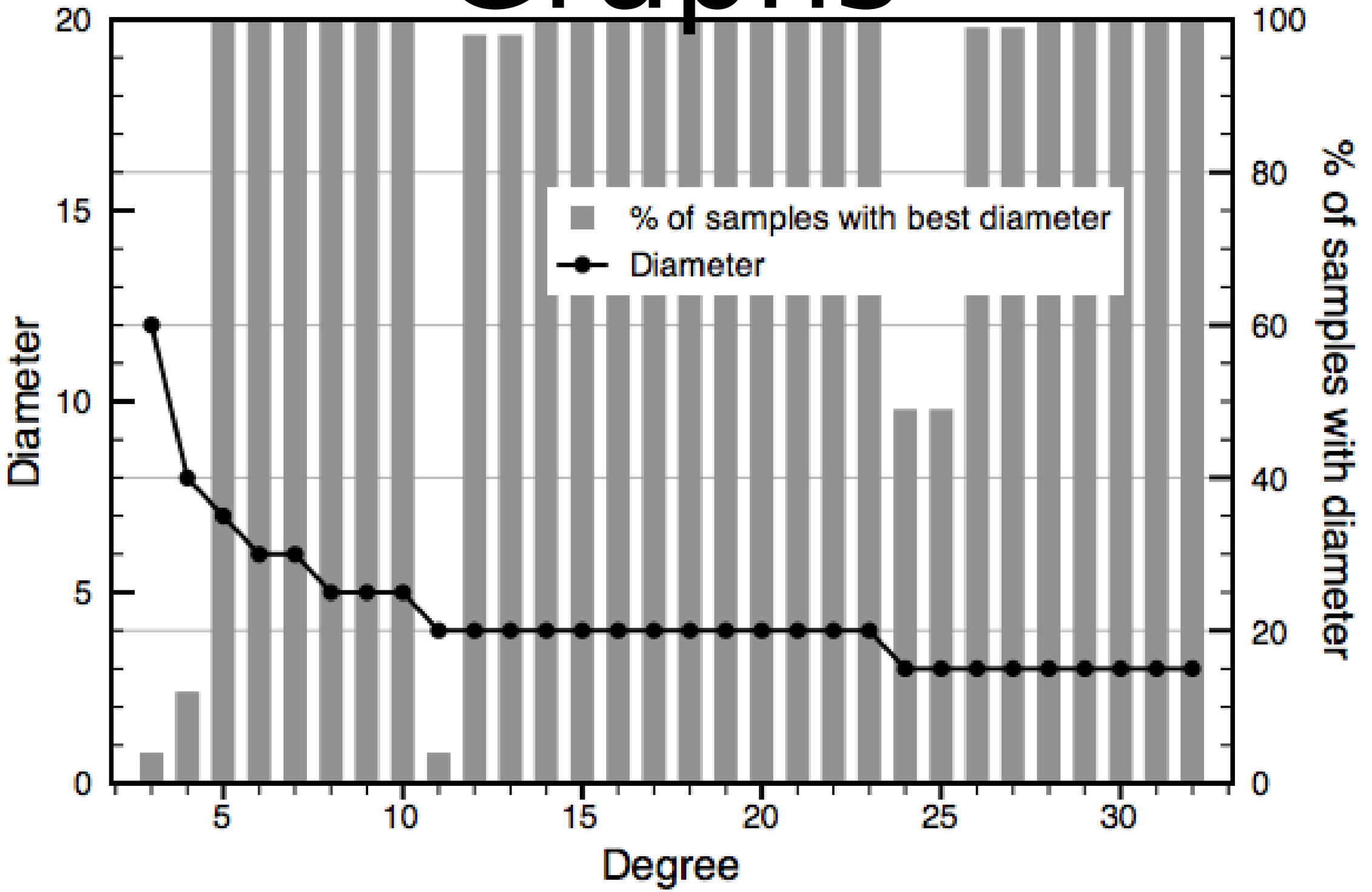
Graphic Animations

- Use animations very sparingly
  - Are you a researcher? or a gimmick generator?
- In fact, don’t use any animations but “builds”
  - Visual elements get successively added, but do not move around :)
    - As we saw still not great for peek-a-boo text revealing
- Builds are easily done by copying slides
  - Which can artificially increase slide numbers
  - Beamer does it nicely
- Make sure there is no jitter
  - Going rapidly back and forth between slides
- Definitely use builds for result graphs
  - Use them as reminders!

Using Builds for Graphs



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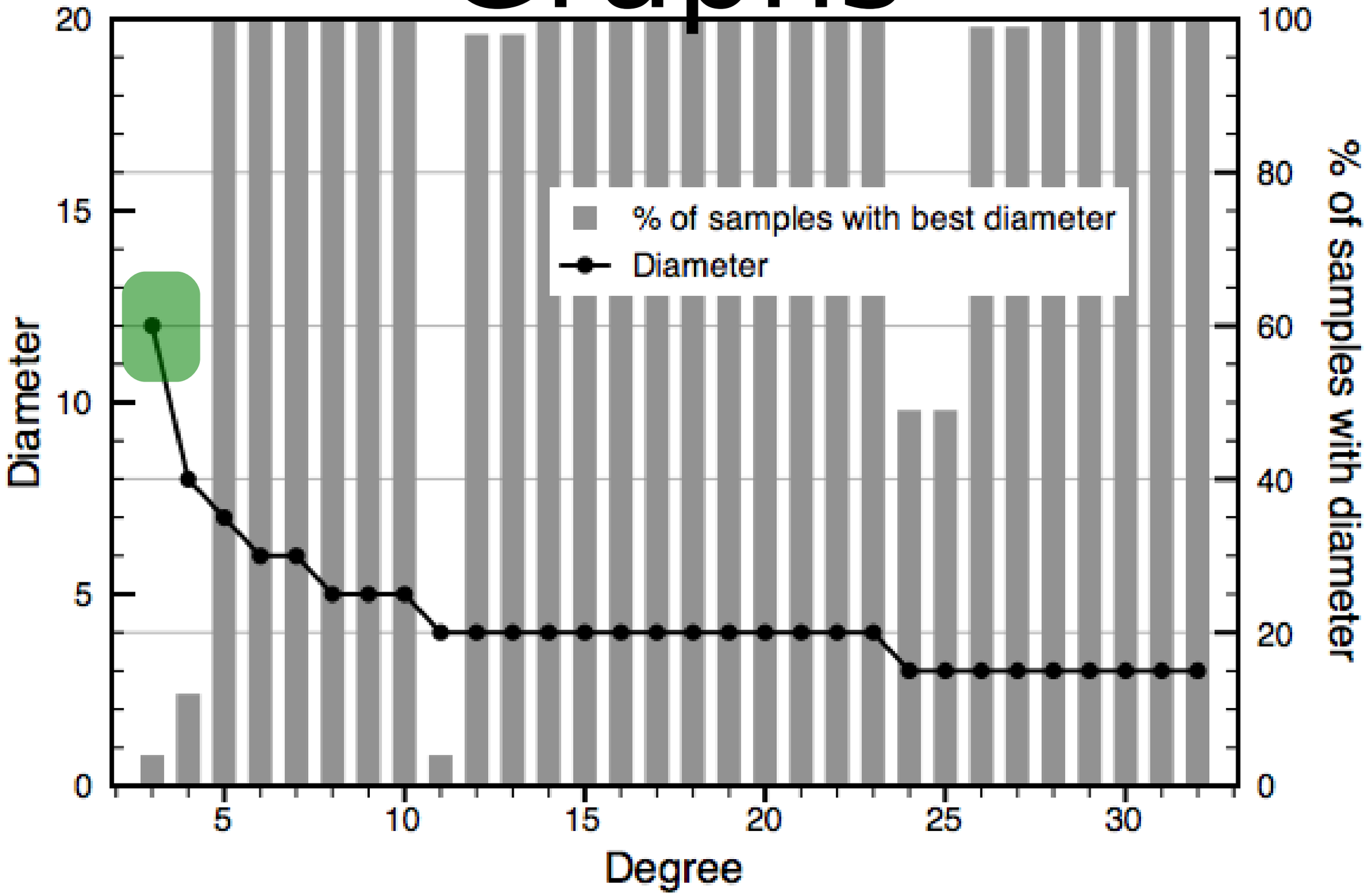

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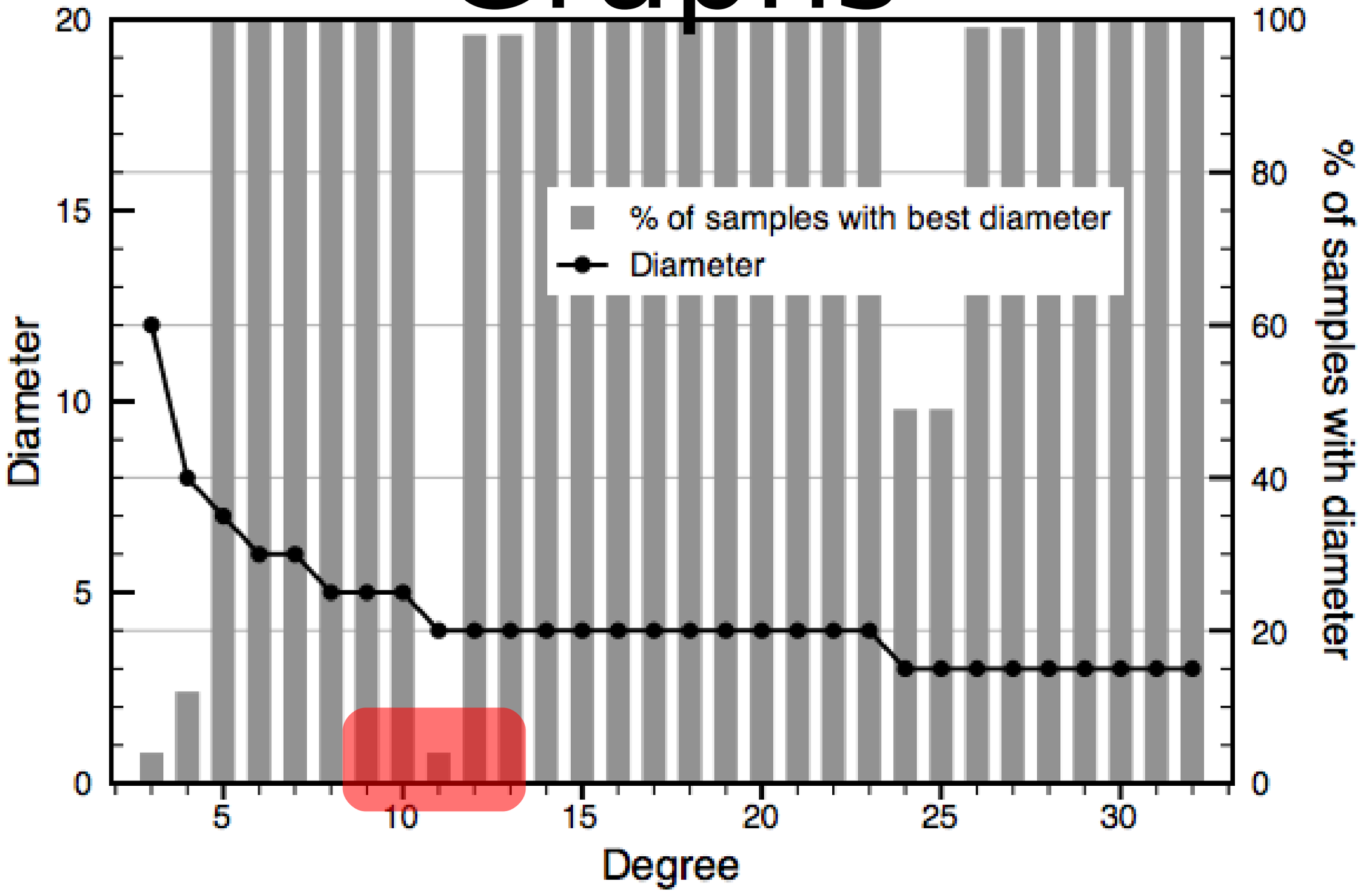

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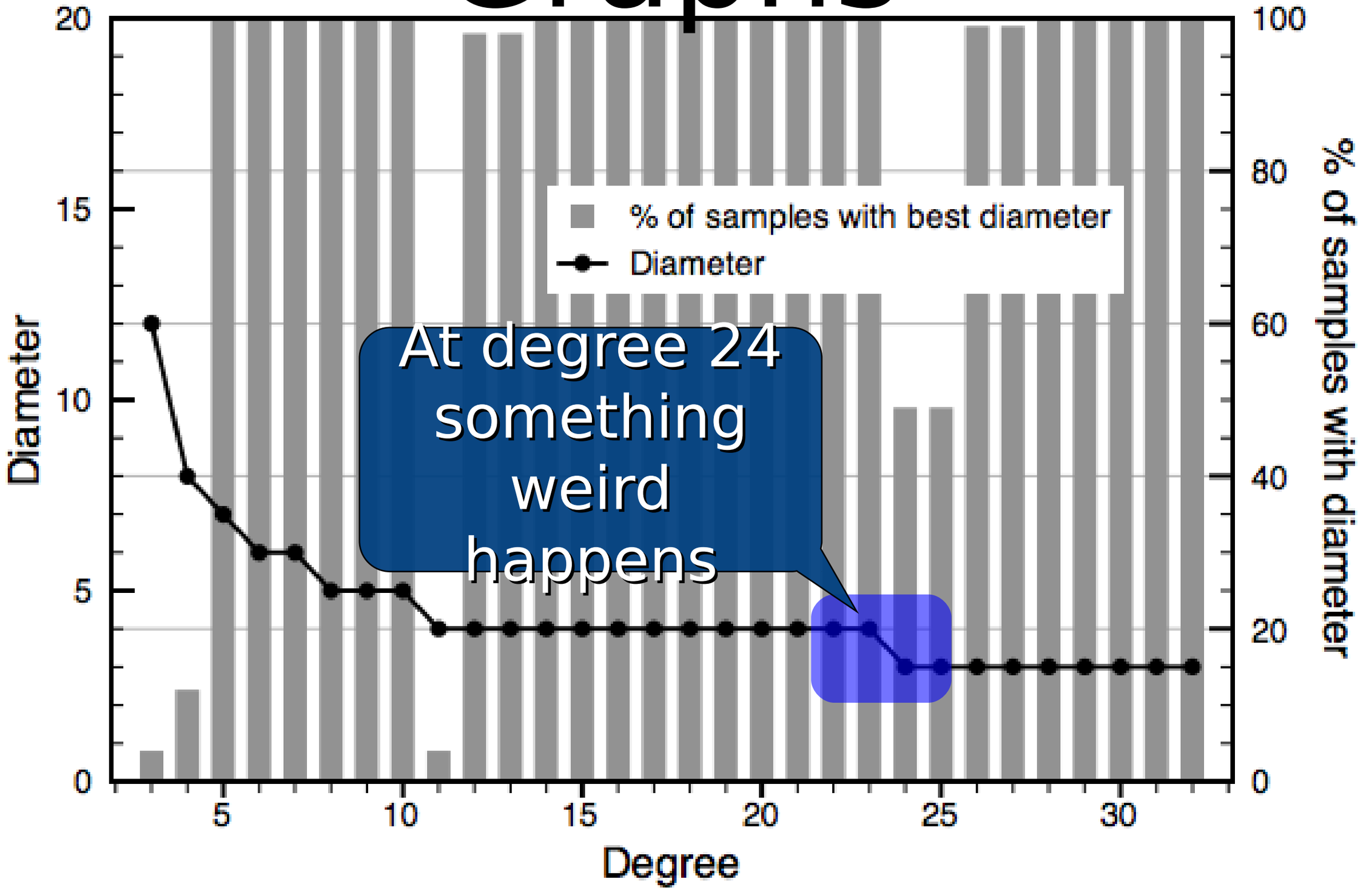

Slide Scheme

- Multi-color backgrounds are almost always a mistake
- Fancy transitions between slides are distracting
- What’s “cool” is often subjective
  - Especially when you’re a computer scientist :)
- With a poor projector, your fancy stuff will not be cool
- It will (suspiciously) distract from the content
- Use white, very light gray, or very light cream backgrounds
- Don’t waste space on margins
- Use a consistent scheme throughout the presentation

Use of Graphics

- Figures are almost always a good thing
  - e.g., diagram of a system’s architecture
  - e.g., diagram of information flow

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- Overused or goofy clip arts are lame

etc.

Math and Equations

- Use math notations and equations only if absolutely essential to understand your work
  - More often than not, it’s not necessary
  - In fact, not being able to explain your work without equations is a bad sign
    - Throwing equations on slides can be seen as a shallow way to impress the audience
- Nobody will remember notations you’ve introduced on the previous slides unless you have very few of them
- If you must show an equations, builds are good

Example

$$P_{+}^{(q)} = P_{u,u}^{(q)} + P_{u,r}^{(q)} \left(\sum_{t=0}^{+\infty} (P_{r,r}^{(q)})^t \right) P_{r,u}^{(q)}$$

Example

probability to remain in the u state

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probability to go to the r state

Example

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probability to stay in the r state some number of time steps

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probability to go to the r state

Example

probability to remain in the u state

probability to stay in the r state some number of time steps

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probability to go to the r state

probability to return to the u state

Example

$$P_{+}^{(q)} = P_{u,u}^{(q)} + P_{u,r}^{(q)} \left(\sum_{t=0}^{+\infty} (P_{r,r}^{(q)})^t \right) P_{r,u}^{(q)}$$

probability to stay in the up state, go to the r state, stay there a while, and then come back to the u state

Tables

- Showing (large) tables of numerical results is not a good idea
  - Your paper has those anyway, more likely than not
- Showing data in graph form is always better
  - And yes, preparing a talk may mean re-interpreting the data from the paper in different ways
    - An audience that has read your paper will thus still be interested
- If you absolutely must show a table, make sure yo use builds to highlight relevant parts

Spelling and Grammar

- It’s rude not to have checked spelling and grammar for an “important” presentation

- The problems is that the audience tends to focuse on misspelled word and thus loose their focuss on the work itself

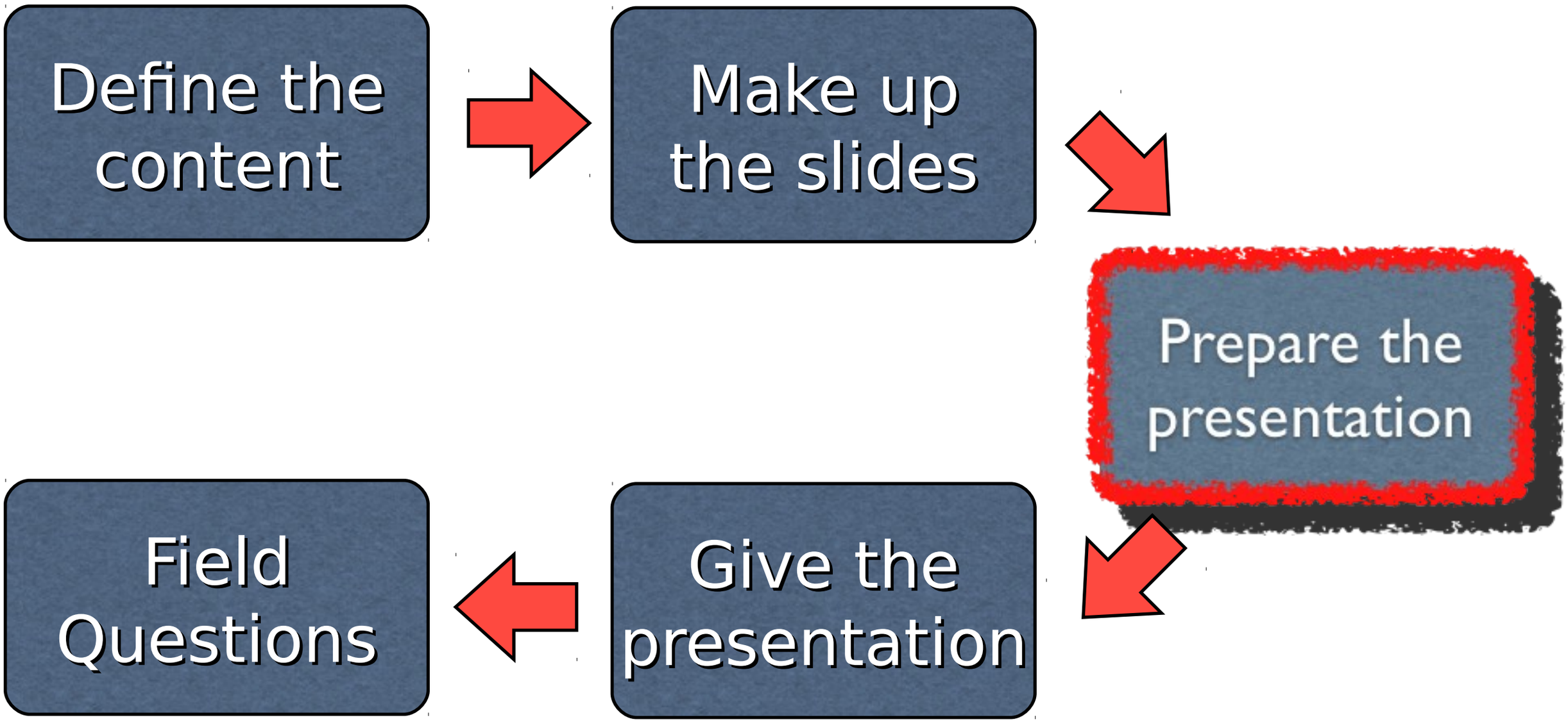
Slide Titles

- If you can’t think of a good (different) title for each slide, there may be a problem with your presentation
- Once you’ve created your slides, review all the titles carefully
  - Are they informative?
  - Do they fit in a decent logical flow?
- You’ll most likely find yourself changing them

Backup Slides

- It’s always a good idea to have backup slides
  - For the content you didn’t put in but that is part of the paper
    - formulas, graphs, tables
  - To anticipate likely audience questions
- Don’t draw unnecessary attention to something complicated in the main presentation
  - But be prepared for it in a backup slide
- Put them after your conclusion slide, with a blank slide in between
  - No accidental: “oops, I went to my backup”

The Process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Practice Talk

- DO A PRACTICE TALK
  - To yourself in the mirror is ok
  - To peers is better (~10 people is good)
    - Get their feedback
    - Give them hard copy slides for writing down feedback!
      - NEVER do that for the real presentation
- Go to other people's practice talk and presentation
- Even if the topic of a talk isn't interesting to you, take the opportunity to study presentation styles
  - Make notes of things you hate

Practice Talk

- Practice talks reveal problems with the logical flow
  - You will rearrange the order of your slides and the order of your bullet points in your slides
- Do you have any nervous tics?
  - Saying “um” all the time
  - Saying “I guess” or “things like that” all the time make you sound indecisive and imprecise
  - Your practice talk audience can help!
- After a while, you won’t do practice talks anymore, but at the beginning they are absolutely necessary

Transitions

- During your practice talk, make sure you have smooth transition sentences between slides to provide flow
  - Provides the audience with signposts and part of the story that can’t be put on the slides
  - Having 5 blank seconds in between each slides is not great
- These transition sentences should come from your “telling the story” exercise when you came up with the presentation content
- You can even put outrageous statements on a slide to aid your transition and wake up the audience
  - But beware of nerves when using such tricks

Overpracticing

- There is such a thing as overpracticing
  - Your talk will sound stilted
  - You will go too fast
  - You will anticipate the next slide just too well to be believable
- But memorizing the first 2-3 minutes can ensure a smooth start even in a high-pressure situation

Thought Experiment

- If the projector were to fail, would you be able to finish your presentation in some fashion?
  - Giving the audience the gist of what’s important
- If you feel like you could do it, then you’re likely ready for the presentation

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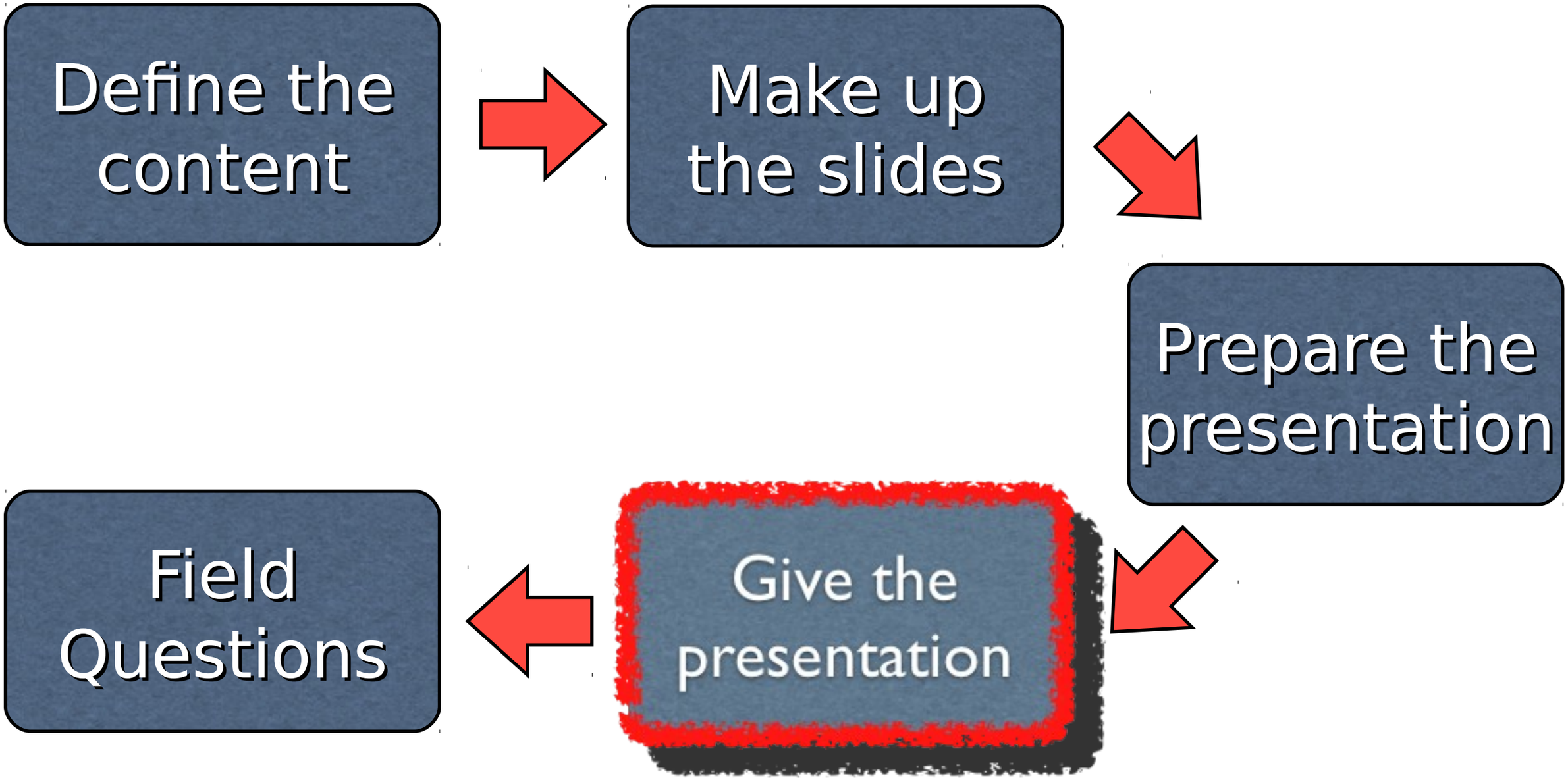
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Presentation Jitters

- You will most likely have them, it’s normal
  - Don’t breathe well, shaky legs, etc.
  - Dry mouth (have water available!!!!)
- Eye contact with the audience is good
  - Find a “nodder”
  - Don’t focus on a V.I.P. only
    - rude to others, and if V.I.P frowns you’ll panic
- Don’t overdress, be comfortable
  - This is a CS audience after all (suspenders and unkept beards scream “Genius Prof. who worked at Xerox Park”)
- If you get flustered, take a break, drink a glass of water
  - Have water available!!!!

Body language, etc.

- Avoid pacing too much, wringing your hands, clearing your throat, coughing nervously
- But don’t be a frozen statue either
  - Just find a good compromise that fits who you are
- Microphone:
  - If the microphone makes noise when you move, take enough time to readjust it properly once
  - Clearing your throat/coughing with a mic on is bad
- Furniture:
  - If a chair’s in your way, take the time to move it out of the way by 1 foot as opposed to moving it 1/2 inch each time you bump into it
- Don’t let your shadow be on the screen

Laptop and Pointer

- Configure your laptop to avoid screensaver/sleep
- Don’t stare at your laptop’s screen
- Don’t point at your laptop screen!
  - It happens often
- Don’t overuse the laser pointer
  - Most people use it badly and too much
    - Having the point on slides more than 10% of the presentation time is too much
  - Use it to point at objects, not to circle objects (it’s a “pointer” not a “circler”)

Presentation Files

- Always have your slides on a USB key, even if you think you'll use your own laptop
  - You may use another computer at the last minute
- Always have your slides in PDF format!
  - If you use a different computer, this ensures portability
  - If you only do animations as builds, then your PDF file is all you need anyway
- Always have your slides in PDF format stored on the Web server so that you can always download them in an emergency
  - Simple URL (you may have to type it in front of the audience while the projector is on)

Don’t Apologize

- DO NOT APOLOGIZE FOR ANYTHING, IT’S AWKWARD FOR EVERYBODY
  - “Sorry, there is a mistake in this slide”
    - Just point it out, not saying “sorry”
  - “Sorry, I didn’t have enough time to prepare”
    - What? You didn’t know this was coming?
  - “Sorry, I can’t say much in this short talk”
    - What? You don’t know how to give a short talk?
  - “Sorry, I went to the next slide”
    - Just go back
  - “Sorry, computer is misspelled”
  - etc.

Talk Introduction

- If there is a session chair and the chair gave you a clear and loud introduction and read your title, just say “thank you for the introduction”
  - Repeating verbatim everything the chair said will be awkward
  - But people do it all the time due to learning the first few minutes of the presentation by heart to avoid jitters

Use your Slides

- Don’t speak forever while your title slide is up
  - Sounds obvious, but happens more often than you’d think
- Speaking more than 30 seconds between slides is not great either

- Great speakers can do the above, no problem
  - But mesmerizing an audience just with words is not something everybody can do

Your main job

- To wake UP the audience
  - Without being totally out of control :)
- Be enthusiastic
- You’re telling a story, your tone should change depending on the part you’re talking about

Do Not Read Your Slides

- Reading your slides = DEATH
  - Worse: bringing a piece of paper will generate a huge sigh in the audience
- If you find yourself reading your slides, it’s because they have too much text
  - Remember: Don’t have full sentences on slides
- Your slides are a crutch so that you don’t forget important things to say at a conceptual level, not at the word level

Running out of Time

- Rushing because you're running out of time = DEATH
- Learn to skip slides!!!
  - The audience doesn't know what slides are coming up anyway, so they're not emotionally attached to them
  - Easy to get caught in the moment and forget to skip slides
    - And even afterwards, to say "pheeew, I managed to present everything... great" without realizing that it was a mistake
- Do not be that speaker who'd rather die than skip a slide because this presentation is SO important
  - Things will get really awkward toward the end
- Don't be to emotionally attached to your slides

Do Not Go Overtime

- Going overtime = (DESERVED) DEATH
  - It is disrespectful (“my work is clearly so much more important than that of the next speaker”)
- When the chair holds up the “5 minutes left” signal
  - Don’t panic
  - Assess where you’re at
  - Decides which slides to skip
  - Proceed with calm
- People will love you for it
  - And hate you otherwise

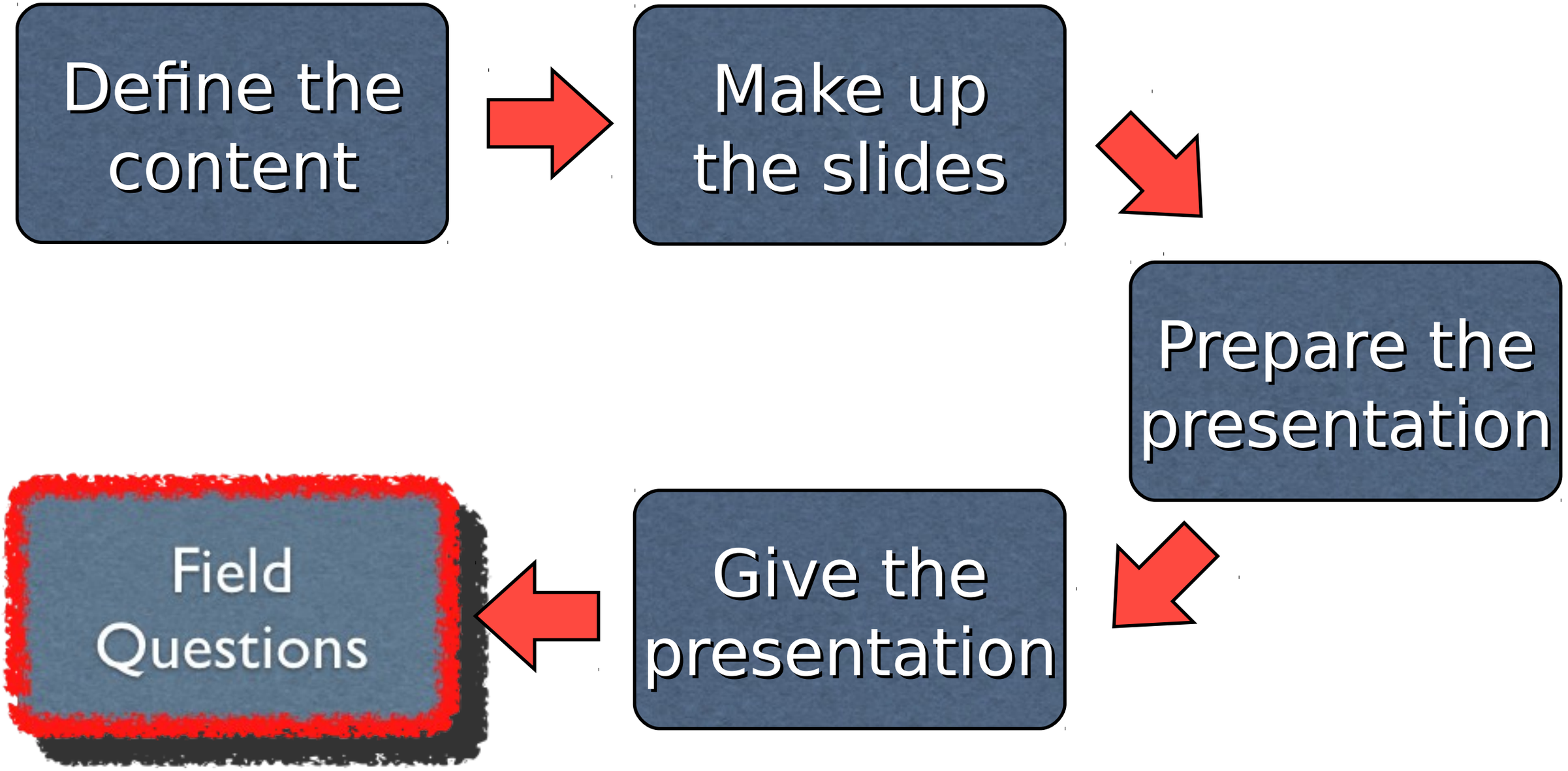
Discussing Previous Work

- Do not disparage previous work
  - You don’t know who’s in the audience
- Be diplomatic: “The work by X et al. was interesting. In this work we go further...”
- Take the “standing on the shoulders of giants” attitude
  - Even if you actually despise previous work

Ending the Talk

- You want to make sure the audience knows your presentation is over
  - Don’t make it look like it’s over and then keep adding “just one more thing”
- Saying “Thank You” at the end isn’t a bad idea at all
- The typical sequence:
  - “thank you”
  - applause
  - questions
- Saying “thank you and are there any questions?” can lead to an awkward situation

The Process


Define the content
Make up the slides
Prepare the presentation
Give the presentation
Field Questions

Fielding Questions

- Fielding question is difficult
  - Becoming good at it takes a lot of experience
  - During your practice talk, ask your peers to ask as many questions as possible
- You need to be focused
  - Inexperienced speakers are SO relieved to be done with the presentation that their brains completely shutdown before questions are asked
  - The questioner is in the back of the room, the question is poorly formulated, and the questioner has an outrageous French accent

How to Find Focus

- It is very common to be stressed, to misunderstand the question, give a 5 minute answer, and then have the questioner say: “that wasn’t my question”
- Solutions: repeat the question for the audience
  - Not everybody has heard the question anyway
  - Gives you time to understand the question and think of an answer
  - Give the questioner a chance to tell you if you haven’t understood the question

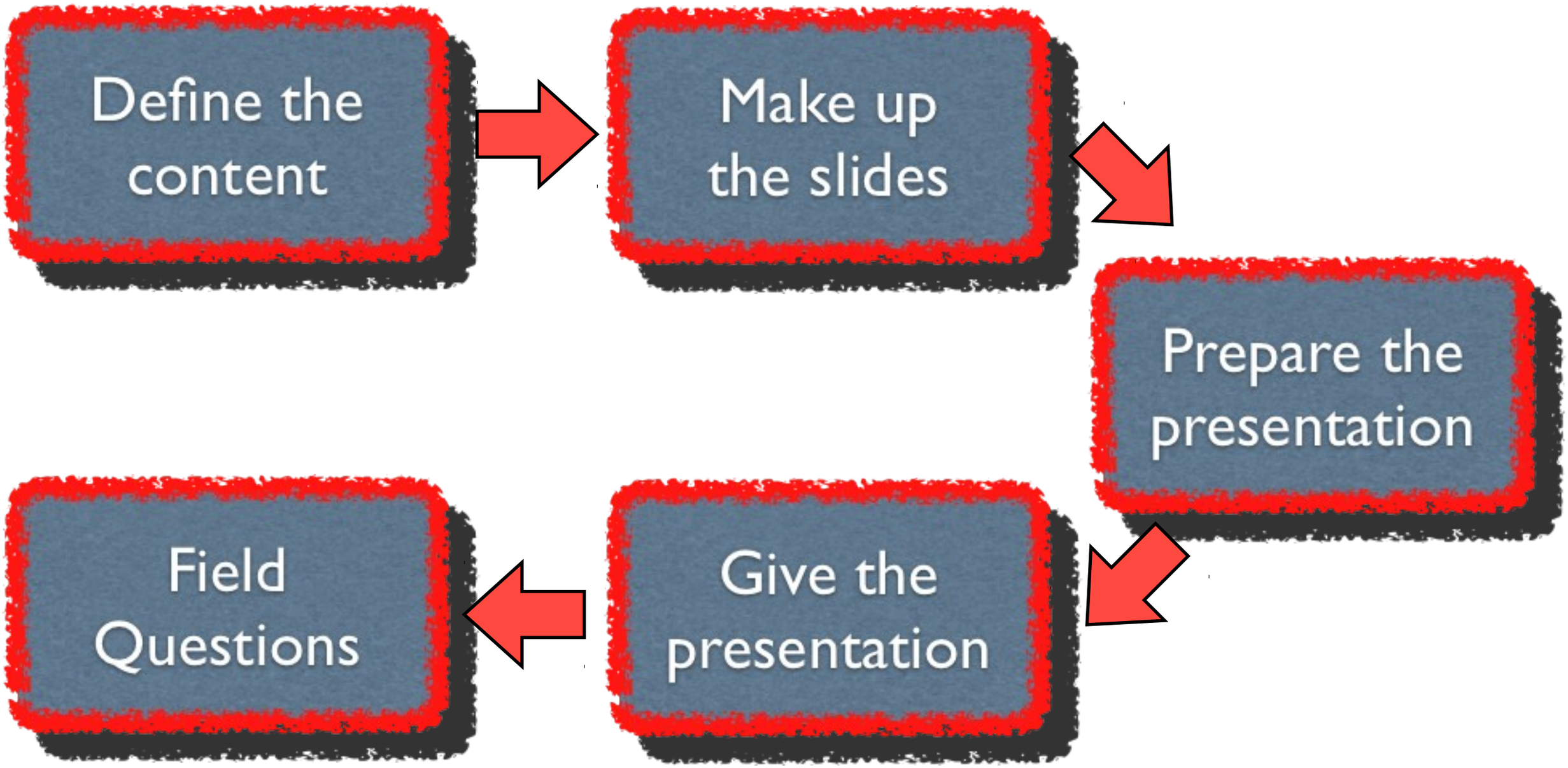
Controlling Questions

- Avoid lengthy exchanges
  - Especially if confrontational
  - Remember that questions can be taken off-line
    - The session chair should help
- Answering “I don’t know” or “we haven’t done that” is OK
  - And don’t apologize for it
- If the answer is “it is not known” do not answer “I don’t know”!!

Simple Answers

- Give the simpler answer first
  - Otherwise, it will look like you're trying to fake it because you're clueless
    - Worse: after 5 minutes of complex answer, the questioner will then say a sarcastic "so, you're saying the answer to my question is... 'yes'?"
- If the questioner asks more details, then fair enough

The Process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Take Heart

- There are so many terrible speakers that doing a little can get you WAY ahead of the pack
- Your talk #n+1 is better than your talk #n with probability ~1
- In the end people will remember your work, not your first talk
  - Thankfully nobody remembers my first talk!

Conclusions

- Your talk should be an advertisement for your paper, not a replacement for it
- Practice your talk
- Things will only get better from here on
- Other questions? thoughts? experiences?