



The University of Texas at Austin
Cockrell School of Engineering

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STARTING TIPS: MAKING PRESENTATIONS (AND POSTERS)

(Have a nice title slide)

Wang Materials Group Meeting Tutorials

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Why bother?

Effective science involves effective communication

How will people know your work is cool
if they cannot understand it?

Treat every talk as a job talk

- It's a chance to show everyone what you've done!
- You never know who might be in the audience!

(I later learned the now Division Head at the Beijing Computational Science Research Center was in the audience at my first conference presentation!)

- Your talk is a representation of the group, the department, and UT Austin
- Every presentation is a networking opportunity
 - Have business cards ready
 - Include contact information
 - Use technology to your advantage (QR codes, Twitter handles)

Know your audience

How much background should you prepare?

How much jargon and technical detail should you use?

Graduate students? Undergraduate students?

Field Experts and Senior Scientists?

General public?



If unsure, upper undergrad/lower graduate level is a good level to start at

Spend the time to properly motivate why the research is important-
even if people don't understand all of the technical details of the results,
they can at least appreciate the impacts

Know/Set up the space

In-person	Zoom
Test projector and connections	Test audio/visual
Laser pointer, slide advancer	Digital pointer
Room size- how much to project, move around the room	Breakout rooms, polls?



<https://enterpriseproject.com/article/2020/8/zoom-tips-online-presentations>

Tell a story

Big Picture Context:

- Why is this research important?
- What was the challenge/unknown?

How did you tackle the problem/challenge?

- Methods, approach, idea

What did you find?

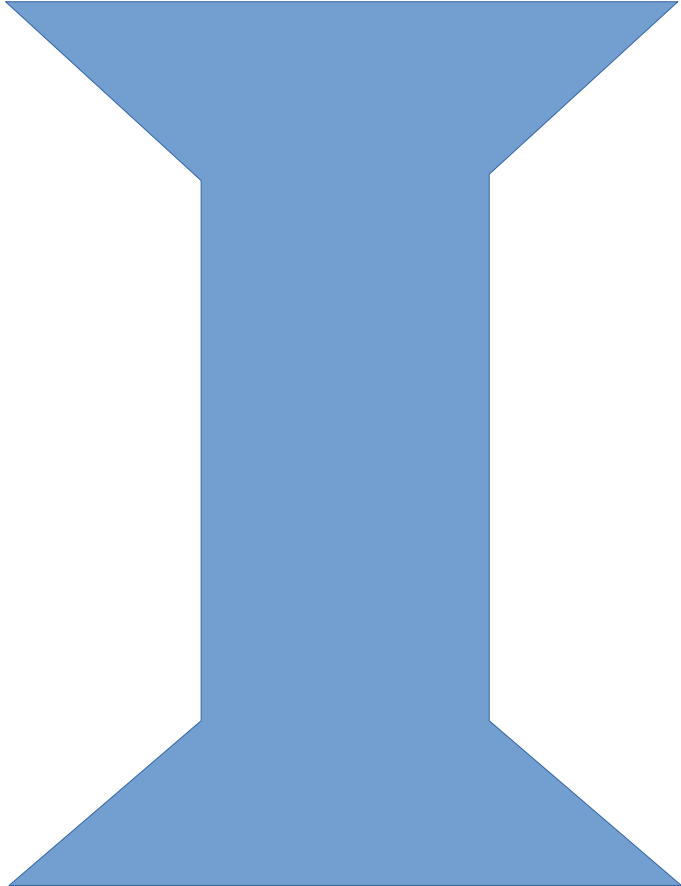
- Results and data

How are your results scientifically important?

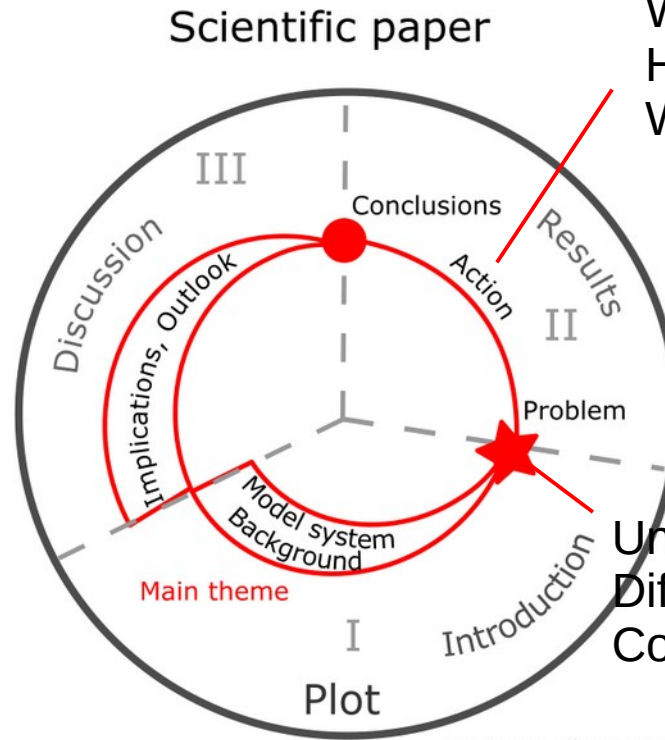
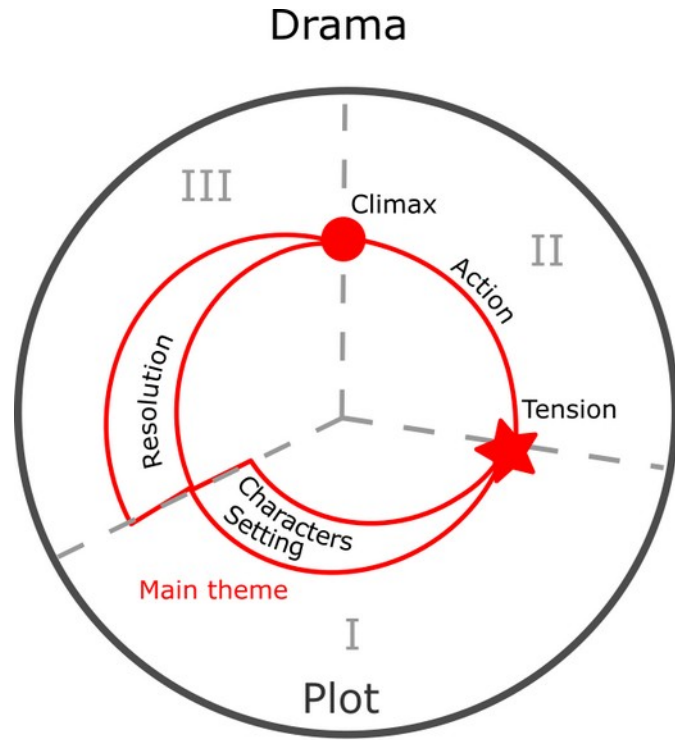
- Discussion and interpretation
- What did you learn?

Impacts and Significance

- What are the implications of your findings in your project, the field, society?
- What will you do next?



Tell a story



What you did
How you did it
What did you find

Unknown
Difficult to determine
Controversial interpretation

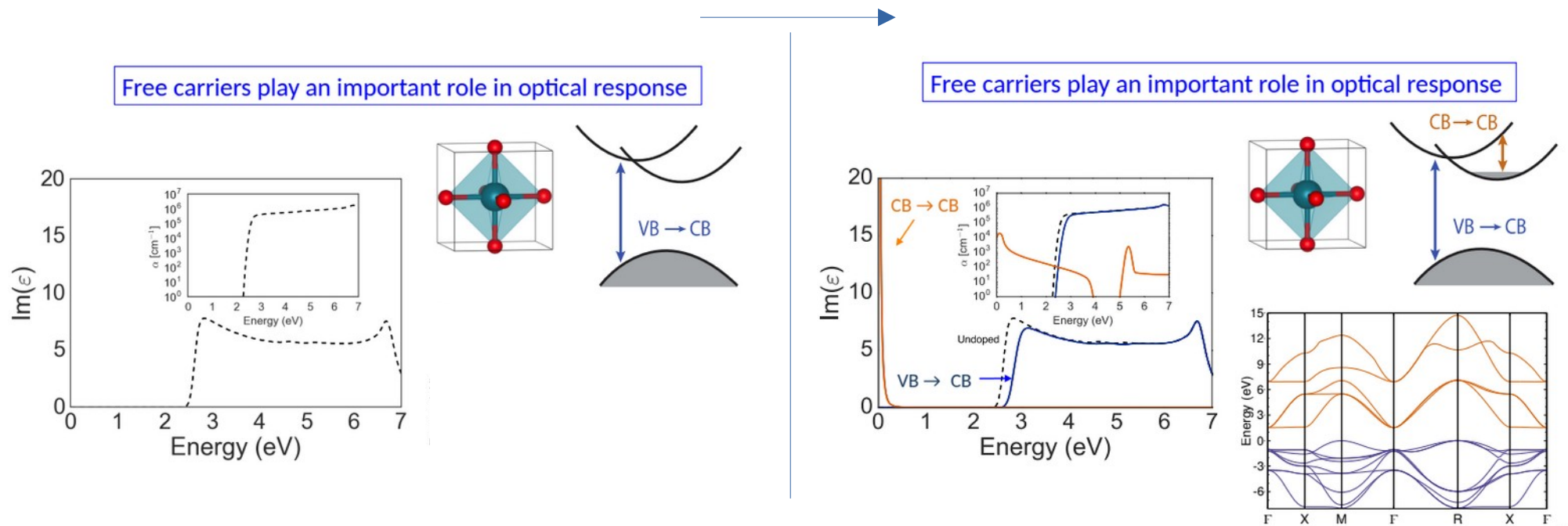
© Anna Clemens

Break up complex ideas and figures

The audience has about 20s to process and understand the plot while also listening to you

Make it easy for them to follow the data

Use simple animations, e.g., build up a figure



Guide the audience through *everything*

Assume the audience is pre-occupied or tired:

Tell the audience what you want them to know

“Here are the two main takeaways I want you to remember”

“If there is anything you remember from this presentation, it is...”

Signpost: “When we turn to the results...”, “In conclusion,...”

Redundancy is good: either reinforced through speech, figures, text, annotations

For the entire presentation:

what are 1-2 main points you want the audience to take away

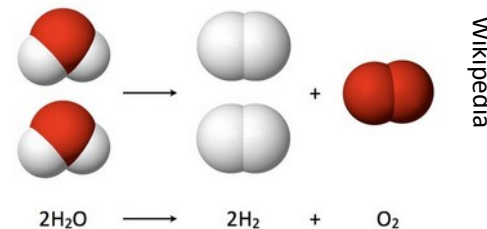
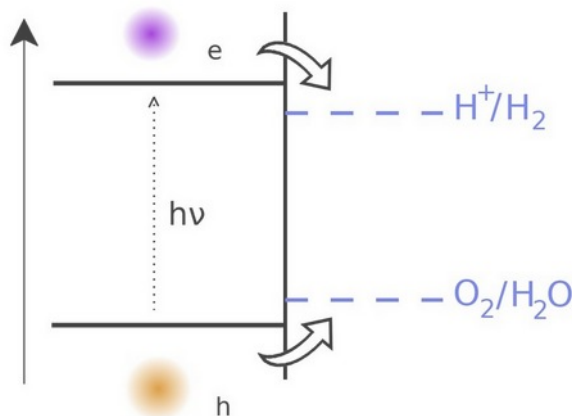
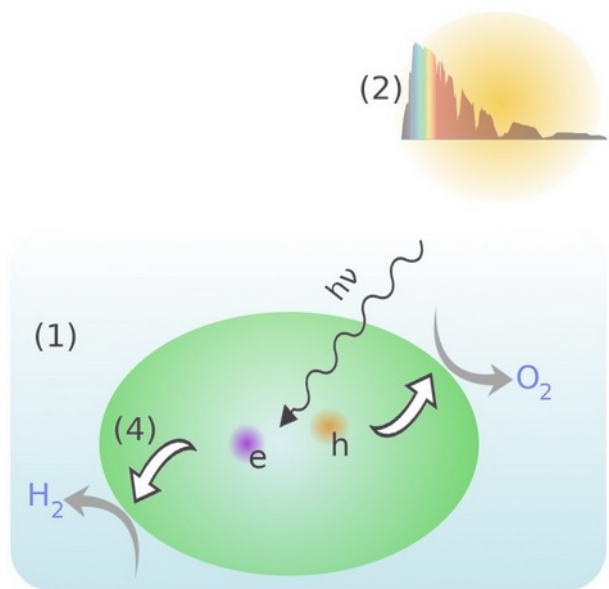
For each slide: what is the main point of the slide

what is the main point of the figure

Water Splitting for Clean Fuel (with oxides)

Materials for photoelectrodes in **water splitting** offer a sustainable way of producing **clean fuels**

An ideal material:



(Minimum) Materials Criteria:

- (1) **Stability** in aqueous environment
- (2) **Band gap** in visible
- (3) **Band edges** near reaction potentials
- (4) Sufficient hole and electron **mobilities** *

Our materials system of choice is bismuth vanadate ($BiVO_4$)

*W. Wang, et al. "The role of surface oxygen vacancies in $BiVO_4$." Chemistry of Materials. 32, 2899-2909 (2020).

Keep it simple/Less is more

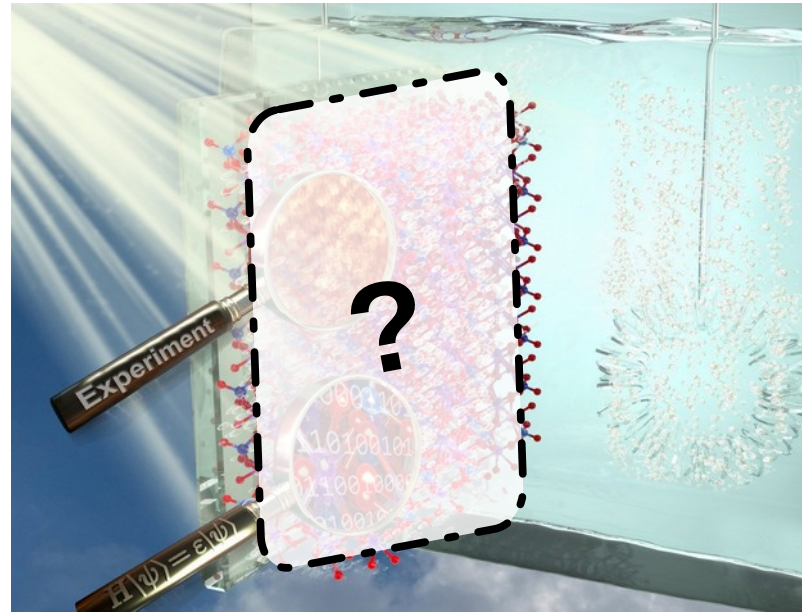
Motivations: Interface- & Surface-driven phenomena

What is the structure of the surface?

How does surface/interface influence photoelectrochemical activity?

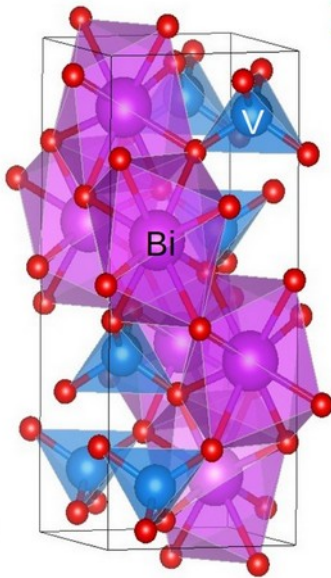
What are the ways and signatures of water interacting with the surface?

Reinforce
main question
with text and
image (and
speech)



Use color to your advantage

Why BiVO_4 ?



BiVO_4 is an attractive photoanode for oxygen evolution

Stable

Band gap

Band alignment

Synthesis

e^- - h^+ yields

OER kinetics

Recombination

against corrosion^{1,2}

2.4 – 2.6 eV^{3,4,5,6}

Favorable w/ H_2 ^{3,7}

Many and varied; not \$\$¹

High, >70%⁴

Slow (requires co-catalyst)

In bulk & surface (?)

Good things in green

Bad things in red

Other things color coded

Interfacial
phenomena

1) Y. Park, ... K.S. Choi. *Chem. Soc. Rev.* **42**, 2321 (2013).

2) T.W. Kim and K.S. Choi. *Science*, **343**, 990 (2014).

3) M. Favaro, ... R. van de Krol, D. Starr. *J. Phys. Chem. C*, **123**, 8347 (2019).

4) T.W. Kim, ... G. Gallì, K.S. Choi. *Nat. Comm.*, **6**, 8769 (2015).

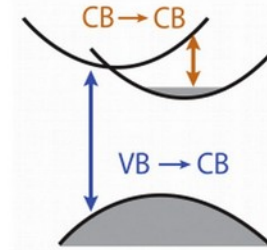
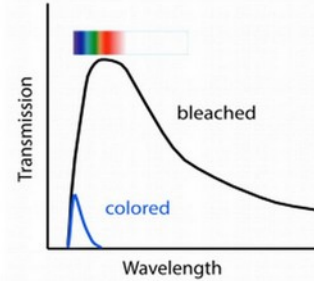
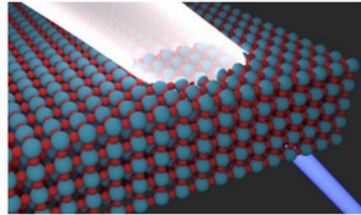
5) D.D. Payne, ... L.E.J. Piper. *App. Phys. Lett.*, **98**, 212110 (2011)

6) M.V. Malashchonak, ... A.V. Mazanik. *Mat. Chem & Phys.*, **201**, 183 (2017)

7) J.K. Cooper, ... I.D. Sharp. *Chem. Mater.* **26**, 5365 (2014).

Use color to your advantage

Optical Absorption: Why & What



$$\varepsilon_2(\omega) \sim \frac{1}{\omega^2} \sum_{v,c} \int_{BZ} \frac{2d\mathbf{k}}{(2\pi)^3} \underbrace{|\mathbf{e} \cdot \mathbf{M}_{cv}(\mathbf{k})|^2}_{\text{Transition strength}} \underbrace{\delta(E_c(\mathbf{k}) - E_v(\mathbf{k}) - \hbar\omega)}_{\text{Transition exists}}$$

Large meshes needed




Transition exists






$$\mathbf{e} \cdot \mathbf{M}_{cv}(\mathbf{k}) = \langle \psi_{c,\mathbf{k}} | \mathbf{e} \cdot \mathbf{p} | \psi_{v,\mathbf{k}} \rangle$$

Transition strength

Use color to your advantage

Using the school colors
<https://brand.utexas.edu/identity/color/>

Color	Pantone®	CMYK	RGB/Hex
	PMS 159	0, 65, 100, 9	191, 87, 0 #bf5700
	PMS 432	65, 43, 26, 78	51, 63, 72 #333f48
	—	0, 0, 0, 0	255, 255, 255 #ffffff

Color	Pantone®	CMYK	RGB/Hex	
	PMS 2011	0, 48, 99, 0	248, 151, 31	#f8971f
	PMS 116 C PMS 114 U	0, 14, 100, 0	255, 214, 0	#ffd600
	PMS 2300	40, 0, 89, 0	166, 205, 87	#a6cd57
	PMS 2277	63, 0, 97, 20	87, 157, 66	#579d42
	PMS 320	96, 0, 31, 2	0, 169, 183	#00a9b7
	PMS 7469	100, 31, 8, 42	0, 95, 134	#005f86
	PMS 7543	24, 9, 8, 22	156, 173, 183	#9cadb7
	PMS 7527	3, 4, 14, 8	214, 210, 196	#d6d2c4

Make everything bigger

The quick brown fox jumps over the red dog.

The quick brown fox jumps over the red dog.

The quick brown fox jumps over the red dog.

The quick brown fox jumps over the red dog.

← Minimum font size: 18
Max number of font sizes: 3

The quick brown fox jumps over the red dog.

The quick brown fox jumps over the red dog.

An 80-year old person with bifocals sitting in the back of the room
should be able to read it

Typeface

Typeface

Roboto

VS.

Font

Roboto Thin

Roboto Light

Roboto Regular

Roboto Medium

Roboto Bold

Roboto Black

Typeface

Free from Google

<https://fonts.google.com>

“metrically compatible”



Short phrases
(presentations, posters,
Flyers)

WW uses
Calibri/Carlito frequently

Sans serif

Tahoma

Arial

Verdana

Trebuchet

Gill Sans

Serif

Times

Georgia

Century

Garamond

Book Antiqua

Block text
(papers, theses, proposals)

WW uses Cambria/Caladea
frequently

<http://sixminutes.dlugan.com/slide-fonts>

Typefaces

Meet the cast:

A B C D
E F G H I J K
L M N O P
Q R S T U V
W X Y Z

Now see the movie:

Helvetica

<https://watchdocumentaries.com/helvetica/>

Typefaces

THE COMIC-SANS GAME! TRY IT!

Keep an eye out for everyone's favourite stylistically-awkward font in everyday life!

You'll notice it more often than you think!

If you see it, just raise your fist and shout "comic SAAAAAAAAAAAAANS!"



Cyanide and Happiness © Explosm.net

Comic Sans....please avoid



<https://www.lingoapp.com/blog/comic-sans-the-innocence-and-hijacking-of-a-much-hated-type>

Practice, practice, practice

- Run through the presentation a few times until you are comfortable
- Get the timing down
 - Leave time for Q&A
 - Figure out how much time it takes for you to go through a slide
 - On average about 1.5–2min per slide

Learn to speak extemporaneously

- Prepare notes ahead of time
- Avoid speech fillers: “um”, “like”, “so”, etc.;
- Pauses are totally fine! They always feel longer as a speaker
- Don't get caught on speech flubs- they happen a lot, but they will stick out to you much more than anyone in the audience; no one will remember
- Practice in front of a mirror or record yourself

Eye contact and gestures

Make eye contact in different places in the audience
(or with the camera on video conferencing)

Gestures for emphasis

Hands and arms at rest at the side by default (feels weird, looks natural)
or...



“Merkel Raute”

Compress images where needed

- Make sure your images are portable/editable
 - paper, presentations, curation
- 600 dpi (dots per square inch) → high-resolution
- 300 dpi → publication quality
- 96-150 dpi → projector quality
- Raster images (bitmap, pixels): distortion when enlarged
 - JPG (lossy compression, less memory)
 - PNG (lossless compression, more memory)
- Vector image (geometric forms): clear resolution at any size
- Files on the order of 10s MBs

Image compression in powerpoint

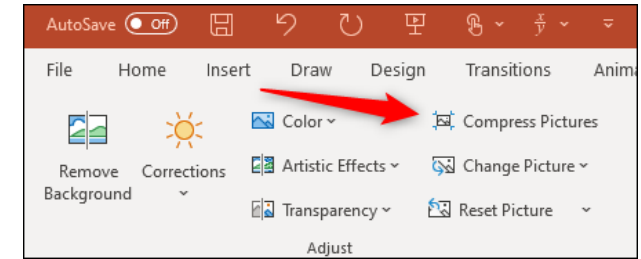
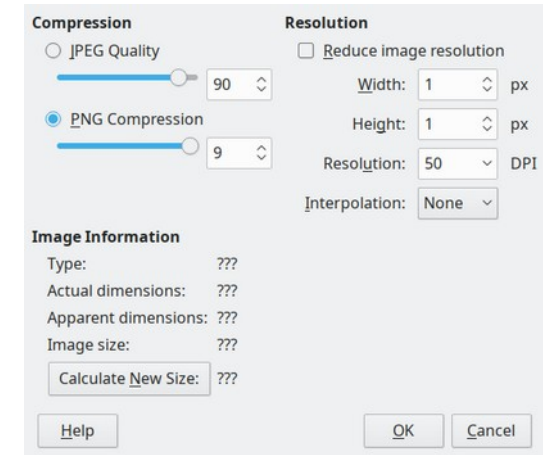


Image compression in LibreOffice



Have backup slides ready

All the things you could not fit in the talk time-

You'll discover what you actually present
is a fraction of the actual work involved

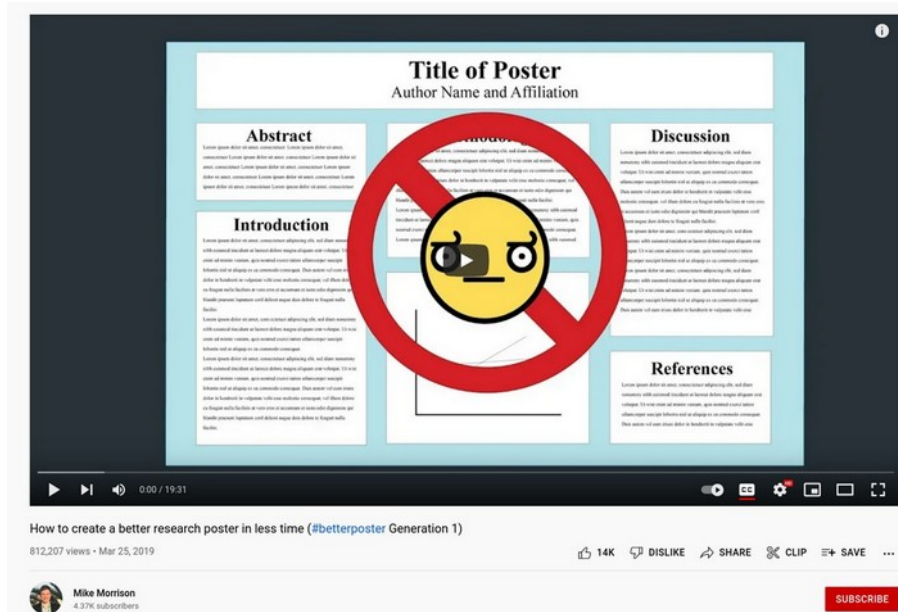
You will pick and choose what is relevant to present based on
the anticipated audience
the type of conference
the overall message you want to communicate

e.g., dissertation: ~35 slides, 20 backup

Find your style

Experiment and try new things!

Aside: Making posters



<https://www.youtube.com/watch?v=1RwJbhkCA58>



<https://www.youtube.com/watch?v=SYk29tnxASs>

Also great insights into how to work with natural human biases/psychology

Guidelines for journal club

Types of topics

- Tutorials on a specific technique
- Methodology developments
- New physics or chemistry
- Studies that revisit published results

Identifying a topic

- Relevant (tangentially or directly) to participating members?
-

Where to start:

- Review or perspective or accounts
- High-impact/flagship journals

What to include in a journal club presentation

- Sufficient background/context
- Motivations of the paper
- What did they find?
- How did they find it? (Use figures, tables; keep in mind methodology)
- 1-2 main points you want people to remember

As an audience

- Think about connections to your own research
- Come prepared to ask questions