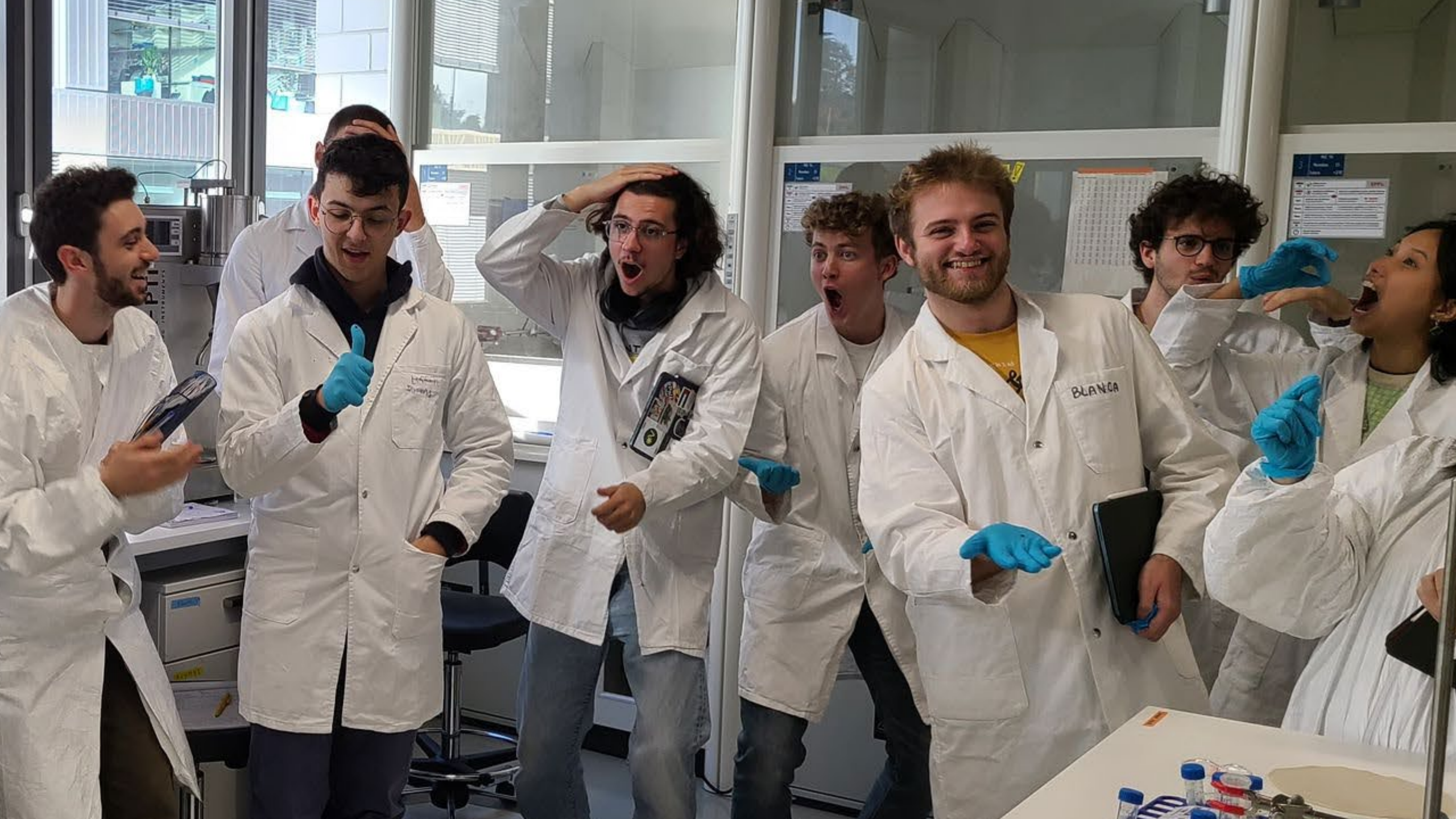


The background of the slide is a dense, microscopic view of cells, likely bacteria, stained with a pinkish-red dye, creating a textured, organic pattern.

Evaluations (mine and yours) MSE 493

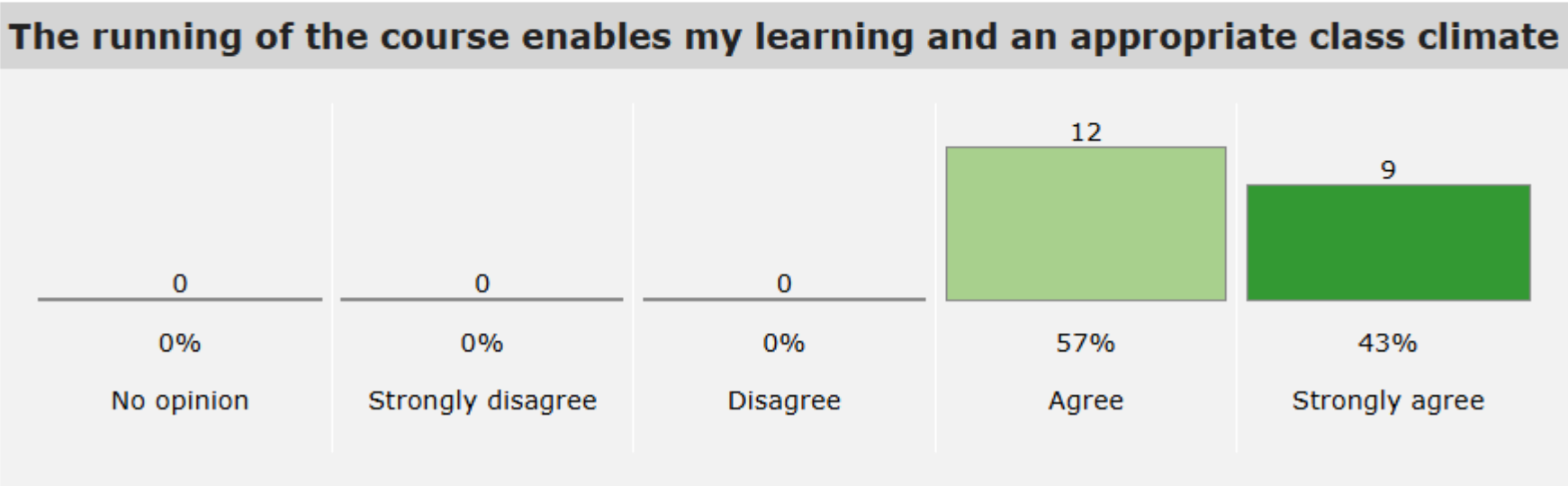
Prof. Tiffany Abitbol

2024



Year	2024-2025
Course	Engineered living materials
Questionnaire	 Indicative feedback of teaching (since 2022-2023)
Nb Registered	36
Nb Answered	21

- 58% respondents
- Positive



- Cours intéressant qui nous présente un domaine nouveau et dans lequel les possibilités semblent très variées. Du fait de la nouveauté du domaine, le cours se base sur des articles afin de développer notre capacité à lire et comprendre des articles scientifiques, ce qui est une bonne chose. Une potentielle amélioration serait de nous donner accès à plus de contenu (sous forme de rappel par exemple) sur les "bases" scientifiques nécessaires à la compréhension de certains articles.
- First, I think that having more general courses from time to time could be appropriate to get a bigger overview of the field. Indeed, working mainly on papers give precise insight of (too) small points of a very various field. Regarding the assignments, I find strange that both the first and second assignments are weighted the same as the first took much more time and research than the second. Finally, I find sad to have imposed groups for the last project. Some people have been in this school for 5 years or more and they are used to work with some people being able to produce better projects. Moreover, as people can leave the course until week 10, the risk of having people that you don't know in the group leave it is not negligible.
- Great course !
- The course in my opinion focuses too heavily on just reading papers on very specific ELM topics without really getting a broader and more general view of what ELMs are. I am also not a big fan of not being able to choose my group for the big final project. The deadline is at the busiest time of the semester and it would be nice to be able to be with people you know you work well with and are able to potentially do a better project with.
- The fact that there are project on 3 different time scale is a bit difficult to manage. I know no one that actually began their "long term" project, and in my opinion it is also due to the fact that were are assigned a group.
- The first short assignment was too long or it should have a bigger impact on the grade. I think overall there are a lot of assignments and papers to read before the class for a 3 credits class. Otherwise the class is interesting and well explained.
- The lectures are interesting and the homework allow us to broaden our knowledge of nature's abilities that could be used in engineering.
- Very interesting course and i really like the grading system, I will enjoy to think about the research proposal

First assignment should have a bigger impact

- My suggestion to divide the 1pt for the assignments:
- Scheme A: 0.75 pt for the first assignment, 0.25 for the 2nd and 3rd together
- Scheme B: equally divided between all 3 assignments
- We will calculate both ways and give you the grade that benefits you

Stressful to have final project at the end of the year with random people

- Two suggested schemes:
- Scheme A: What it is now – 3 pts for proposal, 2 pts for poster
- Scheme B: New suggestion – 2.5 pts for proposal, 2.5 pts for poster
- What do you think? **We will set up a poll via Moodle**

Preparing for the poster

- Any questions?

Preparing for the poster

- My advice –
- Identify important background articles and resources – these may be cited in the article you chose or not (do your research!)
- Include important refs: this includes your selected paper (duh!) but will also include other important refs that you find, e.g., related to the background
- Make sure you and your teammates understand the details of the figures that you show – if you don't - ask a prof, a TA, Claude/ChatGPT, discuss with your group

Preparing for the poster

- The data is the data, let's trust it, but an interpretation of the data is just that an *interpretation* - Think critically, are the conclusions as neat and tidy as presented? Can you think of anything else? **Your views** can be part of the discussion, interpretation, thoughts and direction for future work
- You can replot data if its important and was presented in a non-visual way, e.g. turn a blah table into a nice figure (tell us if you did this when you present)

Preparing for the poster

- You can remake the graphical abstract – maybe there is no graphical summary in the paper or you think you can do better (tell us when you did this when you present)
- Btw this graphical abstract can be the basis of your teaser slide that you will present at the start of the poster session
- It should capture the main parts of the paper in a clear, visual, and simplified way

Tips for a graphical abstract from Springer Nature (one resource, there are many others)

Purpose:

- Catch the reader's attention with an eye-catching image or diagram to draw readers in and encourage them to read further (same purpose as the teaser slide...)
- Can be used to make scientific content more accessible to a broader audience

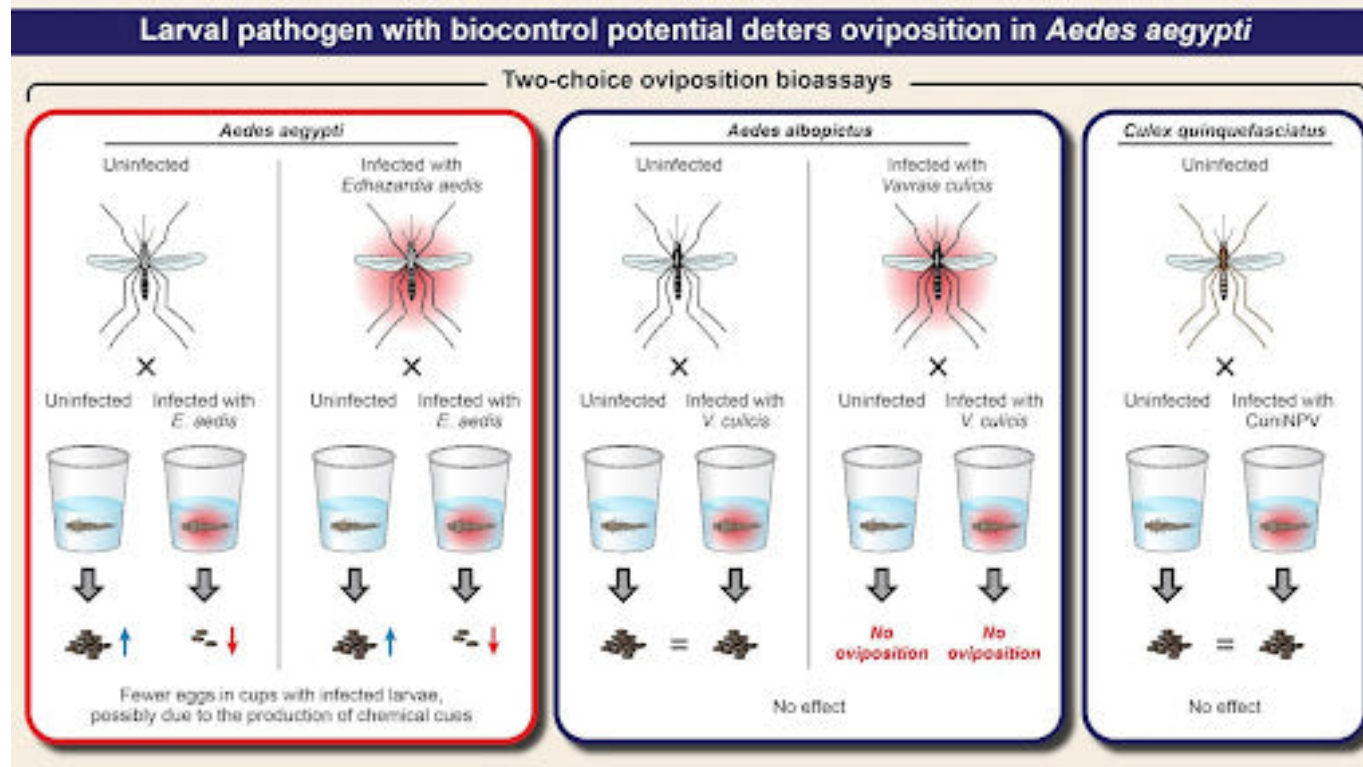
<https://solutions.springernature.com/blogs/visibility/5-tips-for-creating-a-graphical-abstract>

Tips for a graphical abstract from Springer Nature

- Focus on key messages: do not include all findings only most important
- Focus on visual elements: overwhelming the reader with too much text is not effective
- Keep it simple: simplify concepts or data into easily understandable visuals
- Maintain consistency: style, color scheme, design should match the article

<https://solutions.springernature.com/blogs/visibility/5-tips-for-creating-a-graphical-abstract>

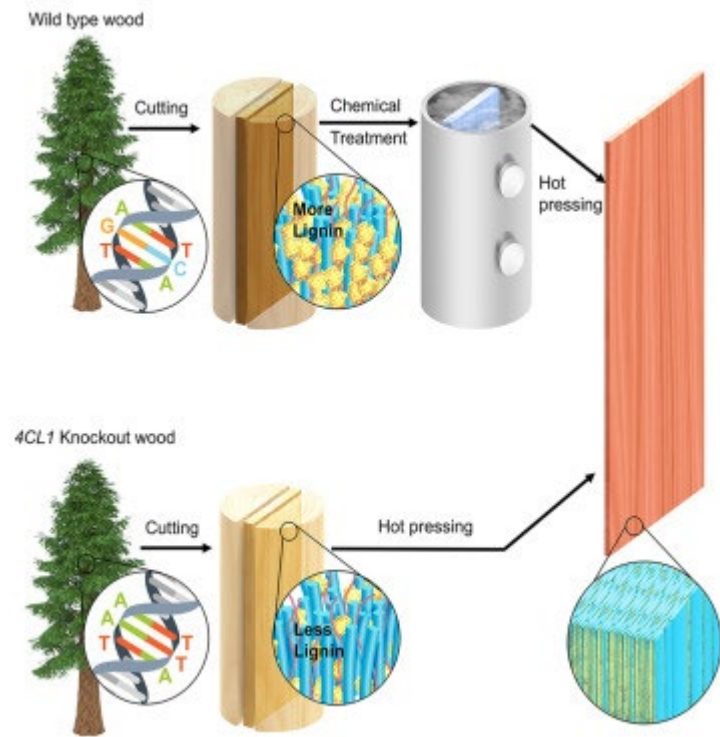
Tips for a graphical abstract from Springer Nature



- Strict color scheme
- Minimal text
- Arrows as guides to main results
- Look at other examples, see what works and what doesn't

Some ELM graphical abstracts (from scrolling Matter)

Genome-edited trees for high-performance engineered wood



Bioinspired structural adhesives: A decades-old science but emerging materials



Preparing for the poster

- Any questions?

Preparing for the proposal

- Any questions?

What's the purpose of this exercise?

- At EPFL, all PhD students have to write and pass a candidacy exam that entails a research proposal, this is done after 1 year
- As PhD student: Your supervisor gives you a topic (more or less detailed depending on your professor and the project – some might be more exploratory)
- The PhD student spends their first year studying the topic, learning the background, understanding where there are research gaps, and then formulates one or more scientific questions they wish to address to address the research gaps and to further the state of the art in a given field

What's the purpose of this exercise?

- The student writes (and iterates a report) – max. 20 pages
- The student also presents the proposal – max 30 minutes
- The student answers questions from a committee
- Whether or not the candidate continues in the PhD can depend a lot on the quality, e.g., novelty and feasibility, of the proposal and how knowledgeable they are when answering questions
- The committee decides

What's the purpose of this exercise?

Show of hands – how many of you might want to do a PhD?

So, why do this if you don't plan on doing a PhD?

- Never say never 😊
- It's a good masters-level exercise

What's the purpose of this exercise?

In your jobs in industry and elsewhere you will likely need to (hello startups!):

- Find support for the research you plan to do - financial or otherwise (resources, time, manpower)
- Whether you get the support depends on a lot of things:
 - Did you write something clear and compelling?
 - Do you show an understanding of the bigger significance and the potential impact and significance of your research?
 - What is the potential societal benefit?
 - Is your plan reasonable? Are the deliverables balanced appropriately by the resources, budget, manpower, time that you are asking for?
 - How do you compare with the competition?

Some guides on how to write a generic proposal

- <https://science.yalecollege.yale.edu/stem-fellowships/how-write-proposal>
- <https://www.sydney.edu.au/study/applying/how-to-apply/postgraduate-research/how-to-write-a-research-proposal-for-a-strong-phd-application.html>
- <https://www.sheffield.ac.uk/study-skills/research/methods/proposal>
- <https://www.mcgill.ca/gps/students/progress-tracking/proposals>

Before we dive in: A proposal is a just that *a proposal* for research that you think is important and that has not yet been done or has been done but you think you can improve in a meaningful and not obvious way. Do you have a new idea to improve a field? What fields are important to you?

1. Follow instructions

- Length of text
- Any other details that can just rule you out in the real world

2. Point form outline

- Have a plan before you start to write (be prepared to revise plan if needed)

3. Know your audience

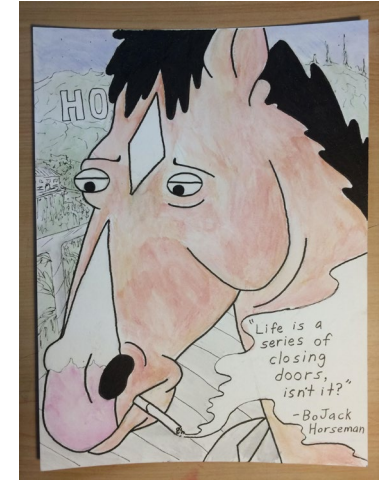
- Know your audience
- Avoid jargon
- Keep it simple

4. Make an impact right away

5. Clear title

6. Emphasize multidisciplinary

- Convey the point clearly and early on!
- Get interest right from the start
- Have a clear purpose to your planned research
- A few words that say it all
- If applicable



When I began researching mycelium materials – I submitted a proposal for a novel and natural alternative to SAPs....things did not go as planned...and here I am!

7. Show that your research is feasible

- You are not in Lalaland
- There is a plan and you can execute it

8. What is the impact?

- How will this new research contribute to a specific field?
- To society at large?

9. Get feedback from others

- Take criticism
- It should be understandable
- Proofread

10. Not binding

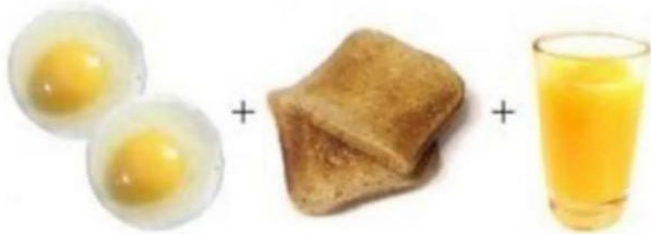
- You can change directions as you write
- Even if funded, you can change directions of your research, nothing is set in stone

WHY I STILL USE THE OXFORD COMMA

shortee.tumblr.com

WITH:

I had eggs, toast, and orange juice.



WITHOUT:

I had eggs, toast and orange juice.



- To Oxford or not to Oxford?
- I suggest it for scientific writing, where it is SO important to be clear and well understood
- It's so controversial lol – many resources
- The point is clarity, so if there is room to be misunderstood, err toward the side of clarity

What is the Oxford comma?

Before we start, a quick introduction to what we're talking about. The Oxford comma takes its name from the following stipulation in the style guide for Oxford University Press:

In a list of three or more items, insert a comma before the 'and' or 'or'.

For example, this sentence uses it...

Benzene, toluene, and xylene were detected in the air sample.

...but this one does not:

Benzene, toluene and xylene were detected in the air sample.

By indicating that the reader should pause slightly between 'toluene' and 'and', the Oxford comma makes it absolutely clear that toluene and xylene are separate entities. A similar logic applies to the use of 'or':

The procedure can be run in accordance with ISO 5530, ISO 6322, or ISO 6639.

The procedure can be run in accordance with ISO 5530, ISO 6322 or ISO 6639.

The Oxford comma also appears widely in other style guides, especially in the USA, but tends to be frowned upon in journalistic circles, where eliminating all unnecessary characters is a long-established principle, in order to save space.

<https://clearlyscientific.com/oxford-comma-reader-first-approach/>

- Avoid a misunderstanding

#1: Avoid the Oxford comma for simple lists where the meaning is clear

As indicated above, I generally prefer to leave out Oxford commas where they're not assisting the reader – just as I'd omit a word that wasn't serving a useful purpose. For example, I'd normally go for the second option below:

Options are available that accommodate 50, 20, and 10 vials.

✓ Options are available that accommodate 50, 20 and 10 vials.

And here:

The main factors affecting the outcomes are temperature, pressure, and rotation speed.

✓ The main factors affecting the outcomes are temperature, pressure and rotation speed.

- Maybe you don't need it if the meaning is obvious without the comma

#2: Avoid the Oxford comma when you have two successive lists

A stronger case for avoiding Oxford commas is when two lists are right next to each other in a sentence. Then, inserting them can easily result in 'punctuation overload':

✗ These heterocycles can be synthesised from azirines, diazo compounds, and amines, or ketones, aziridines, and amino-alcohols.

✓ These heterocycles can be synthesised from azirines, diazo compounds and amines, or ketones, aziridines and amino-alcohols.

- I like the wrong one better but I am open to learn

The extra commas in the first example make it slightly more difficult to scan the sentence, by blurring the distinction between the two lists. They also make it a little bit exhausting to read. So in this case leaving them out helps the reader to read the sentence more easily and grasp the meaning first time round. However, should you want to keep the Oxford commas in, I'd suggest using '(a)' and '(b)' to separate the two lists.

<https://clearlyscientific.com/oxford-comma-reader-first-approach/>

#2: Use the Oxford comma when confusion might arise with another clause

Sometimes, the last two items of a list can together look like an explanatory clause that describes the item preceding it (an apposition). Using the Oxford comma helps avoid this impression:

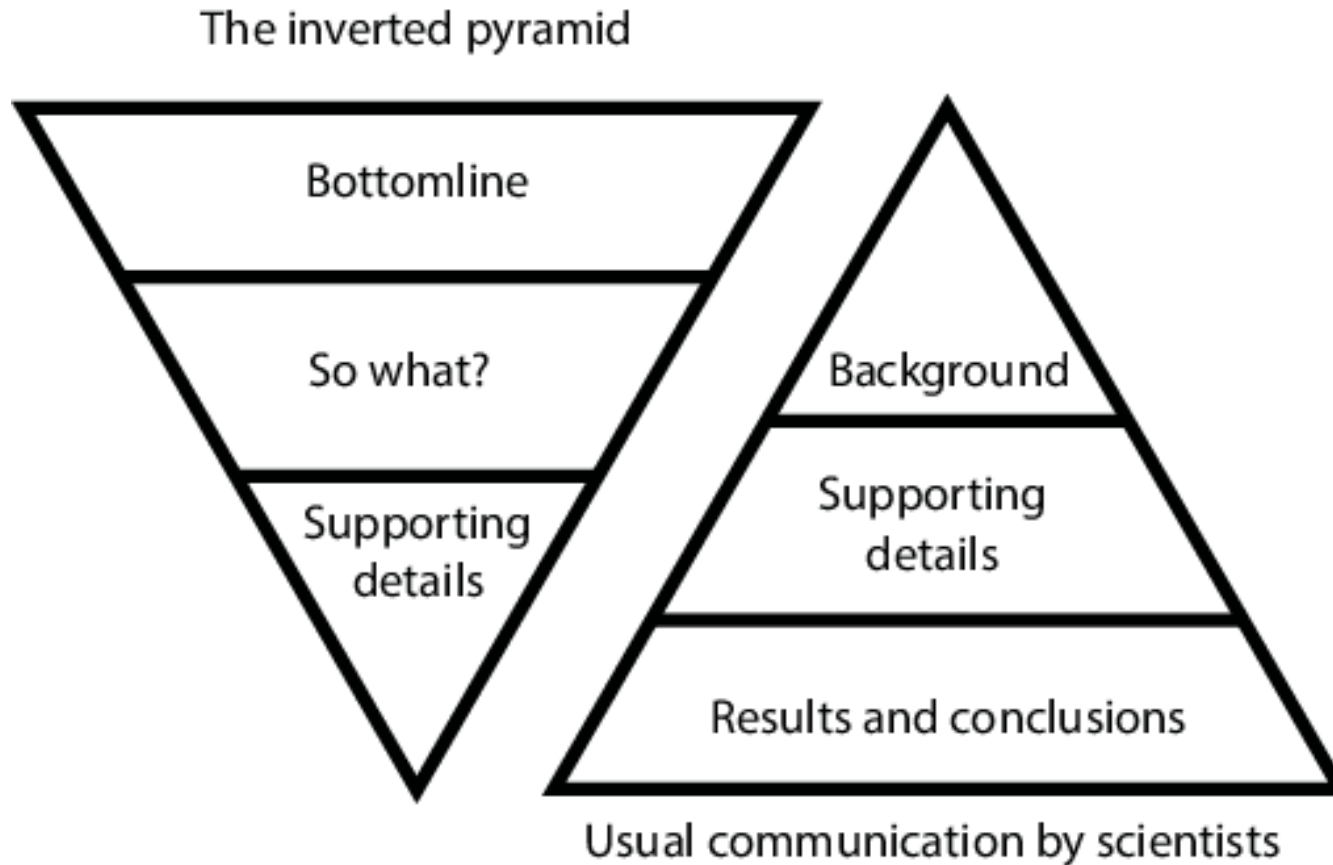
✓ To calibrate the system, we used two common odorants, benzene, and toluene.

✗ To calibrate the system, we used two common odorants, benzene and toluene.

In this case, without the Oxford comma you might have thought that the odorants were benzene and toluene, so including it helps to avoid a misunderstanding. However, in all potentially confusing cases like this it's better still to rewrite the list in a different way:

✓ To calibrate the system, we used two common odorants, **plus** benzene and toluene.

- Avoid misunderstanding at all costs!
- If you are unsure, rewrite the sentence so it doesn't need a comma
- Many, many more examples online



- Try to be conscious of how you write
- Many scientists now choose to use inverted pyramid style
- Still, writing is not all about rules, as long as you are clear and considerate of your reader, with a logic that can be followed, it usually works out

I asked Claude to give me an example

- Prompt:

Please write a short paragraph about carbon capture by photoautotrophic bacteria in pyramid style and then in inverted pyramid style.

Pyramid style (building from specific to broad):

Specialized cyanobacteria, like *Synechococcus* and *Prochlorococcus* species, use tiny but efficient carboxysomes to concentrate CO_2 around the enzyme RuBisCO. These molecular machines enable the bacteria to convert CO_2 into glucose through photosynthesis, powered by sunlight captured through their unique photosynthetic pigments. This biological carbon capture process, occurring in countless microscopic cells across Earth's oceans, collectively removes billions of tons of CO_2 from our atmosphere annually, playing a crucial role in global carbon cycling and climate regulation.

Inverted pyramid style (building from broad to specific):

Marine bacteria serve as one of Earth's most important natural carbon capture systems, removing vast quantities of atmospheric CO₂ through photosynthesis. This vital process relies on specialized light-harvesting pigments and carbon-concentrating mechanisms within photosynthetic bacteria, particularly in abundant ocean-dwelling genera like *Synechococcus* and *Prochlorococcus*. At the molecular level, these microorganisms use protein-based microcompartments called carboxysomes to package RuBisCO enzymes with concentrated CO₂, enabling efficient carbon fixation even in low-CO₂ marine environments.

Preparing for the proposal

- Any questions?