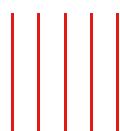


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Designing Scientific Posters

English Course
INSA - Toulouse

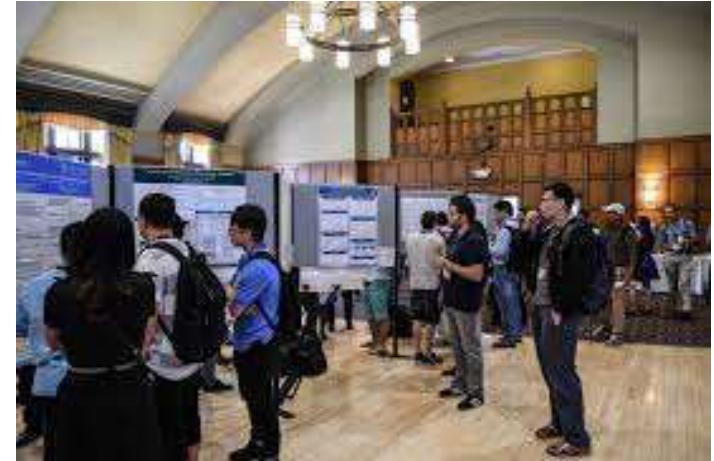




What is a scientific poster?

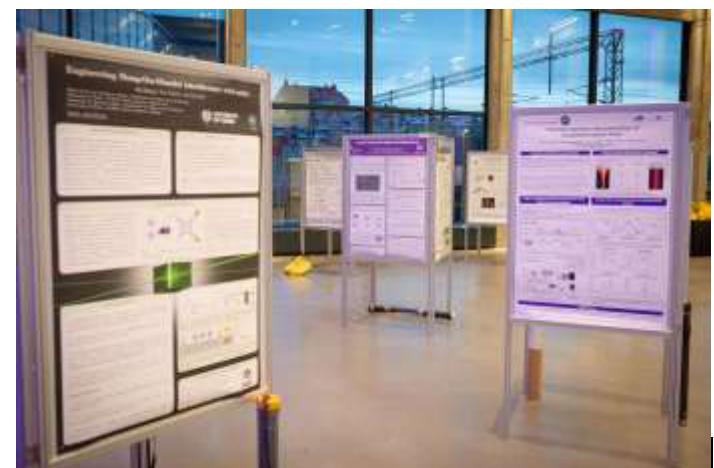
While you are standing next to your poster

- a visual tool to help communication and start a conversation about your work



When you are absent

- a standalone document to concisely communicate your work through effective figures, titles and text.



A good poster can't make up
for bad research, but a bad
poster can make good
research hard to recognize!





Two questions before you start

Who is your audience?

Your audience determines the tone of your poster.

Specialists? Wide-ranging disciplines? The general public? All three?

What is your message?

What is the purpose of your poster?

What story do you want to communicate to your audience?

This message should be reflected in the content of your poster

The key points of your poster should be read in 3-5 mins, full text in 10 mins



An effective poster...

Attracts an audience

Prominent title

Attractive figures + limited number of words

Clean, open layout with effective use of colour

Is readable

No grammatical or spelling errors

Simple English

Correct scientific vocabulary

Concise and clear text

Is legible

Avoids small, fancy fonts

Can be easily read from a distance

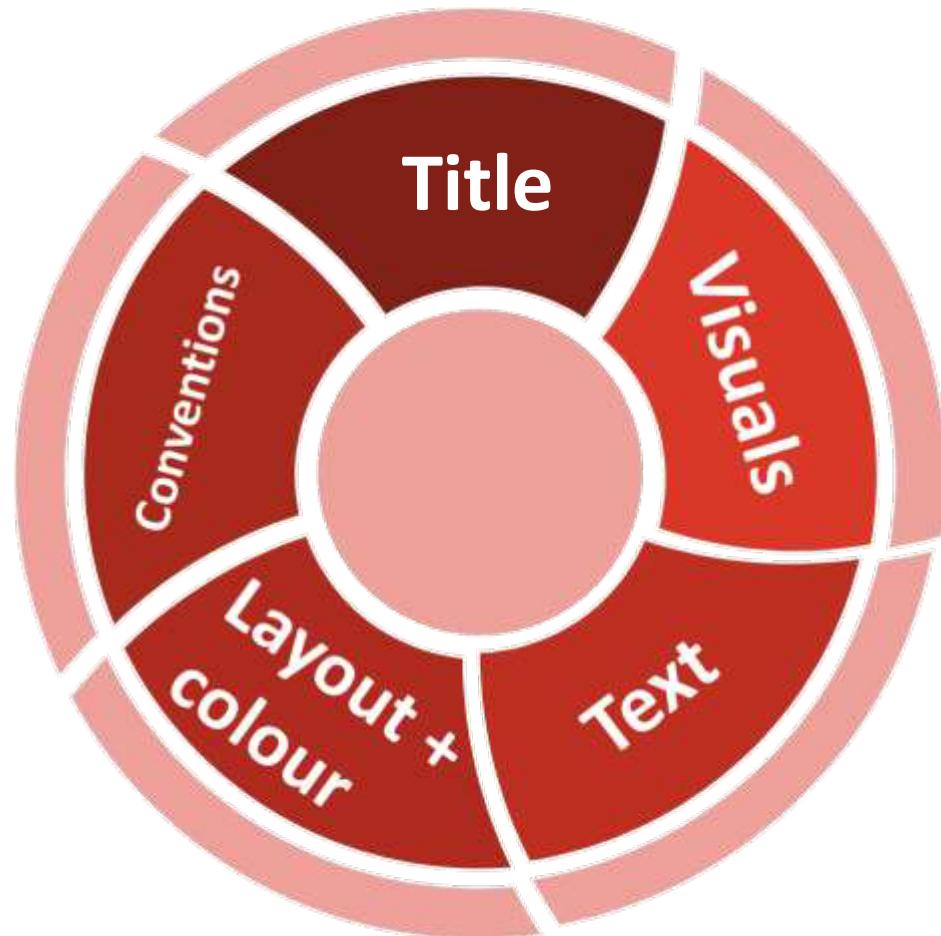
Is easy to navigate

Orientates the reader to key points

Logically arranged sections and elements within sections

Tells a story

What is your message? Who is your audience? What do you want for/from your audience? Does the audience understand the message?



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+	-	-	+	-	+	+	+

Prominent and captivating title



A title should...

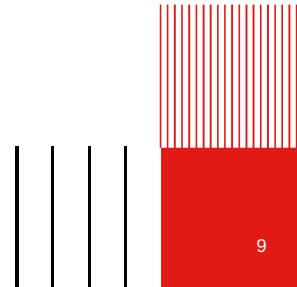
Summarize the main idea you want to get across

Be clear and captivating: it is the first thing the audience will read

Contain key nouns and verbs relevant to your work, linked together with as few words as possible

Be legible: don't use ALL CAPS, don't use shadowing , use **high contrast colors**

Use a non-serif font (e.g. Arial, Calibri, Tahoma)





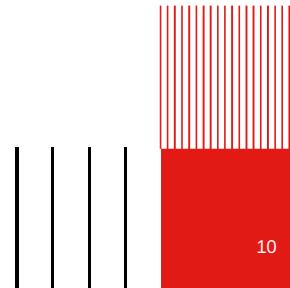
A title should avoid...

Misleading information

Amusing or informal words

Obvious or non-specific openings: e.g., “Report on”, “A Study of”, “Results of” etc.
(these don’t contribute meaning!)

Non-standard abbreviations and unnecessary acronyms





There are three types of title...

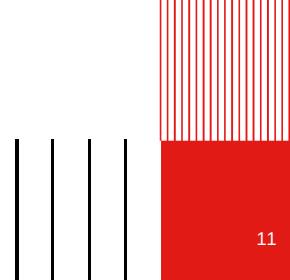
(1) Descriptive

Forecasting residential electric power consumption using regression models

Using BP neural network to predict critical meteorological conditions of pavement icing

Includes the essential elements of the project

Does not include the results or conclusion



(2) Results

(1) Functionally graded plates behave like homogeneous plates

(2)Improved K-mean algorithm by phased assignment optimization: application in air passenger grouping

States the main result of the study

Be careful not to be biased: (1) implies that the issue is settled once and for all!

Prefer to use the simple past for your results (2)



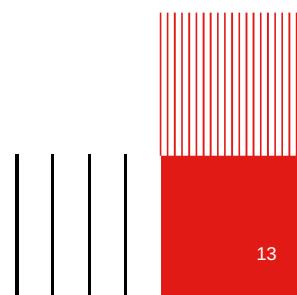
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(3) Question

Deep machine learning – a new frontier in artificial intelligence?

Artificial intelligence in meta-optics: where are we now?

Be careful: can sensationalize the topic





Check list

1. Your title has >3 words? Noun strings? Use prepositions.

Biomass measuring inventory vs An inventory for measuring biomass

2. Articles are needed before a countable noun, but not uncountable nouns

A survey of the importance of X / Vibration analysis for electronic equipment

3. Use –ing form of verbs rather than nouns

Silican mechanical strength measurement for surface damage quantification.

Quantifying surface damage by measuring the mechanical strength of silican.

4. Avoid the terms *novel* and *innovative* – all research is unique in some way!

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**Create a visual poster with attractive,
standalone figures**



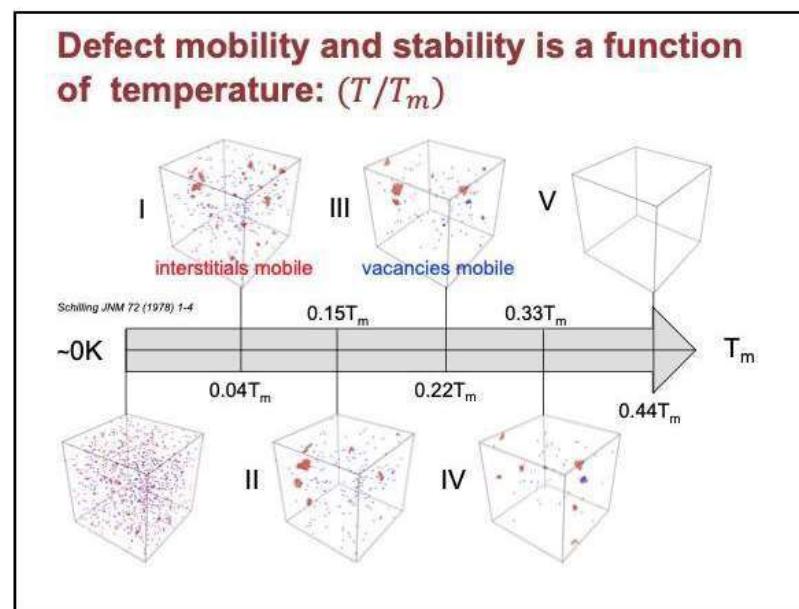
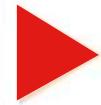
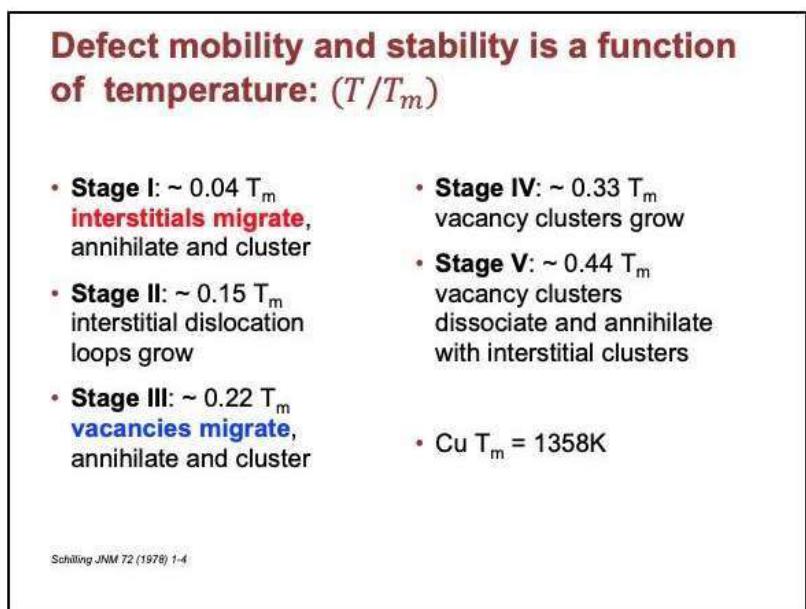
- Use a 1/3 to 2/3 text to figure ratio
- Figures can be images, diagrams, photographs, graphs, charts and maps
- All figures should have a purpose and be standalone
- Include no more than 8 figures
- Tables communicate large amounts of data in a concise and effective manner
- All figures and tables should be large and high quality
- Avoid decorative clip art



Replace text with figures

Graphical content is the most efficient and memorable way to convey information to your audience

The challenge is to turn words into figures!



Eliminate all but keywords and phrases

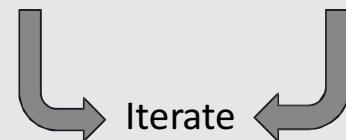


Project Schedule

- Initial design with low-fidelity iterative flow simulation
- High fidelity numerical simulation
 - CFD, FEA
- Iterate
- Full scale model

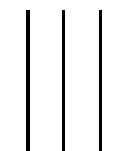
Project Schedule

Initial Design → Simulation → Full Scale Model



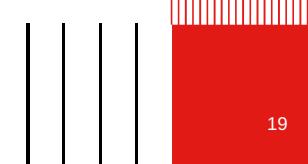
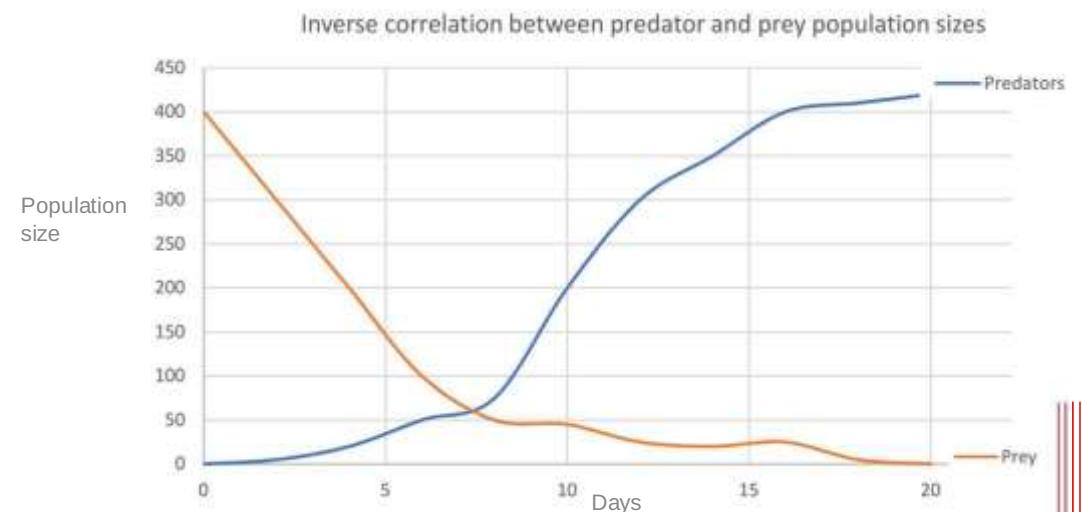
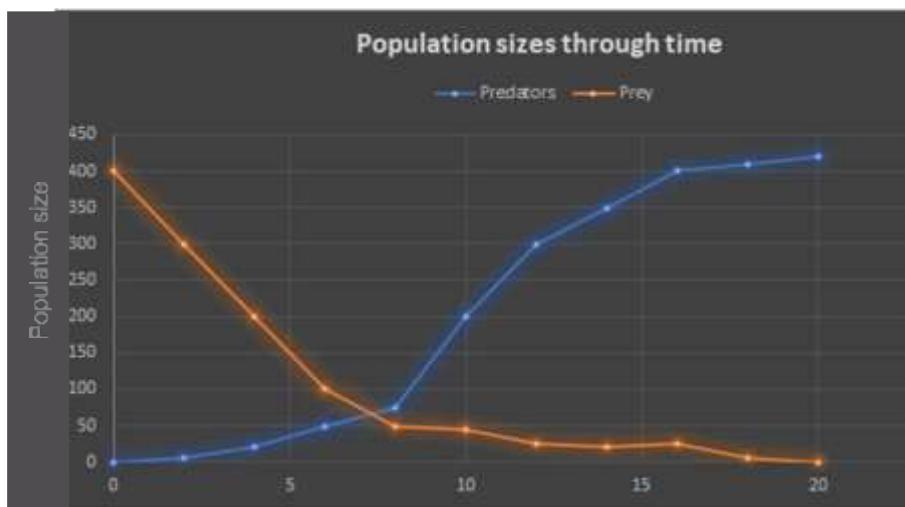
The audience cannot understand the link between the points

Visual representation, only keywords



Simplify your figures: 1

- Delete grid lines if appropriate
- Delete keys – label lines
- Minimise tick marks on axes
- Avoid coloured backgrounds



Simplify your figures: 2

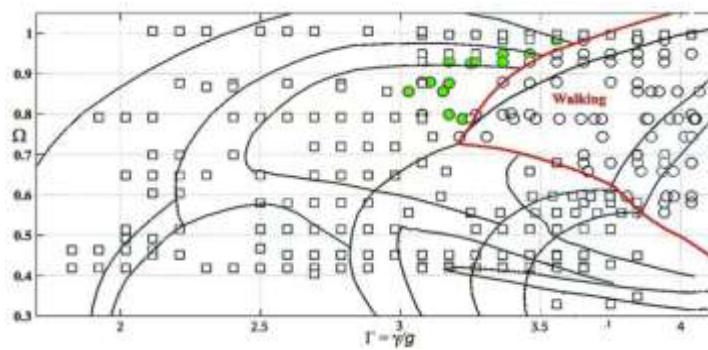
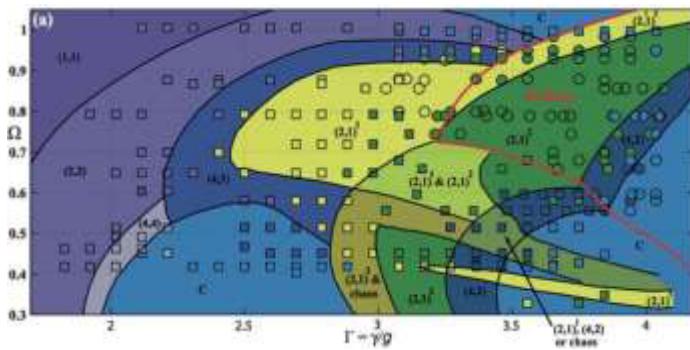
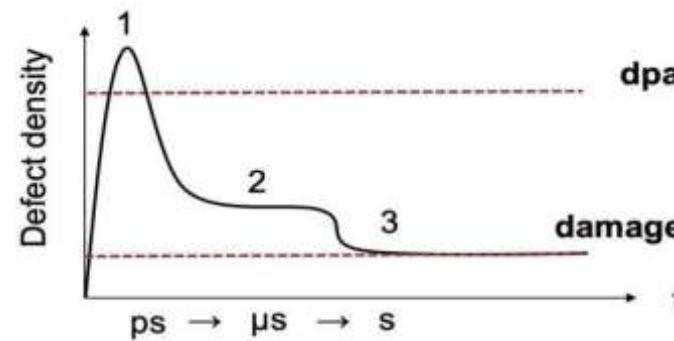
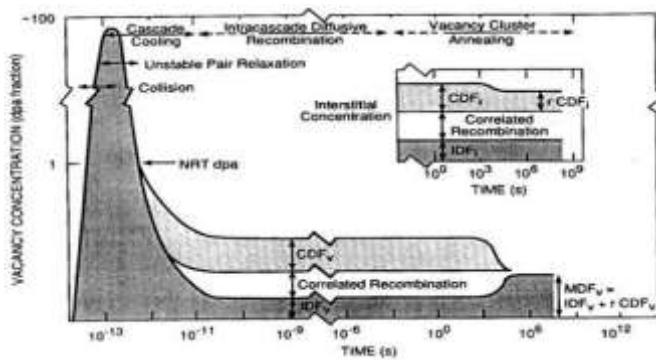


Figure suitable for article:
complete model or data

Source (2, 3)

Figure adapted for poster :
key parts highlighted + labelling

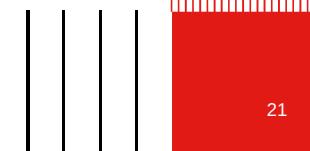
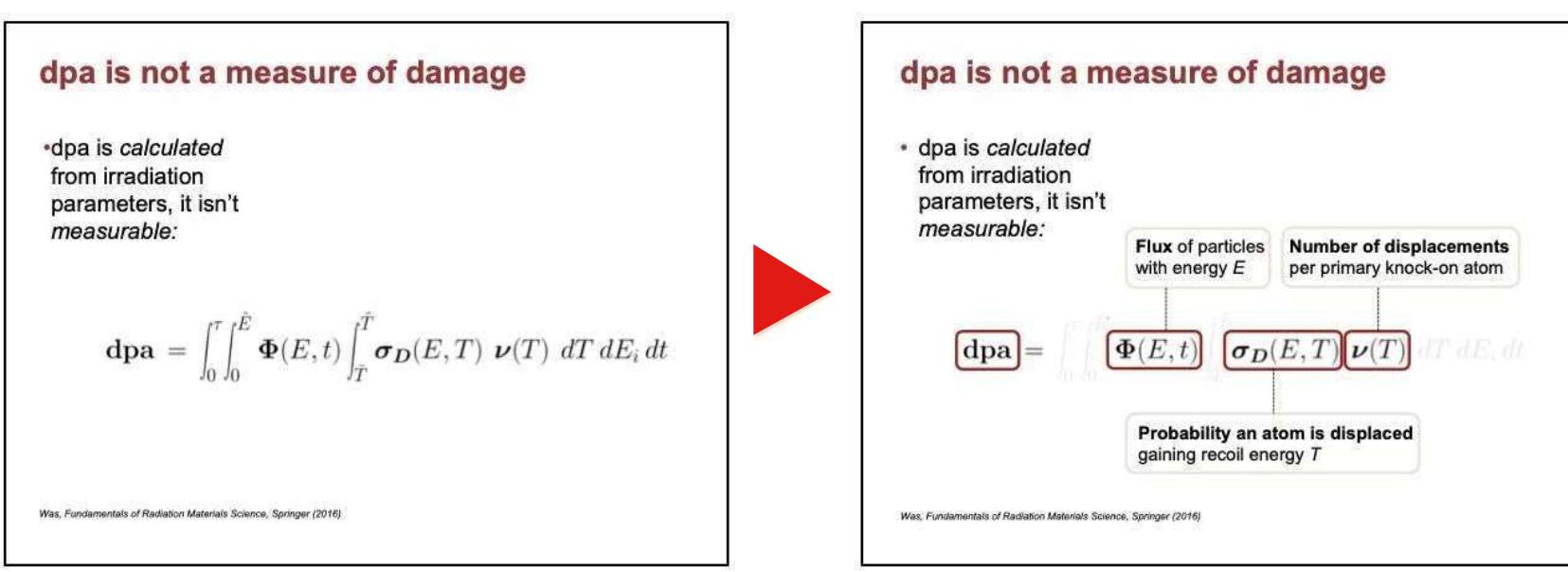




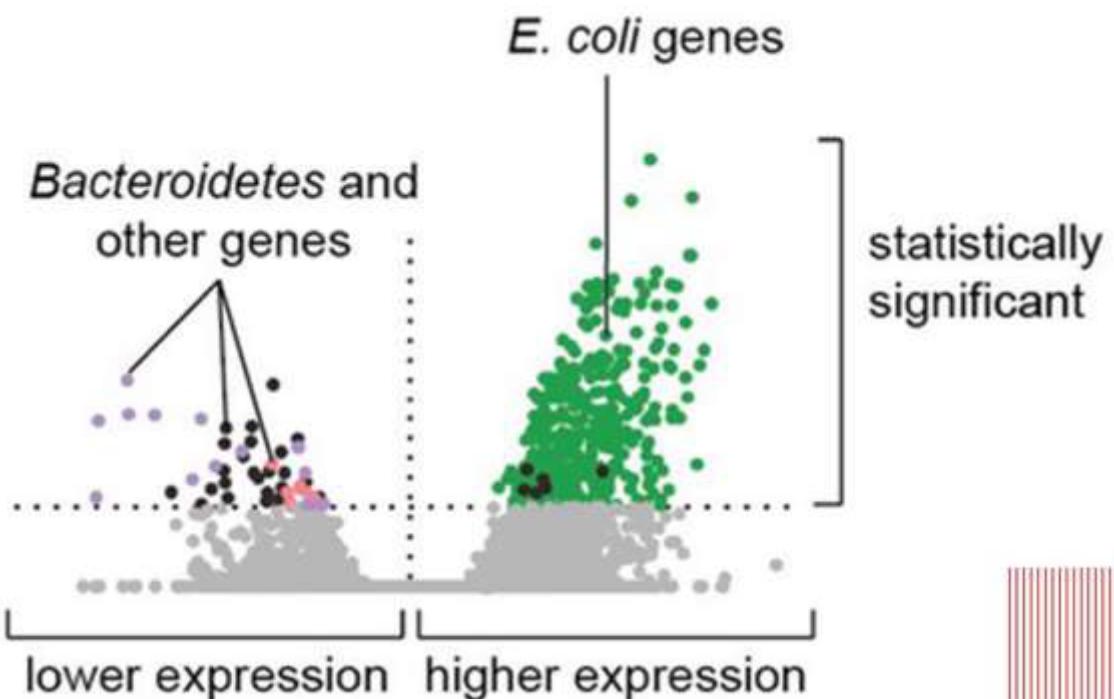
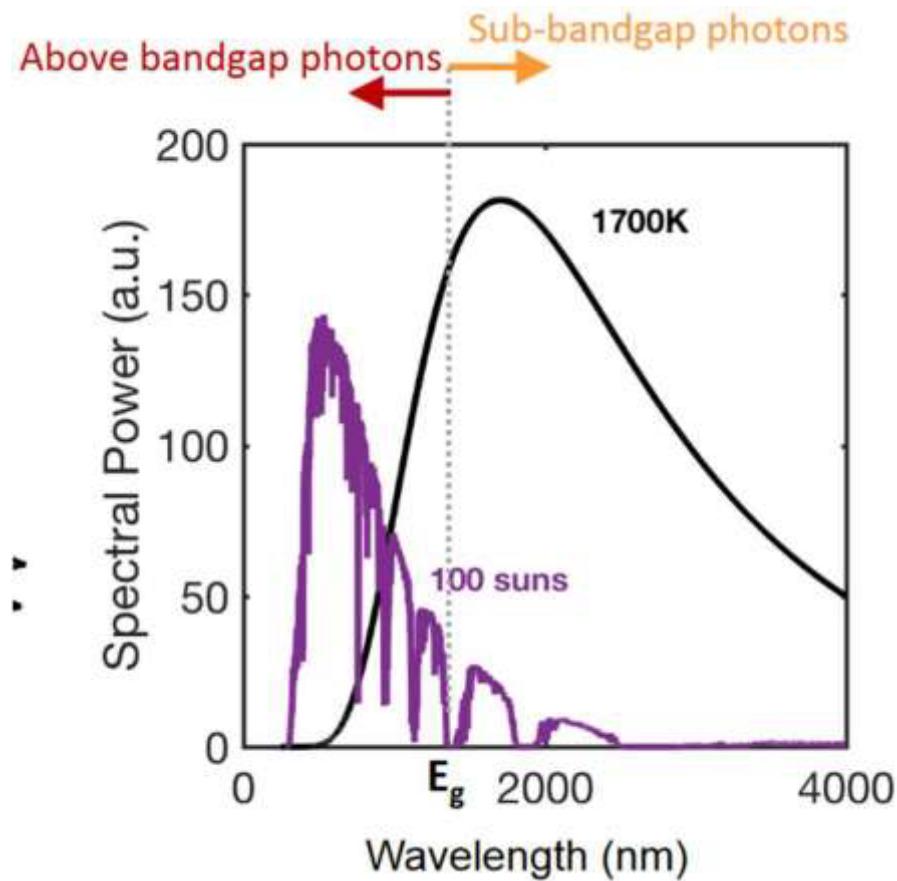
Highlight key parts of figures

Use colours, arrows, shading or labels

- ✓ Shows the reader what to focus on
- ✓ Increases readability
- ✓ Minimises supplementary text



Highlight key parts of figures: other examples



Source (3, 4)

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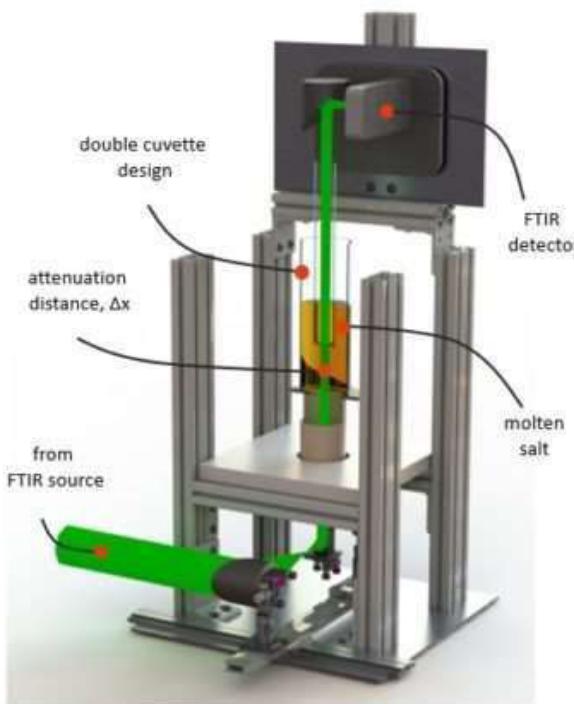
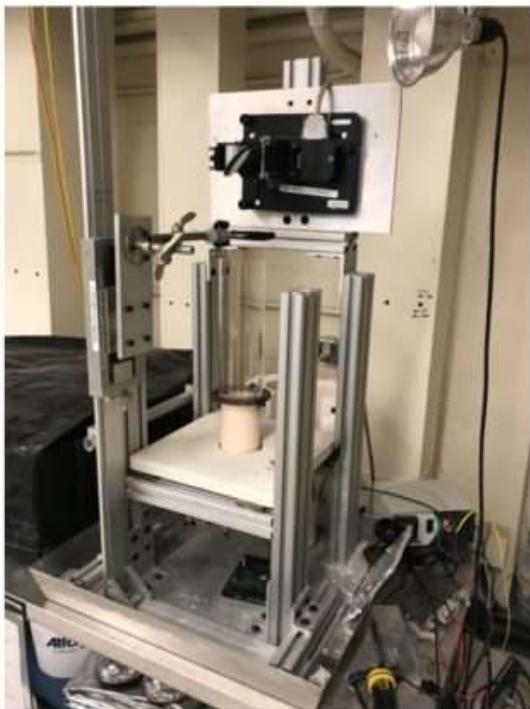
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22

Replace photos with diagrams



Photographs contain many details that interfere with the technical description of your setup



Consider creating a diagram to accompany/replace your photo

Use realistic but contrasting colours to help the components stand out

Label even if your audience knows the structure well

Add a scale bar



Scientific conventions for graphs

- All figures/tables need to be numbered and have a clear caption
- Captions go above figures and below tables
- Refer to the figure/table in the text if this helps the reader navigate your poster
- Cite the source for each figure/table if not your own work

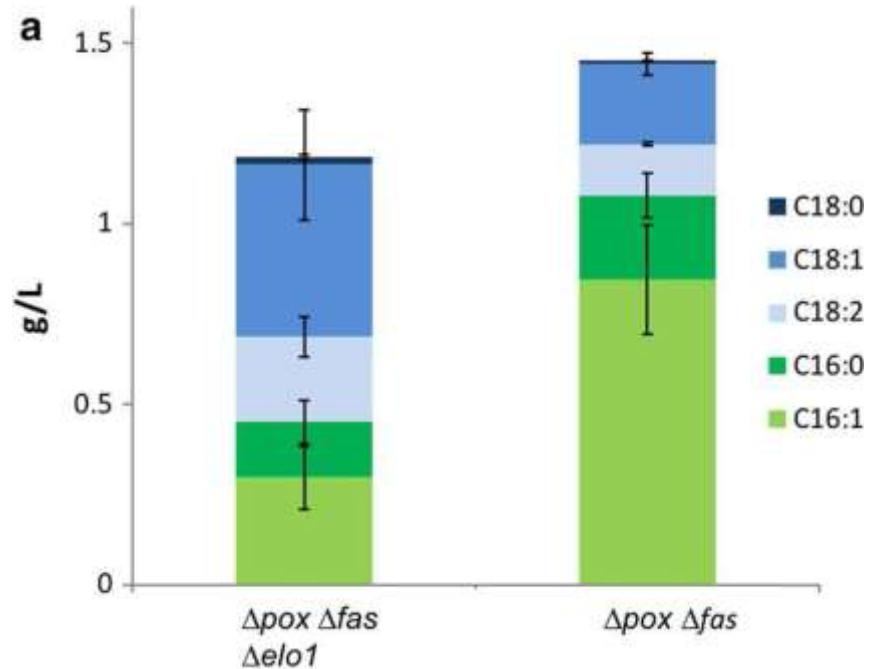


Fig. 3: Lipid profiles of the strains $\Delta pox \Delta fas$ and $\Delta pox \Delta elo1$. (Source: Rigouin et al., (2018))

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Cite the sources of visuals that are not yours

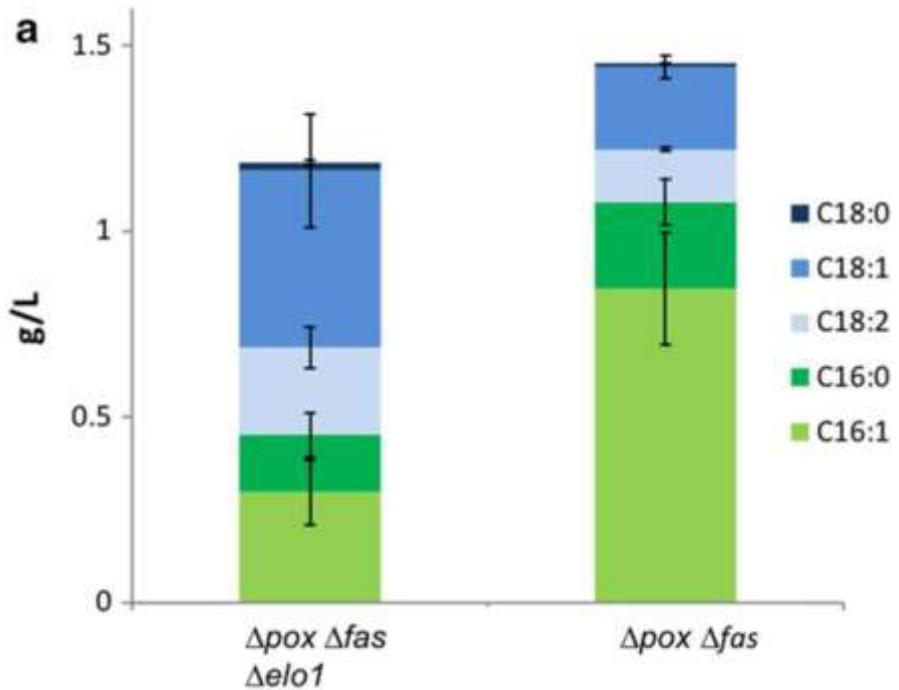


Fig. 3. Lipid profiles of the strains $\Delta pox \Delta fas$ and $\Delta pox \Delta fas \Delta elo1$ grown in rich medium completed with mC16:0 at 72h. From Riguoin et al. (2018)

Write 'Adapted from' if you have modified the visual

Use Numerical (1) or Author/date citations

All citations need to be listed in the 'References' section at the bottom of the poster

References



- [1] R. E. Ziemer and W. H. Tranter, *Principles of Communications*, 7th ed. Hoboken, NJ: Wiley, 2015. [Online]. Available: <https://ebookcentral.proquest.com/lib/vu/reader.cation?docID=5106516&ppg=1>
- [2] J. D. Bellamy et al., *Computer Telephony Integration*. New York: Wiley, 2010.
- [3] C. Jacks, *High Rupturing Capacity (HRC) Fuses*. New York: Penguin Random House, 2013, pp. 175–225.
- [4] N. B. Vargafik, J. A. Wiebelt, and J. F. Malloy, "Radiative transfer," in *Convective Heat*. Melbourne: Engineering Education Australia, 2011, ch. 9, pp. 379–398.
- [5] H. C. Hottel and R. Siegel, "Film condensation," in *Handbook of Heat Transfer*, 2nd ed. W. C. McAdams, Ed. New York: McGraw-Hill, 2011, ch. 9, pp. 78–99.
- [6] W. M. Rohsenow, "Heat transmission," in *Thermal Radiation Properties*, vol. 3, M. W. Catton and J. P. Hartnett, Eds. New York: Macmillan, 2012, ch. 9, pp. 37–62.
- [7] H. Schmidt-Walter and R. Kories, *Electrical Engineering. A Pocket Reference*. Boston: Artech House, 2007. Accessed: Oct. 16, 2016. [Online]. Available: <http://ebrary.com>

Barnet, S., Bellanca, P., & Stubbs, M. (2013). *A short guide to college writing*. Pearson Education.

Caron, T. (2008). Teaching writing as a con-artist: When is a writing problem not? *College Teaching*, 56(3), 137-139. <https://doi.org/10.3200/CTCH.56.3.137-139>

Cismas, S. C. (2010). Educating academic writing skills in engineering. In P. Dondon & O. Martin (Eds.), *Latest trends on engineering education* (pp. 225-247). WSEAS Press.

Drew, S., & Bingham, R. (2010). *The guide to learning and study skills: For higher education and at work*. Gower.

Löfström, E. (2011). "Does plagiarism mean anything? LOL." Students' conceptions of writing and citing. *Journal of Academic Ethics*, 9(4), 257-275. <https://doi.org/10.1007/s10805-011-9145-0>

Oshima, A., & Hogue, A. (2007). *Introduction to academic writing*. Pearson/Longman.

Rose, J. (2007). *The mature student's guide to writing*. Palgrave Macmillan.

Soles, D., & Soles, D. (2005). *The academic essay: How to plan, draft, revise, and write essays*. Studymates.

Turner, K., Krenus, B., Ireland, L., & Pointon, L. (2011). *Essential academic skills*. Oxford University Press.

In numerical order (if you used numerical citations on your poster)



In alphabetical order (if you used author/date citations on your poster)



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**Limited text: concise + clear to convey
your message**



Content + view

- Remember the 1/3 to 2/3 text to figure ratio
- 400-700 words is a good target, but depends on field/purpose (check with your tutor)
- Distill your message: eliminate all but the vital elements of your work
- The poster should have a clear take-home message
- Avoid big blocks of text: use bullet points or spaced-out, short paragraphs





Text size + fonts

Think legibility! Text and figures should be legible from 1-1.5 m away

Use san serif fonts = more legible than serif fonts at a distance

Avoid having many font sizes and styles – go for a consistent look

Use **bold** and *italics* sparingly, and avoid underlined text

Recommended font sizes for an A0 poster

Title ▲ 85 pt Body Text ◀ 24 pt Authors ▲ 50 pt
Sub-headings 36 pt ▲ Captions 18 pt ▶





Bullet points

Posters shouldn't have too much text.

But good posters don't just convert text into bullet points.

- Current approaches:
 - MILP based encoding (Sherlock), satisfiability modulo solvers (Reluplex)
- Challenges:
 - Scalability with respect to the network size
 - MILP/SMT solving is expensive, and size of the constraints is proportional to the size fo the network



You have to be more judicious

- Prioritize bullets for lists
- Don't use bullets for titles/subheading
- Be creative and display you text visually
- Space out sentences and short paragraphs



Incorrect grammar (different grammatical forms)	Incorrect grammar (all nouns)
A Java infrastructure for: <ul style="list-style-type: none"> • MPEG-7 features processing • XML database managing • Algorithms ontology exploiting • Functions integrating 	A Java infrastructure for: <ul style="list-style-type: none"> • MPEG-7 features processing • XML database management • Algorithms ontology exploitation • Functions integration
Good example (all verbs in gerund –ing form)	
A Java infrastructure for: <ul style="list-style-type: none"> • Processing MPEG-7 features • Managing XML databases • Exploiting algorithm ontology • Integrating functions 	 <p>If you do use bullets make sure the first word of each bullet is grammatically the same</p>

Create word tables for ideas and concepts



APOPTOSIS

- Genetically Programmed cell death Deletion of individual cells by fragmentation into membrane-bound particles, which are phagocytized.
- apoptosis elicits no inflammatory response in adjacent cells and tissues.
- Besides being genetically programmed, apoptosis can be:
 - Induced by injury to cellular DNA, as by irradiation and cytotoxic agents
 - Suppressed by naturally occurring factors (e.g., Prot. Kinase AKT) and by some drugs (e.g., prostaglandin E2).

- 11 -

What is Apoptosis & how does it happen?

Definition

Death of individual cells by fragmentation into membrane-bound particles, which are phagocytized.

Note: apoptosis elicits no inflammatory response in adjacent cells, tissues.

How it happens

- Typically genetically programmed
 - Induced by injury to cellular DNA – e.g., by irradiation and cytotoxic agents
- Note:* Can be suppressed by naturally occurring factors (e.g., Prot. Kinase AKT) and by some drugs (e.g., prostaglandin E2).

- 15 -



Create a table with rows + columns
Define categories





Create message titles not topic titles

The assertion-evidence model of slide design (1) can be applied to posters

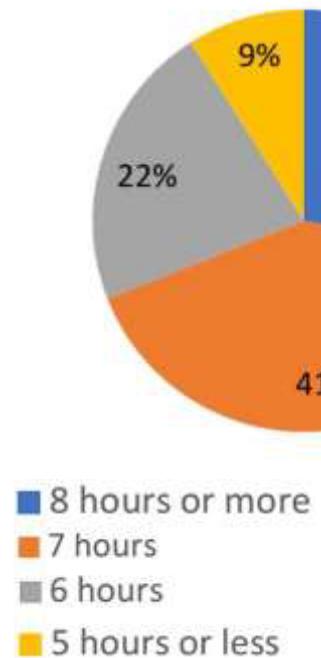
Build talk on messages → **Support message with visual evidence** → **Explain your evidence**

Section in poster	Weak topic title	Strong message title	Why?
Introduction section	Introduction	Hydrogen-based energy supplies	It tells the audience where you are and what concept your are illuminating
Conclusions section	Conclusions	Remote sites can become energy self-sufficient in the future	You say 'in conclusion' with your words, tone and body language during your pitch.

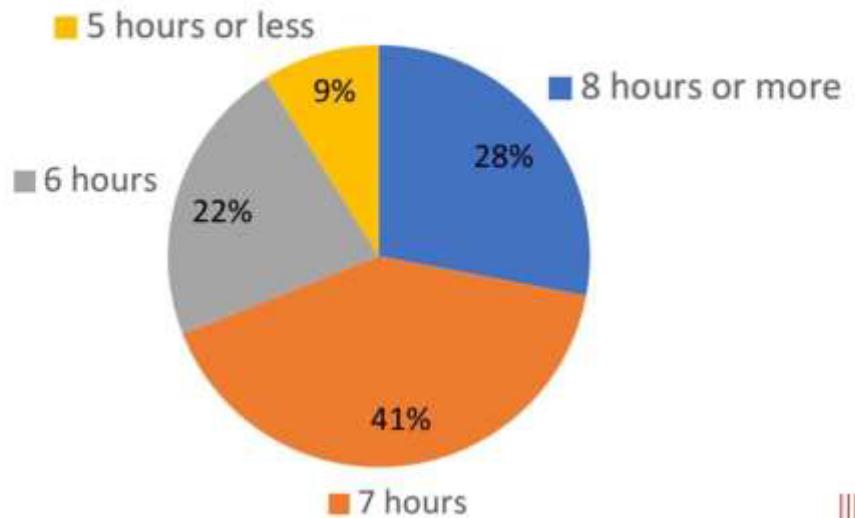


Message titles for result sections

Distribution of the number of sleep hours for adults



Only 28% of adults slept the recommended 8 hours



Message titles usually have a verb (past simple tense)

Source (3)

INSA Toulouse

34



English language

All text must be in English, including graphs

Correct spelling and grammar

Correct scientific vocabulary

Think readability!

Scientific style + other considerations

- Use simple words – avoid needlessly complex words
- Be concise – avoid redundancy, repetition, long sentences and use verbs, not nouns!
- Keep basic word order (subject, verb, object) with elements close together
- Use active verbs (avoid *do* and *make*)
- Check for false friends (*important, realise, control, thanks to, actually, evolution* etc.)
- Avoid noun strings



- Use active voice (personal or impersonal style)

X*The voltage was displayed by the oscilloscope (passive voice)*

✓ *The oscilloscope displayed the voltage (active voice - impersonal style)*

- Numbers must be in English style

✓ 1,253,934.289 or 1 253 934.289 **X** 1.253.934,289

✓ 0.72 **X** 0,72

- Correct notation of scientific units: (**✓** 85 K **X** 85K, **✓** 103 Hz **X** 103 HZ)

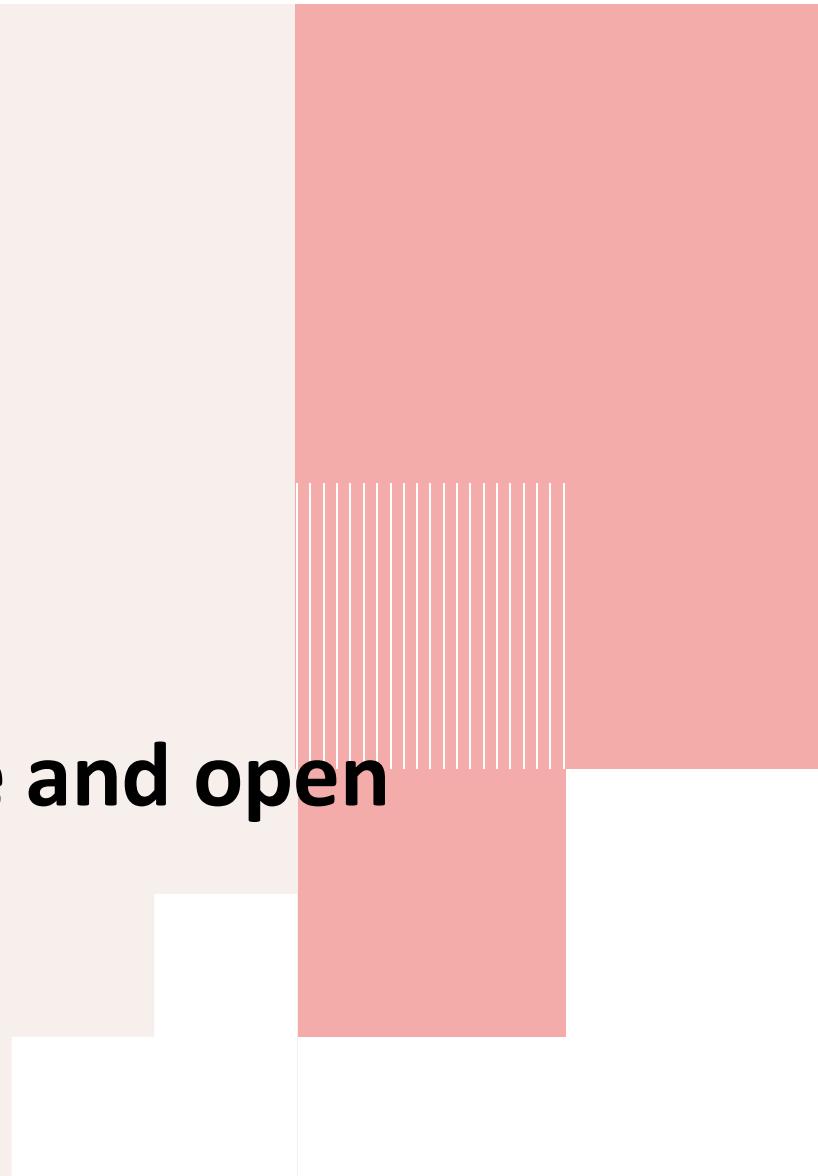
- Avoid abbreviations

- Write out acronyms in full the first time they appear (unless well known in your field)



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Layout: aligned, easy to navigate and open

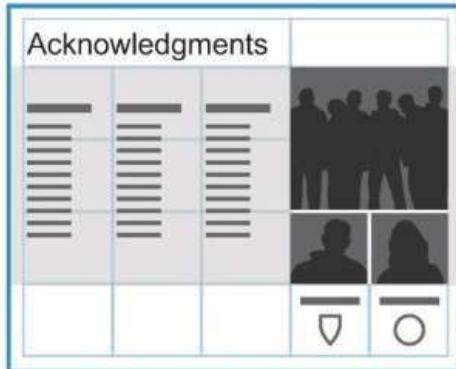
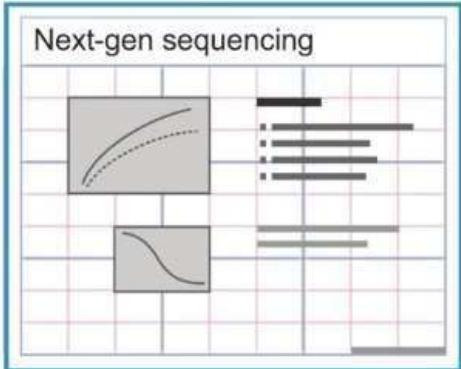
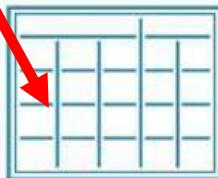
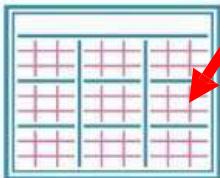


Layout the sections in an aligned + logical order

Make sure there is a coherent 'flow' between the sections in your poster.

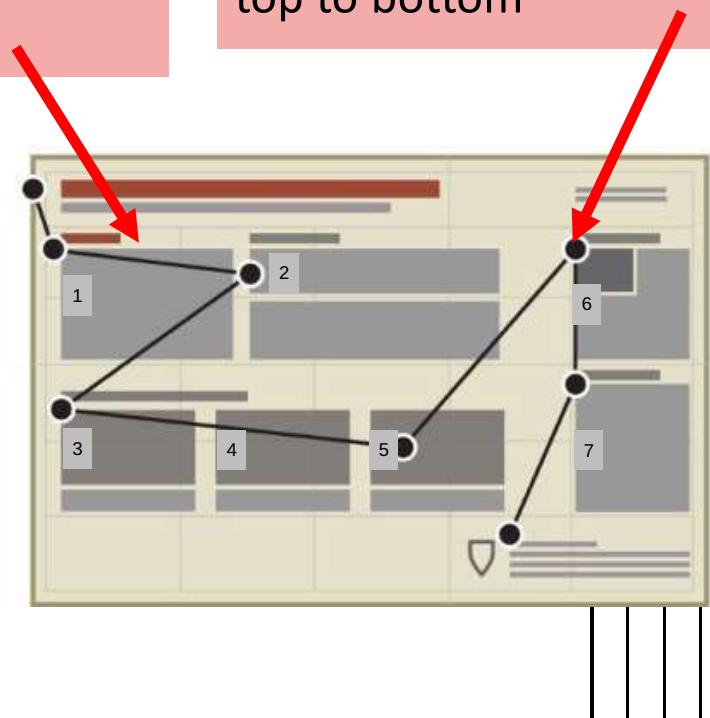
You are telling a story, so make sure the reader knows where to start and end

Use a grid system to align sections and elements within sections so poster is visually appealing + easy navigation



Guides (arrows and numbering systems) can help but may add visual noise

Natural tendency = to read from left to right, top to bottom



Source (7, 8, 9)





Make sure there is enough white space

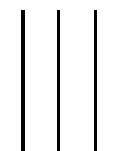
White space = the lungs of good design = improves the visual appeal, readability and effectiveness of your poster

Provide a wide gap between each element/section

Avoid dark, bold outlines to demarcate – use space and colour, light lines



OR

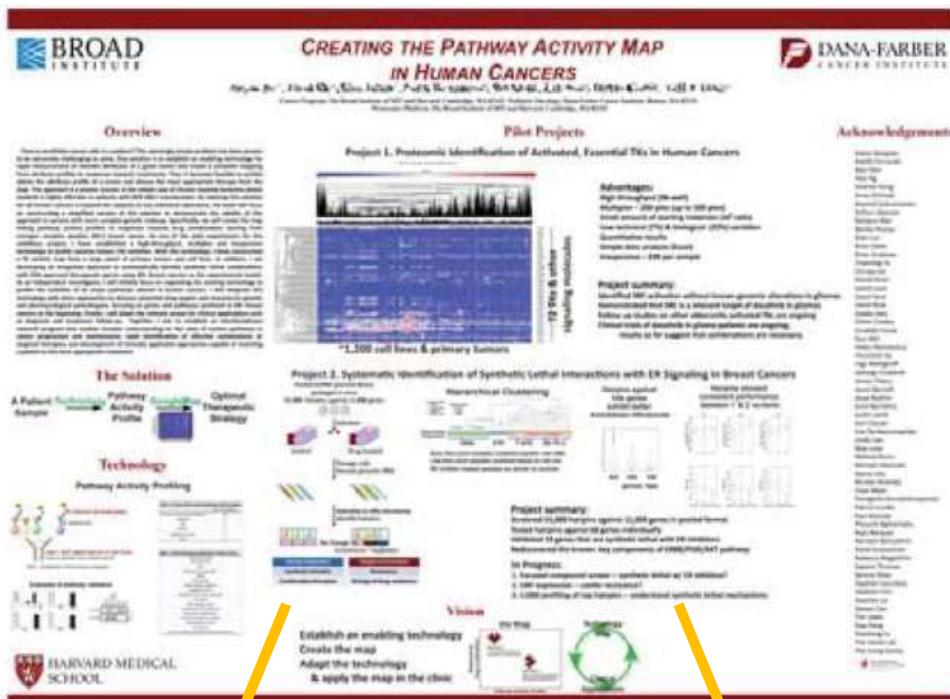


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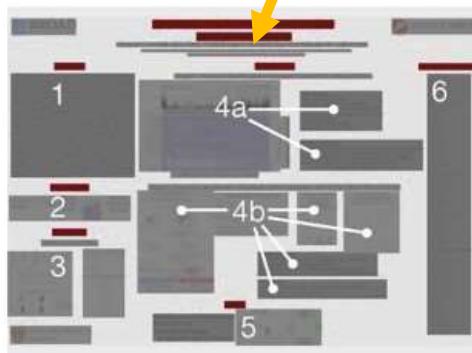
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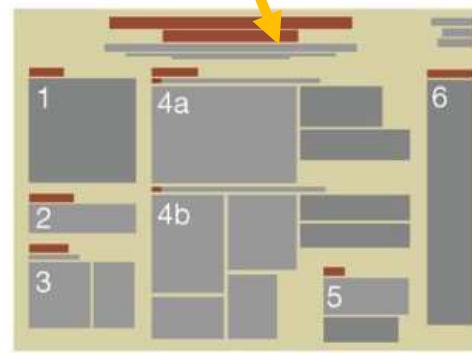


b



X

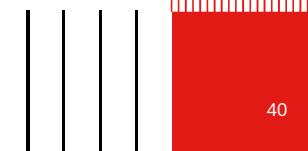
Source (7, 8, 9)



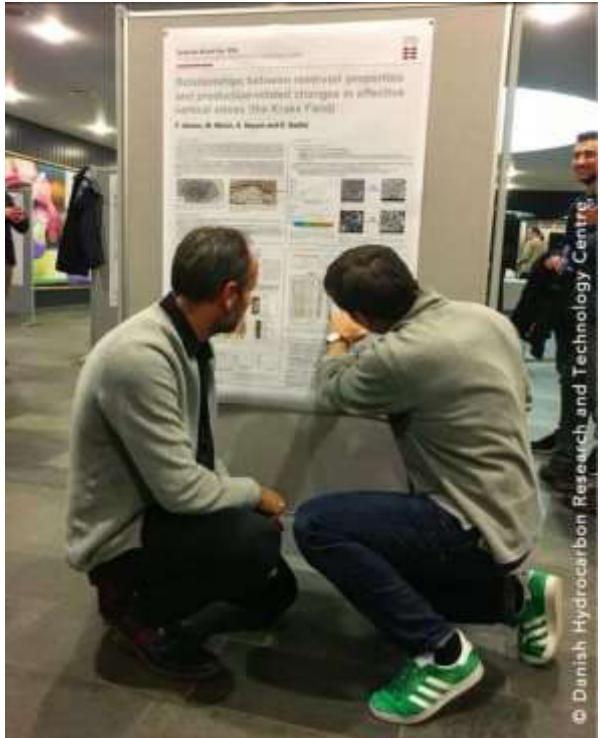
✓

Unify whitespaces into regularly shaped blocks
= easy navigation

- larger gaps to differentiate sections
- thinner gaps to separate items within a section



Portrait or landscape?



Source (10)

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41

Date of poster presentation

+
Context

06/09/2022
Conference of
Automation Science and
Engineering, London

Title

Author(s) and affiliation(s)

First name + surname + position + full address of school/company

John Doe, 4th year student, Department of Electrical and Computer Engineering, INSA – Toulouse, France
Electrical Apprentice Engineer, Cyber Security Department, Hensoldt Nexeya, Toulouse, France
Tutor: Jane Doe, Position, Company address, Country

Sections to include in a scientific poster

References

Include citations in the main text using a standard referencing style (APA, AMA, IEEE etc.) when you:

- Refer to other researcher's work
- Use figures/tables/images that aren't yours

e.g. Previous studies have focused on optimising flow rate
(Kennedy 1999, White, 2020) OR (1, 2, 3) OR ^{1, 2, 3}

Write out the full references in this section in alphabetical or numerical order (according to the referencing style used, i.e standardised format).

School + company logos



Acknowledgements

- Thank individuals for specific contributions (e.g. X for technical advice, statistical advice, discussion, comments on poster etc.)
- Mention who has provided funding.
- Include any conflicts of interest.



Where to put the logos?

Figure 1. Sample poster showing two logos at the top left.

Put logos at the top of your poster to ruin poster aesthetics, reduce legibility of title, and undermine the ability of your graphs to visually compete for viewers' attention

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Introduction
Your reader was mildly intrigued by the title, but you have exactly two chances to turn them into reading more. So decide quickly what your top priority is: to make it easy or why it really needs to be addressed. Orientation background selection will cause them to walk away.

Typically research fast shows that less is easier to read. If you’re a well-fit fast such as *Tissue*, that was a wise call for title, headings, etc., so justify big that they’re different. Research fast shows that fully justified text like this paragraph is harder to read, so don’t do this, even if it seems cool and professional looking.

Materials and methods
Few people really want to know the granular details of what you’ve been up to, so be brief. And be visual. Once photograph, drawing, or flow chart of procedure appears, add a heading like “Methods” and then proceed. If you can’t fit everything in one object, add sub-sections and refer to sections to activate info on us. Refer to the complete version (use bottom right section for more ideas if you are already challenged).

Figure 2. Hand-drawn illustrations are preferable to computer-generated ones. Just take a risk with an artist to get them to help you out. A photograph of you actually doing something might be nice.

Literature cited
Buss, D.J., K.L. Kenrick, and R.M. Bringsberg. 1996. Lower condition influences choice (Critic’s comment). *American Alfred*. Bethesda: U.S. G.P.T.

Buss, D.J. 1993. The evolution of mate choice rules. Paper #7. In *The Evolution of Sex*, edited by R.E. Mankos and B.R. Linton. Somerville, MA.

Soltis, E.C. 2005. *Evolution vs. Creationism: an Introduction*. University of California Press, Berkeley.

Science for the Study of Evolution. 2007. Statement on teaching evolution. <<http://www.evolutionstatement.org/statement.html>>. Accessed 2007 Aug 9.

Results
The overall layout of this area should be visually compelling, with other eyes on how a reader moves between the sections. You want a large area with lots of graphs. On face equations are off and accents with supporting graphs on right. Be sure to separate figures from other figures by generous use of white space. When figures are too cramped, viewers get confused about which figure is used first and which legend goes with which figure. If you’re going to put labels on each leg, then try to remember that a Bunsen burner on a poster does not need to look like a Bunsen burner on a manuscript, so feel free to re-imagine.

If you can add small drawings or icons to your figures, do so ... these visual cues can be priceless aids in orienting viewers. Add one colored series of symbols to focus attention on one specific group. This is especially useful when you’re trying to argue to tell someone what’s going on that’s not explicitly related to the hypothesis test. E.g., “This control was most highly valued by consumers when I inserted into their ‘A’.” Also, don’t be afraid of using colored connecting lines to show how one part of a figure relates to another figure.

Figures are preferred because they communicate more vividly than text. If you must include text, try to great effect to make it look professional like this table, i.e., Look at a respectable journal and emulose the layout, font types, line thickness, text alignment, etc., exactly. A table looks best when it is the component section. Microsoft Word, for example, is an Object. Use absolute text reference to data contained in important parts of the table.

Paragraph, however, is fine, but we see better lines of results:

- 9 out of 12 measurement cuts survived
- Measurement errors are low
- Control has comparable mean times, no average, than test without frame.

This sample results section is very low key; in case you were wondering.

Are treatments A and D different?
Figure 3. Legend can describe the treatment, allows the question, and even include statistics if you choose (unlike a minimalist figure legend), but keep brief!

Treatment	Variable Y (min)	Variable Y (max)
A	1.0	1.5
B	1.5	2.0
C	2.0	2.5
D	2.5	3.0

Are A and B respond differently to X?
Figure 4. Label elements instead of relying on reading text. Put descriptive text in front of labels. Add pictures of A and B if they are actually things (e.g., leaves of plants and kangaroos Roasted).

Variable X (min)	Variable X (max)	Variable Y (min)	Variable Y (max)
A	1.0	1.5	1.0
B	1.5	2.0	2.0

Are means of treatment A and D different?
Figure 5. For the love of God, use a legend to describe the size in Figure legends, just labels, etc. Your viewers are probably most interested in reading your Figure 2 and legends.

Treatment	Variable Y (min)	Variable Y (max)
A	1.0	1.5
B	1.5	2.0
C	2.0	2.5
D	2.5	3.0

Conclusions
“Conclusion” can be more summation of your results – this would be best. You want to provide the reader strength what you have concluded from the results, and you need to make the first several sentences understandable on their own and interesting, because many conference attendees will skip reading this section first. If you don’t think there, they’ll “get it” after the first several sentences should suffice (but, again, if the first few sentences are not interesting, if you didn’t mention a burning issue in the introduction, go back and fix that).

A good conclusion will also explain how your conclusion fits into the literature on the topic. E.g., how exactly does your research add to what is already published on the topic? It’s important to be brief and get to the point, so remember that most of your literature discussion may be at the conclusion, and further inform them on exactly what and how it is similar and different. You can also draw upon less formal types of context such as quotations you have had with senior and respected people (Godd, personal communication). Finally, you will want to end with a forceful call to action, long when you can be done now, and who can do it. E.g., are you taking the next logical step, or should another discipline follow up on your amazing work? If it’s OK to put a bit of personality here this ending because it may represent you as the person, and if it’s not seriously stretching them out, then just do it. However, your power should be doing that the right way, not over伸展 (over伸展, your power should be doing that the right way, not over伸展).

If you have a graphical way to express the next iteration of your hypotheses, by all means include it. For example, you might make a graph of hypothetical data that shows an expected result in a future experiment. That’s something you could do in a traditional manuscript, but it’s surely fine for a poster.

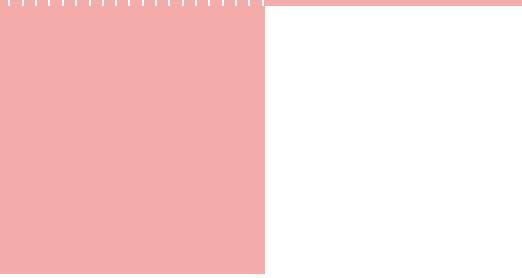
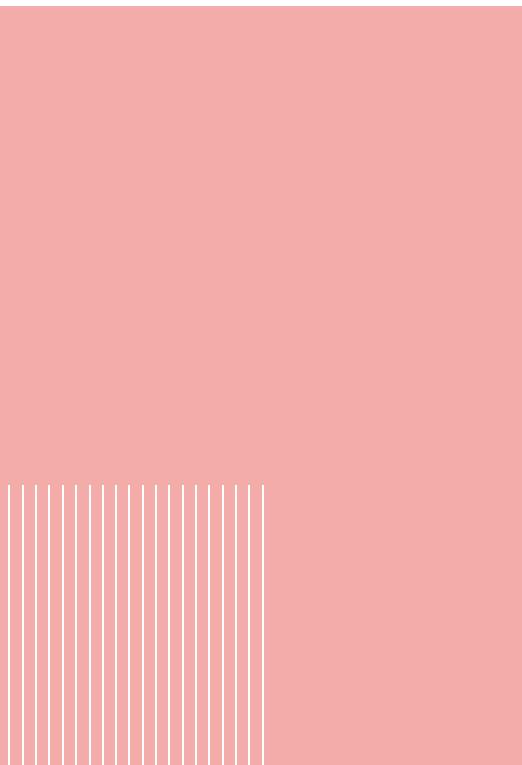
Acknowledgments
More tips from your old school would be found in “Designing effective posters for science conferences” and “Poster presentations”. (Note the URLs should be copied or otherwise hyperlinked, following prior to posting, posting a poster, you can do that by right-clicking, then “choose hyperlink.”) This file and content copyright Colin Purrington. Free for people to link to and use, but not for plagiarizing, adapting, or linking elsewhere (hahaha).

Further Information
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Organise the content in the individual sections

- Each section is like a slide in a presentation, with a title, figures and text.
- Choose appropriate titles – no conventions to follow except if tutors ask for AIMRAD.
- Don't add bullets for section titles – use a bolded, larger font
- Use italics instead of underlining. Underlining draws too much attention to a word.
- Text should be in bullets/short sentences with white space rather than paragraphs.



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Colour



Use colour to define the relationships between the different areas of the poster

Use dark letters on a white / light-coloured background

Avoid overly bright colours: they attract attention, but are tiring!

Don't overuse colour. Stick to a colour theme. 2-3 colours. No more!

Easiest to read

Easy to read

Hard to read

Hurts to read



References and Bibliography

- (1) <https://www.assertion-evidence.com/templates.html>
- (2) <https://mitcommlab.mit.edu/meche/commkit/technical-presentation/>
- (3) <https://mitcommlab.mit.edu/nse/commkit/figure-design>
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<https://www.northwestern.edu/climb/resources/oral-communication-skills/designing-PowerPoint-slides.html>
- (7) Wong, B. 2011. Negative Space. Nature Methods. Vol. 8. No. 10. p783.
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- (10) Colin Purrington (2019) Designing conference posters. <https://colinpurrington.com/tips/poster-design/>

Adapted from:

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