Writing a good project report

Jamie Davies, February 2019

How to use these slides:

In this talk, I will *talk* and you won't need to read the slides most of the time. I have written lots on them so that you can go back to them later.

http://golgi.ana.ed.ac.uk/coursenotes/msc.html

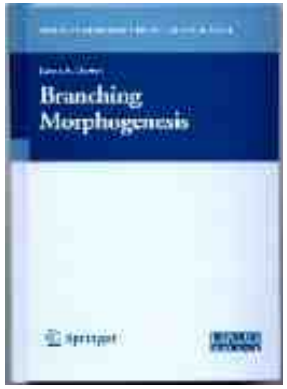
Generally, people in this class are confident that they know most of what there is to know about writing.

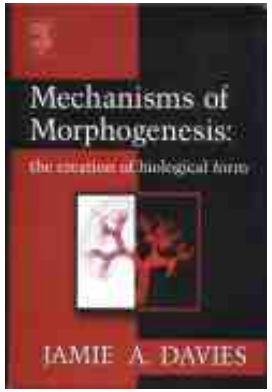
Your present lecturer has written:

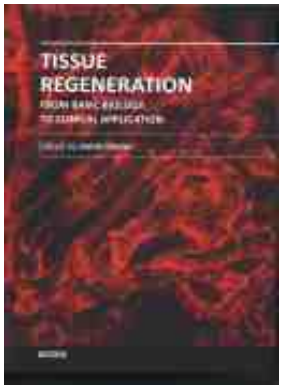
About 200 papers

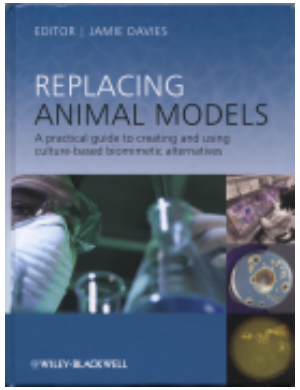
Cited >10,000 times

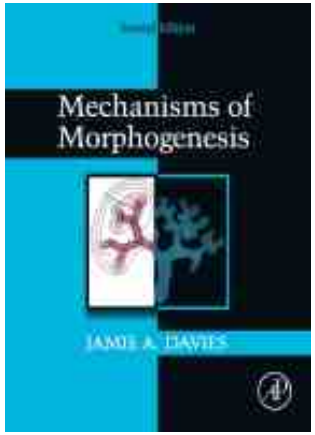
..and these books:

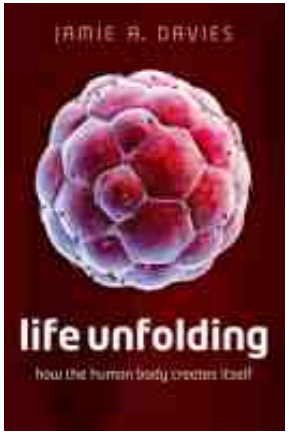


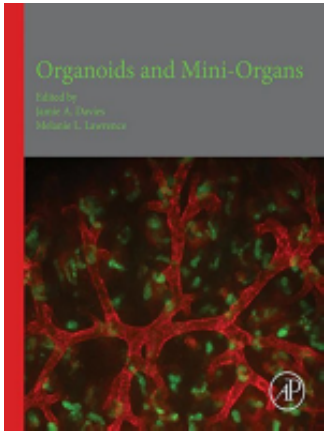


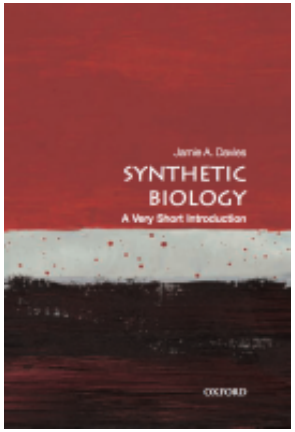


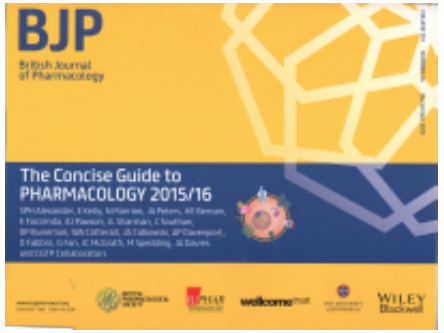










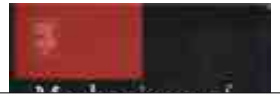


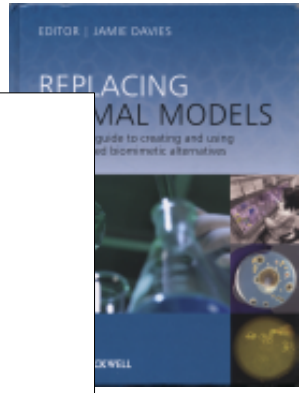
Your present lecturer has written:

About 200 papers

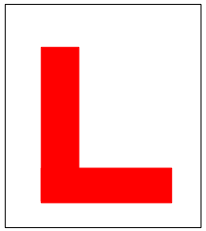
Cited >1
times

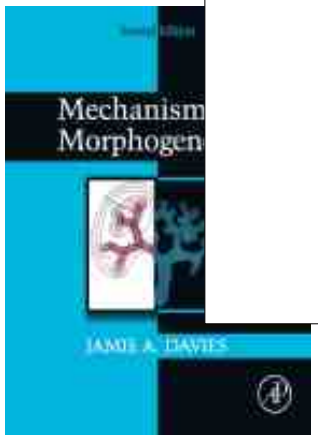
..and the

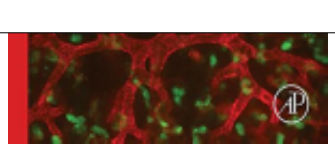
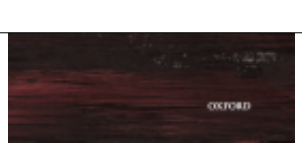



And is very much still a learner!





Project reports are modelled on scientific papers

What is the purpose of a scientific paper / report?

* To explain why the science was worth doing and how it fits with existing knowledge/debate

* To report a new discovery

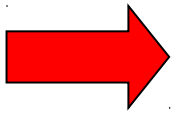
* To explain what you think your discovery 'means' and how it changes thought in the field.

Before you write, you must READ

- You have to understand the current state of your field.
- You need to avoid re-doing what has already been done.

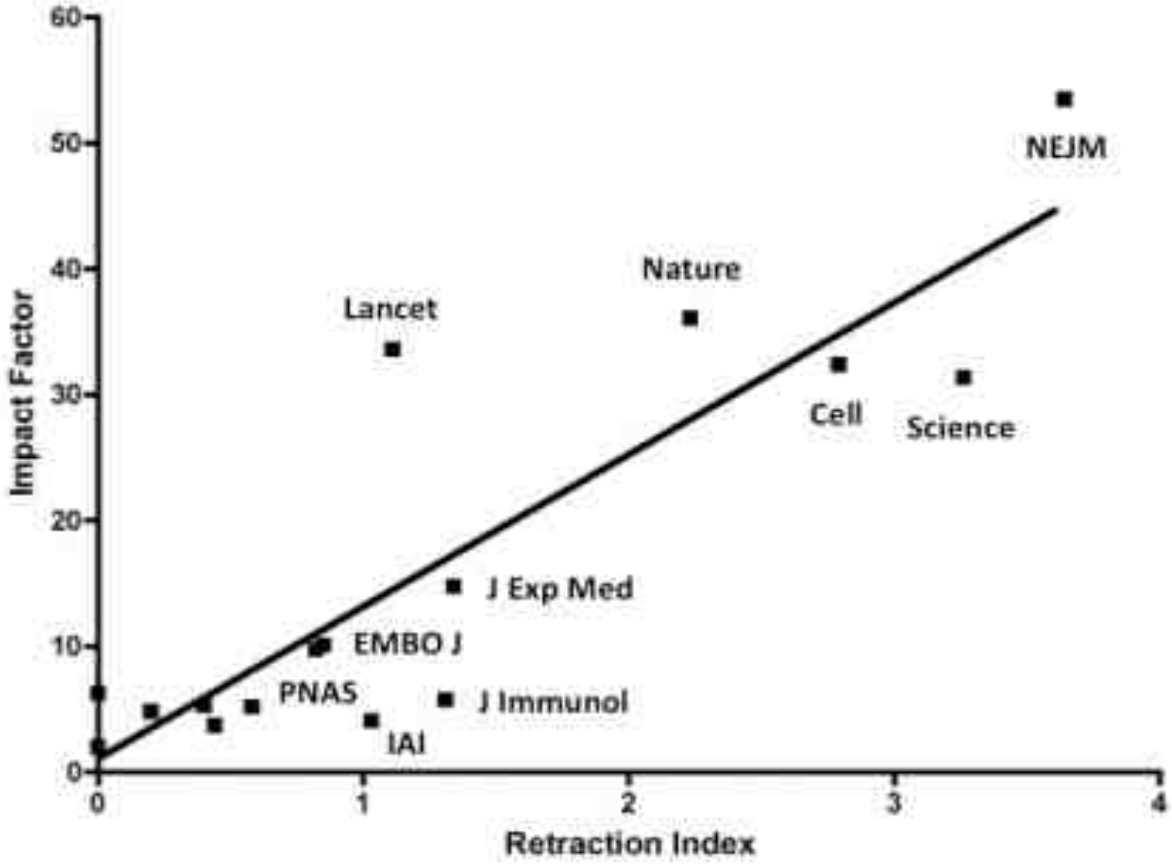
Defensive reading

- Your work is probably based on something someone has already published.



What if what was published is actually wrong??

Papers do contain mistakes of interpretation, and the probability of this is NOT lower in prestige journals



Fang, Casadevall, Morrison (2011) *Inf Imm* 79:3855-3859

Six Key Questions

(Concept borrowed from Bill Earnshaw)

- Why way the study done?
- What does the author claim to have found?
- What did (s)he actually find?
- Are the author's claims valid
- What are the additional questions? (yours)
- What are the next experiments?

Make notes!!! (On photocopies, on cards, in endnote etc)

Project reports are modelled on scientific papers

- Abstract (perhaps a ‘Lay abstract’ too)
- Introduction
- Materials and Methods
- Results
- Discussion
- Acknowledgements

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

Why start with a working title?

→It should summarise, in a “sound byte”, the story you are going to tell.

→It should therefore act as useful ‘road map’ to help guide you through the details.

(Don’t worry – *working* titles can change if they need to).

Which of these titles would you prefer to see?

- “Investigations into the function of Sonic Hedgehog in pulmonary development”
- “Sonic Hedgehog inhibits airway branching in the developing lung”

The second one tells you the story at once

Remember, you are not writing a detective story!

A novelist may ‘report’ on a story under a baffling title such as

“*Mystery at the Manor*”

A scientific report would have a clear summary title, such as

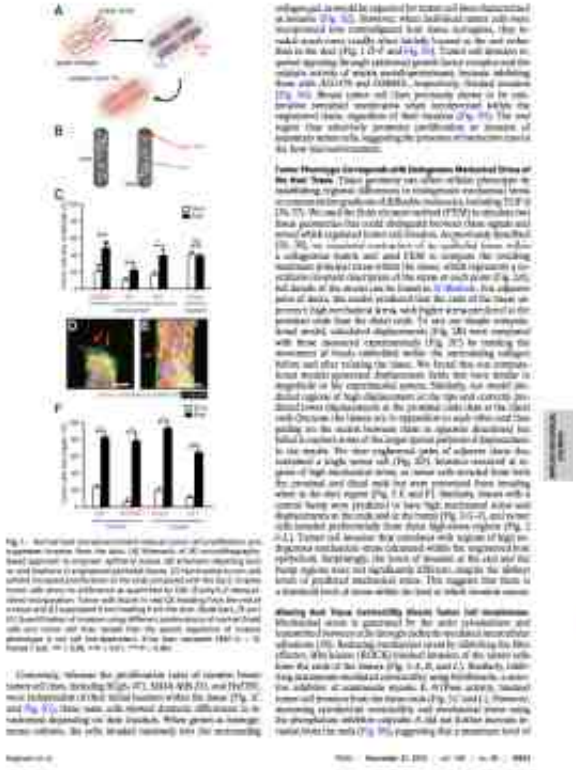
“*The Butler murdered the Brigadier*”.

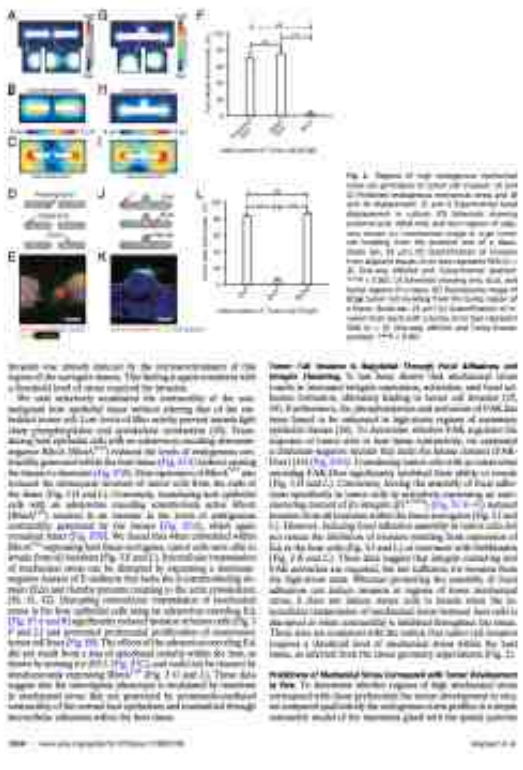
One way to write a report:

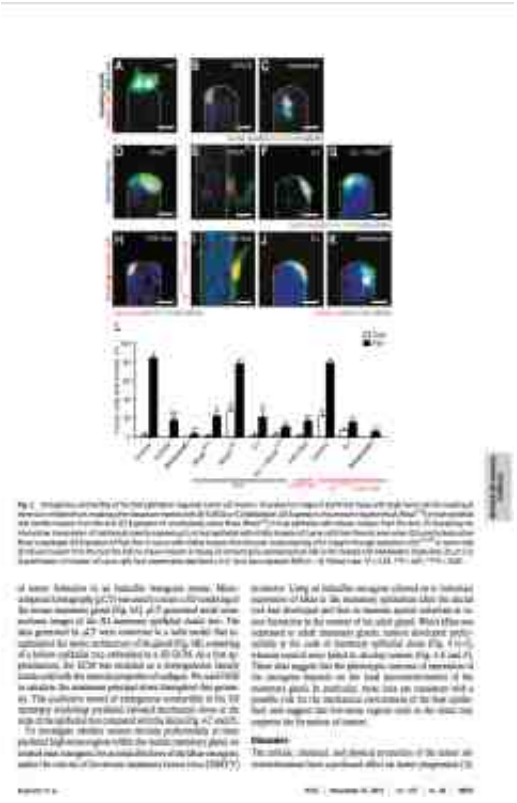
1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

Why start with the figures?

- In almost all biomedical papers, all of the results are presented in figures.







Why start with the figures?

- In almost all biomedical papers, all of the results are presented in figures.
- Figures and their legends should therefore tell the whole story in a skeletal sort of way (indeed, this is exactly what they do, in posters).

Why start with the figures?

- In almost all biomedical papers, all of the results are presented in figures.
- Figures and their legends should therefore tell the whole story in a skeletal sort of way (indeed, this is exactly what they do, in posters).
- Getting the figures right is therefore THE essential step towards completing the results section.

Organizing the figures

- Remember, you are NOT writing a diary!
- Use only the figures you need.
- Use them in the right order to tell the story, not (necessarily) the order you made them!

Remember:

- Label the axes of graphs
- Include scale bars (beware magnifications!)
- If you can, indicate lane contents/ exptal-control identity on the figures rather than forcing people to flick between legend and figure all the time.

Figure legends:

- These must allow a reader to understand the figure without reading the main text.

This is a really good time…

- To show the figures to fellow-scientists working in a similar field and ask them for criticism.

- You should all be asking whether all of your results are shown, and whether any controls or additional necessary results are missing.

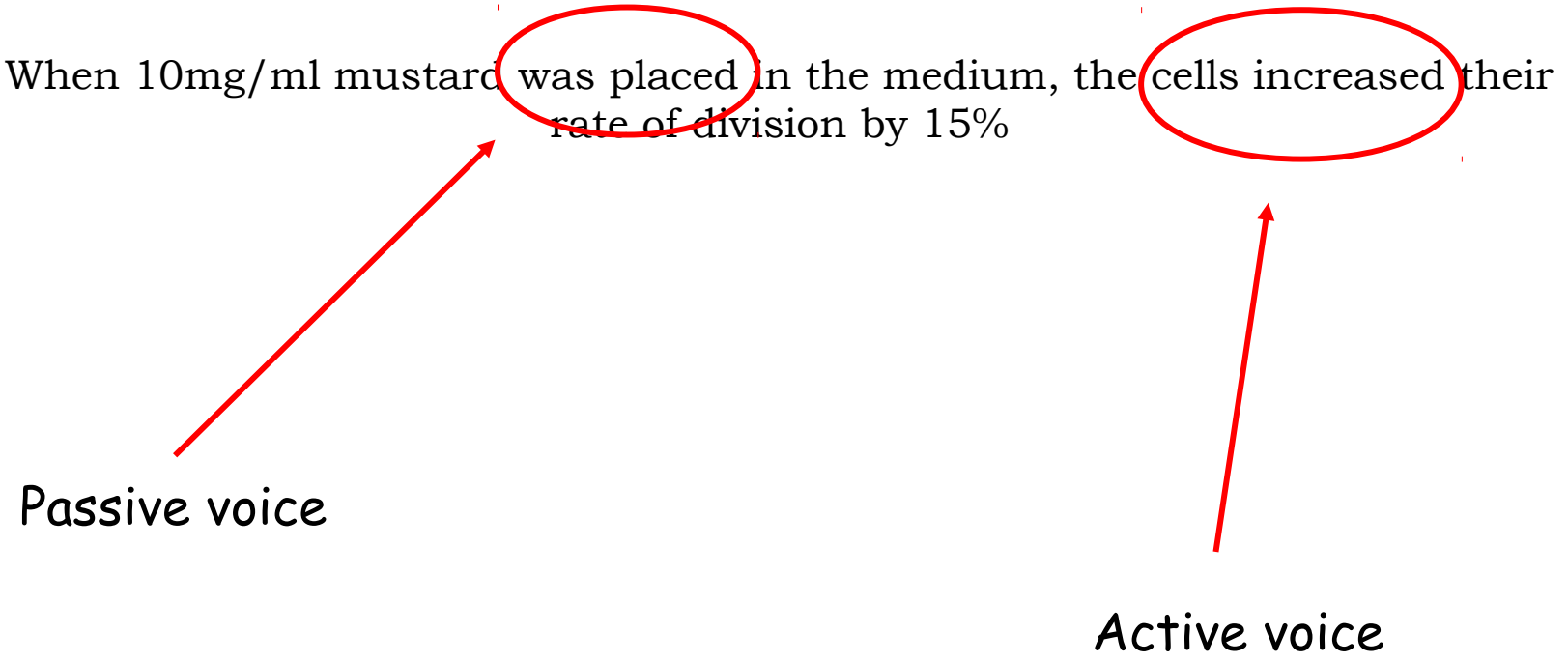
One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

The results section:

- Should present your results in a logical order (your figures have already helped you decide this order)
- They should NOT include speculation or discussion (but they can include an explanation of why something was done, and how paragraphs connect)

By convention, results tend to be written in passive voice, but only with respect to the authors.

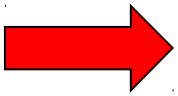


A good rule-of-thumb:

- One topic: one paragraph
- No more than two concepts per sentence.

A card trick…

- When you are writing the results, you will think of things you want to have introduced in the introduction.
- *Write them down on a card*, and put them cards in a pile marked ‘intro’
- You can now safely let this idea leave your brain



Less stress!

Do the same thing for items you may want to cover in the discussion.

(a different pile of cards called ‘discussion’.)

[And an extension of this idea, if you hate having to keep lots of things in your head at once, is to have a third pile of cards called "process".

If, when you are writing one part of a report, you think something like "I wonder if I should do those other things in another order", just write the thought on a process card.

You can then 'forget it' and get on with what you are doing, and know that you will come back to the idea later.]

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section 
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

Materials & Methods

- Having already written the results, you know what you need to cover in M&M.

- Write in about the same detail as M&M in real papers – maybe a little more, but not a step-by-step ‘recipe’ of instructions.

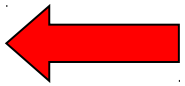
Markers are looking for sentences like this:

"Cells were passaged using Trypsin/EDTA (Sigma T9390) and were cultured in 40mls Earle's medium with 10% newborn calf serum, in 75cm^2 flasks at 37^oC in 5% CO_2/95% air."

They do NOT want to see an instruction sheet !!!

"Wash the cells in calcium-magensium-free medium
Thaw out an aliquot of trypsin-EDTA and add it to the flasks
Incubate for ten minutes at 37^oC
Collect the supernatant and centrifuge at setting 4 for 2 minutes
Pour away the supernatant and resuspend the pellet in 2mls complete medium
Place 1 ml in a new flask and add 39mls of complete medium.
Place back in the incubator"

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion 
6) Write the abstract
7) Write the acknowledgements
8) Check everything!

Writing the discussion

- The discussion presents your view of what your results mean.
- Repetition of your results should be kept to an absolute minimum. This is one of the most common things people do badly.
- You will probably be making frequent reference to the work of others in this section. This is one of the areas in which your reading counts.

Organizing the discussion

- Think about what your results (might) mean.
- If you like the card idea, make cards of things you think you need to say (and add them to any cards you wrote while working on the results section)
- Put your thoughts in a LOGICAL order

You can use active voice in the discussion;

Do not write

"It is proposed that…." if you are doing the proposing right then

Write

"I (we) propose that…"

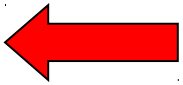
It is more honest, less pretentious, and easier to read.

It also emphasizes that the discussion is YOUR opinion.

Things not to do…

- Do not include everything you can possibly think of in the discussion; prioritize instead.
- Do not just repeat the results
- Do NOT waffle. The discussion is normally shorter than the results!

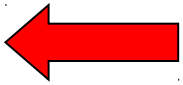
One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction 
7) Write the abstract
8) Write the acknowledgements
9) Check everything!

Why have we left the introduction until now?

- The introduction is not a random mix of everything that you know about a subject.
- Instead, it sets up the background and relevance of *the precise question you answer*, and the way that you will discuss it.
- For that reason, you can only write it when you know where the rest of the paper is going.

One way to write a report:

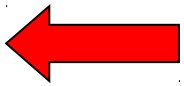
1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract 
8) Write the acknowledgements
9) Check everything!

The abstract

- One or two sentences about the background
- A summary of what you did.
- A summary of what you found.
- One sentence to say why you think it is important.

- NO references.

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements 
9) Check everything!

Acknowledgements

- Supervisor, anyone else who helped
- You MUST acknowledge any work done for your project by others. Not to do so is plagiarism and you will be in deep trouble..

One way to write a report:

1) Choose a working title.
2) Produce your figures & captions
3) Write the results section
4) Write the materials and methods section
5) Write the discussion
6) Write the introduction
7) Write the abstract
8) Write the acknowledgements
9) References 
10) Check everything!

References - choosing

- For anything central to your project, FIND THE ORIGINAL REFERENCE. Secondary sources are not good enough.
- For peripheral things, only, cite a good review
- NEVER quote secondary sources as if they are primary – this is a really good way to look sloppy and lose lots of marks.

References - technical

- If you can, use reference management software (eg Zotero/Reference Manager/ Endnote)

- If you cannot to this, try not to use numbered references.

General points about writing

Use simple, natural language:

Which would you prefer to read?

a) “Twenty percent of the individuals subject to the clinical intervention suffered a terminal morbid event.”

b) “Twenty percent of the patients died”.

Keep your sentences short.

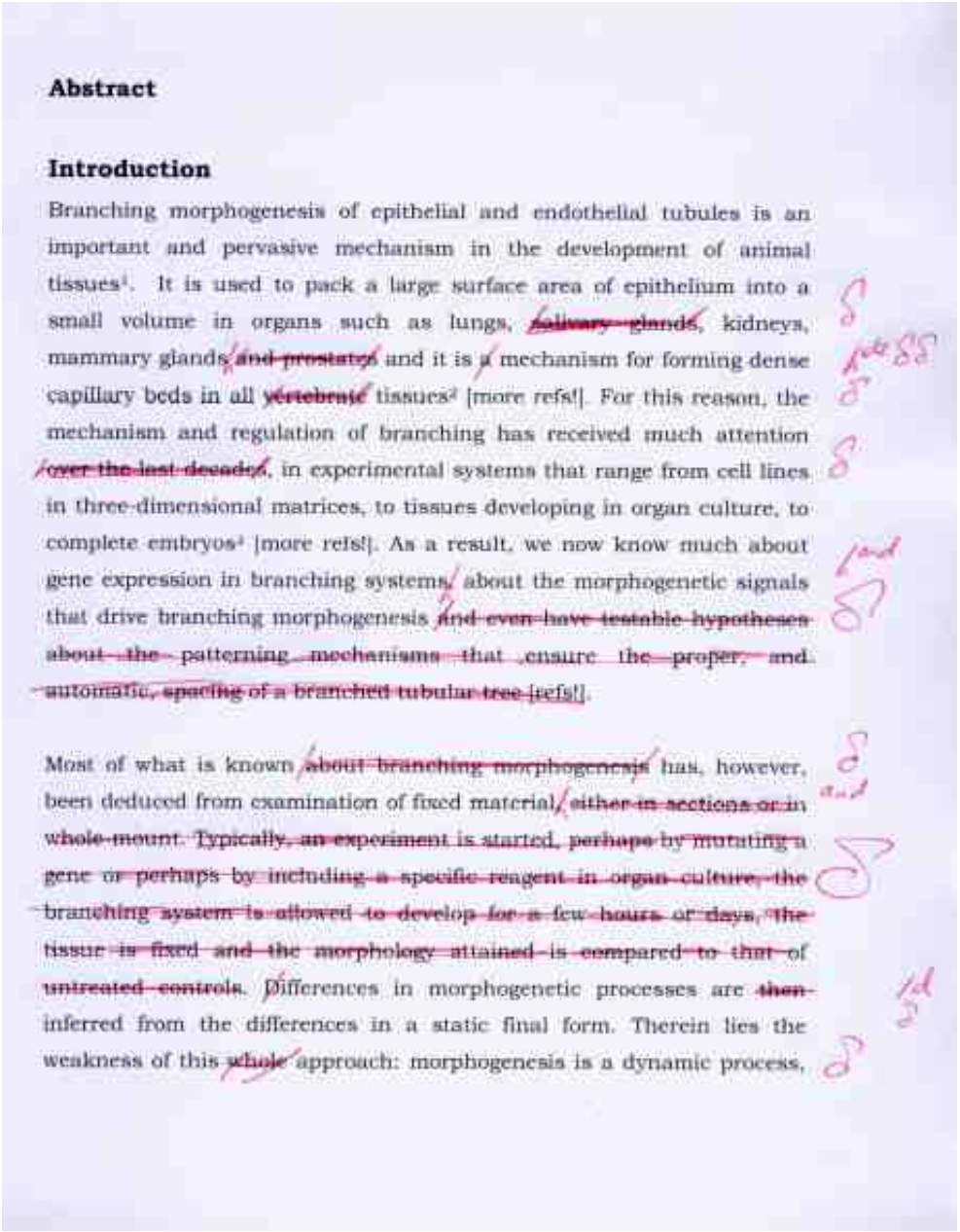
If you cannot read your sentences aloud comfortably, without turning blue, your readers will not read them on paper without getting a headache!

Drafts and revisions:

- Do not get attached to your first draft: revise and revise, and most of all – CUT!

This is typical of what my own first drafts look like after I have read them through for the first time.

You will see that the most common type of change is cutting.



Abstract

Introduction

Branching morphogenesis of epithelial and endothelial tubules is an important and pervasive mechanism in the development of animal tissues[1]. It is used to pack a large surface area of epithelium into a small volume in organs such as lungs, ~~salivary glands~~, kidneys, mammary glands ~~and prostate~~ and it is a mechanism for forming dense capillary beds in all ~~vertebrate~~ tissues[2] [more refs!]. For this reason, the mechanism and regulation of branching has received much attention ~~over the last decade~~, in experimental systems that range from cell lines in three-dimensional matrices, to tissues developing in organ culture, to complete embryos[3] [more refs!]. As a result, we now know much about gene expression in branching systems, about the morphogenetic signals that drive branching morphogenesis ~~and even have testable hypotheses about the patterning mechanisms that ensure the proper, and automatic, spacing of a branched tubular tree~~ [refs!].

Most of what is known ~~about branching morphogenesis~~ has, however, been deduced from examination of fixed material, ~~either in sections or in whole-mount. Typically, an experiment is started, perhaps~~ by ~~mutating a gene or perhaps by including a specific reagent in organ culture, the branching system is allowed to develop for a few hours or days, the tissue is fixed and the morphology attained is compared to that of untreated controls~~. Differences in morphogenetic processes are ~~then~~ inferred from the differences in a static final form. Therein lies the weakness of this ~~whole~~ approach: morphogenesis is a dynamic process,

Seek Feedback!

Common pitfalls of writing in English

Common pitfalls of writing in English

- Beware ambiguity in

  [adjective]-[noun]'s-[noun]

Antique Gentleman's Wardrobe, walnut veneer, slightly scratched, £45. 01620 892315

OR

?

Images: Wikimedia commons

Common pitfalls of writing in English

Be careful about adjectives or modal phrases that can attach to more that one thing in a sentence:

Groucho Marx made a living from this kind of thing;

"*I once shot an elephant in my pyjamas….*

How he got in my pyjamas I'll never know"

Library of Congress – Wikimedia Commons

Common pitfalls of writing in English

Beware that most words ending …ing can be read as verbs or adjectives, creating two different meanings…

"*Students are weary of annoying lecturers*".

Common pitfalls of writing in English

Being over-concise

Sign in an Edinburgh laundrette:

AUTOMATIC WASHING MACHINES: PLEASE REMOVE ALL YOUR CLOTHES WHEN THE LIGHT GOES OUT

Sign in a local church centre:

AFTER TEA BREAK STAFF SHOULD EMPTY THE TEAPOT AND STAND UPSIDE DOWN ON THE DRAINING BOARD

Sign in a gents' lavatory, Hugh Robson Building, University of Edinburgh:

URINALS OUT OF ORDER. PLEASE USE FLOOR BELOW

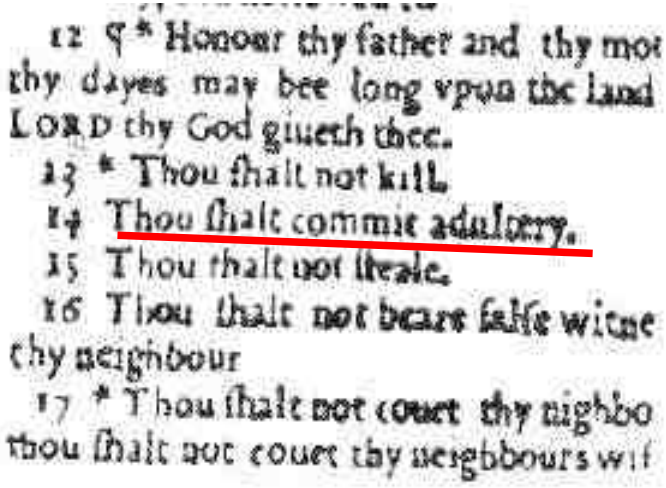
Be particularly careful about words like 'unique', 'exclusive' etc;

THE BONGO CLUB IS THE MOST EXCLUSIVE DISCO IN TOWN. EVERYONE WELCOME (*Holyrood Rd, Edinburgh)*

Proof Reading

Check everything, but be particularly careful that the word 'not' has been neither omitted nor inserted (nor changed to 'now' by mistyping).

In 1623, Baker and Lukas published a Bible in England since called "The Wicked Bible"


12 ¶ * Honour thy father and thy mot
thy dayes may bee long vpon the land
LORD thy God giueth thee.
13 * Thou shalt not kill.
14 Thou shalt commit adultery.
15 Thou shalt not steale.
16 Thou shalt not beare false witne
thy neighbour
17 * Thou shalt not couet thy neighbo
thou shalt not couet thy neighbours wif

The printers were heavily fined by the high commission and the whole edition was destroyed.

Proof Reading

Check that you have written what you really mean;

Proof Reading

Check that you have written what you really mean;

"This is the worst disaster in California since I was elected." --California Governor Pat Brown, discussing a local flood

Proof Reading

Check that you have written what you really mean;

"This is the worst disaster in California since I was elected." --California Governor Pat Brown, discussing a local flood

"I will bring my bike tomorrow if it looks nice in the morning".

You can of course use this to be subtly vicious;

"This book fills a much-needed gap in the literature" – review in American Mathematical Society Journal.

And be VERY careful about acronyms

Supplementary information

Electrochemical synthesis of metal and semimetal nanotube-nanowire heterojunctions and their electronic transport properties

Dachi Yang,[ab] Guowen Meng,*[a] Shuyuan Zhang,[c] Yufeng Hao,[ab] Xiaohong An,[ab]

1. Experimental details

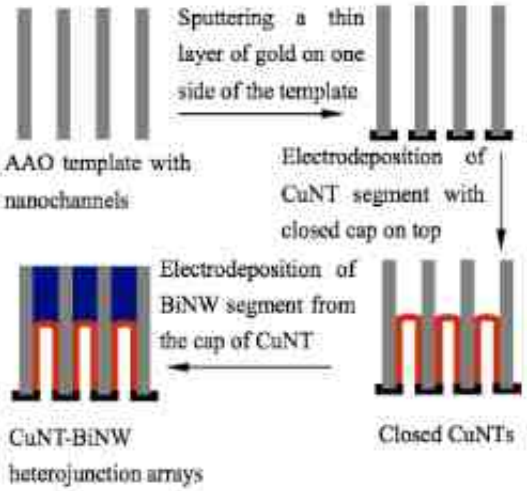


Figure 1. Schematic illustration of synthesizing CuNT-BiNW heterojunction arrays.

"Copper Nanotubes"

"How to write good." (1)

- Each pronoun must agree with their antecedent.
- Between you and I, case is important.
- Verbs has to agree with their subject.
- Watch out for the many irregular verbs which can be finded in our language.
- Don’t use no double negatives!

Important note for people with less strong English: these 4 slides are a joke – each line makes the exact error it mentions. The title is also grammatically incorrect.

"How to write good." (2)

- Being bad grammar, don't use dangling participles.
- Don’t write a run-on sentence you have to punctuate it.
- About sentence fragments.
- In letters reports theses articles and stuff like that you should use commas to separate a string of items.
- Take care to avoid commas which, aren’t necessary.
- Its important to use apostrophe’s correctly.
- Don’t abbrev’.

"How to write good." (3)

- It is a cardinal sin to ever split an infinitive.
- Prepositions should never be used to end a sentence with.
- It behoves the writer to eschew archaic expressions.
- Make less mistakes deciding between ‘less’ and ‘fewer’.
- Muddling ‘imply’ and ‘infer’ infers that the author is poorly educated.
- Don't use hyperbole - not one writer in a million can use it effectively.
- Clichés are a dime a dozen - avoid them like the plague.

"How to write good." (4)

- Mixed metaphors are a pain in the neck and ought to be thrown out of the window.
- In scholarly writing, don’t use contractions.
- Basically, a truly good writer is especially, painstakingly careful to practically eliminate unnecessary adverbs.
- Speling can be a majorr hazzard.
- Check to see if you any words out.
- Always poorfead your munascript carefully.

Resources:

**** Fowler's Guide to Modern English Usage *****

- Urdang, L: A dictionary of misunderstood, misused and mispronounced words. (Reader's Union)
- Trelease SF (1947) The Scientific paper (Williams & Wilkins)
- Pechenik & Lamb (1994) How to write about biology (Longman)

Writing good English.

- MOST IMPOTRANTLY – you must strive for clarity. Scholarly writing does not have to be difficult to understand, and the best papers are written so that even an inexperienced undergrad can understand them easily.

sesquipedā'lian or **sesquip'edal** adj (L *sēsquipedālis*, from *pēs*, *pedis* foot) tending to use long or cumbersome words; (of words) long, pedantic or polysyllabic (after *sesquipedalia verba* words a foot and a half long, coined in Horace's *Ars Poetica*).