جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Tips for Scientific Writing

English Language and Communication Program

Contents

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Before you start to write

- Make sure to follow the KAUST thesis guidelines (available at https://library.kaust.edu.sa/theses) or your selected journal's instructions to authors.

- Make sure to apply the correct referencing styles for your document (check the thesis guidelines or your selected journal's instructions).

Spell checking

- Many students forget to actually use the spell check tool! Make sure your spell check is turned on/actually applied to the text and using the correct language. Use English US for KAUST documents/your dissertation and usually US or British English for journals.

- Ask your spellcheck to ignore scientific abbreviations and definitions (or add scientific words/abbreviations to your dictionary). This will allow you to spot mistakes easily.

Tip: if you ask the spellcheck to "Ignore All" for an abbreviation like "MBP", you'll easily see if you've written "MPB" by mistake.

- Use the “Find and Replace” tool in Word or press the “Ctrl” + “F” keys in Overleaf to find simple mistakes, incorrect use of similar words, and formatting inconsistencies.

Example: you can search for “from” vs. “form", “high risk” vs. “high-risk”, and “preform” vs. “perform”.

- If using Grammarly, you can probably ignore most suggestions about simplifying the text or changing from passive voice to active voice. Grammarly is designed for general writing and is not perfect for scientific writing (but is *very* useful for spelling and basic grammar issues).

- View spellchecking as a separate, final task — a few minutes dedicated to checking your file/chapter will always help you find some typos and basic errors.

Basic formatting rules

- Make sure text/right margin is aligned in the same way throughout the file — align the margin to the left or justify the text. Don’t use a mixture of these styles and always follow your thesis/journal’s guidelines.

- Be consistent with the use of capital letters in headings and subheadings: apply the same style throughout your file.

Example: Use “This is a New Subheading” or “This is a new subheading” *not* a mixture of these styles.

- Chemical elements, most chemical names, and the generic names of drugs do not need to be capitalized, unless at the start of a sentence.

Example: use "helium" instead of "Helium" and "sodium chloride" instead of "Sodium Chloride".

- Tradenames/trademarked products/drugs and the names of chemical kits should be capitalized as shown on the manufacturer's website.

Example: Agilent Cary Eclipse fluorescence spectrometer.

Punctuation

- Use single spaces after a full-stop/period/dot.

Tip: In Microsoft Word, find and use the "Show/Hide button", which places a dot symbol between spaces to help you "see" spaces (and page breaks).

- Avoid double brackets/parentheses in text (with exceptions for Math).

Example: "(Figure 3; $P > 0.05$)" *not* "(Figure 3) ($P > 0.05$).

- Add a space between words/numbers and brackets.

Example: "...text (reference)" *not* "text(reference)".

- Make sure that all brackets and/or parentheses are closed.

- Use “e.g.,” and “i.e.,” (note the use of dots and commas).

- Most journals prefer/require “final”/Oxford commas after the "and"/before the final item in lists with 3+ items. Oxford commas help to make the text clearer. Oxford commas are not needed in lists with only two items.

Example: “1, 2 and 3” should be written as “1, 2, and 3”.

- Make sure lists in sentences have the word “and” before the final item (sometimes authors forget the final “and”).

Example: “We conducted PCR, Western blotting, and apoptosis assays” *not* “We conducted PCR, Western blotting, apoptosis assays”.

- Colons are good for “announcing” the start of a list.

Example: We prepared three treatments: control, drug 1, and drug 2.

- Semi-colons are good for separating items in complex lists, e.g., where you might also use commas in the descriptions of each item.

Example: We prepared three treatments: control, treated with 1% ethanol; drug 1, treated with 10 µM drug 1; and drug 2, treated with 10 µM drug 2.

Hyphens and dashes

- Most combinations of one adjective and one noun don't need to be joined using a hyphen.

Examples: low cost, high impact, high risk.

- However, if you place *another* noun after an adjective/noun pair, you generally need to put a hyphen between the adjective/noun pair.

Examples: low-cost solution, high-impact process, low-capacity factor.

- Words ending in ...ly generally don't need to be followed by a hyphen.

Examples: "typically performed" and "widely used" not "typically-performed" and "widely-used".

- En dashes are slightly longer than hyphens. Use en dashes for number ranges.

Example: 20–30%.

- Em dashes are longer than en dashes. Em dashes are useful for creating clarity in complicated sentences and can be used in pairs like brackets/parentheses.

Example: The idea is—by exploiting Lagrange dual reformulation of the objective function—we can remodel the objective function from a sum-of-log to a sum-of-ratio form, which we can use to apply the quadratic transform.

Tip: In Microsoft Word, type "--" to write an en dash and type "---" to write an em dash. Word should autocorrect the text automatically; if not, search the Symbol function for the correct symbol.

In Overleaf; type "--" to write an en dash and type "---" to write an em dash in the code editor.

Units and numbers

- Most numbers and units should be separated by a space.

Examples: 24 V or 52 cm *not* 24V or 52cm.

- Use capital letters for SI units.

Examples: mL and µL *not* ml and µl or ul.

- Use h, min, and sec as abbreviations for units of time (no full stops/periods/dots or plural "s" required).

Examples: 30 min and 2 h *not* 30 min. and 2 hs.

- Use the correct degree sign symbol "°" for temperatures, not a superscript letter "o". You can find the symbol in Word's symbol tool.

Example: 37 °C *not* 37 ºC.

- Use spaces around math symbols such as + = > < consistently: either always use spaces or never use spaces (check your guidelines/journal's instructions).

Tip: If you can't find any guidelines, pick one style and use it consistently throughout your document.

- Use a standard style for symbols such as *P* throughout your file. Be consistent: if you can't find any guidelines, apply one style consistently.

Example: Use *P* = 0.05 or *p* = 0.05 or *P*=0.05 or *p*=0.05 *not* a mixture of these styles.

- Spell out first, second, and third, etc. in full unless they are part of an official name e.g., 6th edition of the AJCC.

- Spell out fractions in full.

Example: three-quarters *not* ¾.

- Spell out numbers under 10 that are not followed by a proper/SI unit.

Examples: "three trees" (not a proper unit) and "3 cm" (a SI unit) are both correct.

- Spell out all numbers (and units) at the start of a sentence or add some words to avoid this issue.

Example: '36 m' could be changed to 'Thirty-six meters' or "In total, 36 m …'.

- Don't use a space between numbers and percentage symbols.

Example: 23% *not* 23 %.

- Add a space between numbers and percentages or other data in brackets.

Example: 23/100 (23%) *not* 23/100(23%).

- When reporting percentage values from your own data/results, the best practice is to also report the numerator (number on the top) as well as the denominator (number on the bottom). This lets your reader know the size of the cohort/sample, which is especially important if you assess different subsets/subgroups.

Example: "10% (10/100) of patients …" or "10/100 (10%) patients".

Abbreviations

- Use standard styles for abbreviations — don't make up new abbreviations for existing words/concepts. Search related papers/databases to make sure you are using the correct/widely accepted abbreviation.

- Of course, you can create an abbreviation for new models/processes that you produce/invent/design!

- You typically don't need to use capital letters when defining the words in an abbreviation.

Example: … peripheral blood mononuclear cells (PBMCs).

- Note: You should always use capital letters in the definition for any proper names.

Example: World Health Organization (WHO).

- Define all abbreviations at first use in your abstract, and then define each abbreviation again at *first* use in the main text of your manuscript or thesis chapter. Thereafter, only use the abbreviations.

- Some journals have a list of common/well-known abbreviations that don't need to be defined at all, e.g., DNA, MRI; check your journal's instructions.

- Use the "Find and Replace" tool of Microsoft Word or Overleaf to check that you've only defined an abbreviation once and only used the abbreviations thereafter.

Tip: Search the text using all or part of the full name and make sure the full name only appears at the first mention/definition.

- Avoid defining an abbreviation at first use in a heading – use the full name/definition in the heading and define the abbreviation at first use in the text below. After that, you can use the abbreviation in subsequent headings.

- Biologists: format gene symbols in *italics* e.g., *Abc1* and format protein symbols in plain text e.g., Abc1.

Tip: Check you are using the correct gene symbols using the Genecards.org website.

- Biologists: be aware that genes from different species are formatted differently e.g., *Abc1* for the mouse/rat gene and *ABC1* for the human gene.

General grammar rules

- Use of that vs. which: scientific writing generally uses the "American style". 'That' is used for clauses that are restrictive. 'Which' is used for non-restrictive clauses, which should be separated using commas.

- Avoid contractions such as can't, won't, don't, and aren't in scientific writing.

- Avoid apostrophes, if possible, in scientific writing.

Examples: "the impurities' location" and "the processes' characteristics" are better as "the location of the impurities" and "the characteristics of the processes".

- Avoid dangling modifiers/clauses.

Example: "To identify the protein, we used MS" is better rewritten as "We used MS to identify the protein".

First/second person

- You can use “we”/second person in your thesis and scientific papers. Instructions to not use “we”/second person are outdated and old-fashioned; most journals now encourage the use of “we” to make the text easier to read.

- It is preferable to avoid the use of “I” in scientific papers; scientific research is generally a team effort, so first person sounds “too confident”.

- However, many supervisors at KAUST allow/encourage the use of “I”/first person in your MSc or PhD dissertation; chat to your supervisor/lab mates and look at recent dissertations from your group.

Special issues you might like to consider

Noun modifiers

Compare the following phrases, which are all grammatically correct:

v*ehicles with fuel cells vs. fuel cell vehicles*

sequencing data for cancer tissues vs. cancer tissue sequencing data

values of annual installations vs. annual installation values

When we add a second noun/additional nouns immediately after another noun, the first noun usually becomes singular, even if the first noun is plural. So, we say strawberry cake, not strawberries cake.

Tip: Remember "strawberry cake" to remind you of this rule; a strawberry cake contains more than one strawberry!

"The results show/showed"

If you tend to use the phrase *the results show* (or *showed*) many times in your text, consider either removing this phrase completely or being more specific. *The results show* does not actually give any useful information. For example:

The results showed drug X led to a 50% reduction in cell viability

might be better as either:

Drug X led to a 50% reduction in cell viability (this is more concise, avoids unnecessary words) …or…

The MTT assay showed drug X led to a 50% reduction in cell viability (this is more informative because we name the method used, as a reminder for your reader).

Vague words: it, one, ones, they, them

Clarity and precision are very important in scientific writing. Some students have been told not to repeat words in scientific writing, but this guidance is misleading.

Every paper/dissertation investigates one or more specific concepts, so you will inevitably need to repeat the names of key concepts (i.e., nouns) many times. Repeating the names/nouns/concepts is much better than being vague. Don't be tempted to use a mixture of names for the same concept, as this can be really confusing to your reader.

Here is an example of why we need to repeat names/nouns:

I like ice-cream, cake, and lemonade. It is my favorite food

is much clearer if I write:

I like ice-cream, cake, and lemonade. Ice cream is my favorite food.

Tip: It is good practice to search your text (using the "find" tool) for vague words, especially *it, one, ones, they,* and *them.*

Replace these words with the name or noun. Another option is to use collective phrases instead of the name e.g., *This process, those results, these data, Our study,* etc.

Side note: It is good practice to use a variety of verbs; for example, don't say "we discovered" in every sentence of your results. Instead, you could use a mixture "we found", "we identified", "we show", "we confirmed", etc.

Words that you might like to avoid

Some words can seem too informal for scientific writing. Therefore, you may like to consider the following words "swaps" to make your writing more professional. Note there are no rules to say you can't use these words, but these suggested word swaps are generally better options.

Instead of using… ***done/do/did***

Consider using... *conducted, performed, achieved*, or any action verb that describes what you did (*measured, quantified, determined, assayed, purified,* … etc.).

Instead of using... ***get/got***

consider using... *obtain or achieve*.

As an exception, "get" is acceptable in math/modelling when deriving a formula or proof.

Instead of using… ***besides***

consider using... specific words/phrases that have clearer meaning, such as *in agreement, therefore,* or *however*.

Besides can sometimes suggest both "in addition" or "in contrast".

Don't start a sentence with….

One set of rules for formal writing in English relate to words that should *not* be used at the start of sentences. Therefore, you might like to consider using the following alternatives to elevate your scientific writing.

Instead of using…	**Consider using**…
And	Moreover, In addition, Additionally
Because	Since, Due to the fact...
As	Since, Due to the fact...
Also	Moreover, In addition, Additionally
But	However

Passive vs. active voice

There are no strict "rules" about whether you should use only active voice or only passive voice in each section of your paper or thesis chapter. Good scientific writing uses a mixture of active and passive voice.

Note: Passive voice used to be the main voice used in scientific writing; this style is now old-fashioned and discouraged by most journals; you can use a mixture of voices and if you are uncertain, active tense is probably best.

Many times, it can be simpler, clearer, and more direct to use active voice (subject, verb, object) in scientific writing. Consider the following examples:

Example 1. *Another feature that can draw attention to health warnings, convey meanings, and communicate different danger levels is color.*

This sentence is clearer if we put the subject, color, first:

Color is another feature that can draw attention to health warnings, convey meanings, and communicate different danger levels.

Example 2. *There are numerous examples of diversification tools that have been used to achieve synthetic directed evolution in different organisms.*

In this example, we don't actually need the initial object/verb. Removing "there are" and starting the sentence with the subject, diversification tools, allows us to write a more concise and clearer sentence:

Numerous diversification tools have been used to achieve synthetic directed evolution in different organisms.