Thursday, October 31st - 11am - Davis Auditorium

Columbia University Libraries Edition

Write Like an Engineer!

Grammar, mechanics, and style

FOR ENGINEERS

Learn to:

- Tell an important story
- Spin your research
- Decide what matters
- Build correct sentences
- Properly punctuate

Wednesday, October 23rd - 11am - Davis Auditorium

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Get Published!

Preparing an article for submission

FOR ENGINEERS

Learn to:

- Find the right journal
- Write using templates
- Read instructions
- Deal with rejection
- Expect criticism

Monday, November 4th - 12pm - Davis Auditorium

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Save Time in Word!

Templates and advanced document formatting

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Learn to:

- Save time when writing
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- Build Tables of Contents
- Cross reference
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3D Printing!

Intro to modeling in OpenSCAD and Sketchup

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Why do we write?

Research not communicated didn’t happen.

To tell a story.

So tell a story.

What is “good” writing?

- Communicating ideas, clearly, effectively

What is “bad” writing?

- Difficult to define, but we all know it when we see it!
- Too wordy
- Dead weight phrases
- Vague sentences

What makes a good writer?

- Talent
- We can all learn and we can all improve

Read. Read a lot.

How to make it better

- What are you trying to say? Know your purpose.
- Who are you trying to say it to? Know your audience.
- Plan it out.
- Revision, revision, revision
- Use a thesaurus.
- Be ruthless when you edit.

Keep it concise

- This occurs less frequently
- Have the same opinion
- A number of
- In every case
- It gives rise to

- Rare
- Agree
- Many
- Always
- Causes

Dead weight phrases

- In the event that
- It has been estimated that
- It seems that
- In a manner of speaking
- In a very real sense
- For the most part

Cut out unnecessary words

- As stated earlier in the paper, TCE demonstrated specific antiproliferative activity against the more progressive and metastatic SW620 cells.

Cut out unnecessary words

- As shown in the paper by Conderoy et al. (2008), there is an increasing amount of evidence that suggests an association between cancer and the cyclooxygenase (COX) enzyme; hence, the COX-expressing cell line HT-29 was studied in this present work.

Replace wordy phrases

- Similar to this, fractions enriched in organic acids also inhibited cell growth.
- Similarly, fractions enriched in organic acids also inhibited cell growth.

Replace wordy phrases

- Despite that fact that the temperature was increased, the rate of reaction remained the same.
- Although the temperature was increased, the rate of reaction remained the same.

- Ask yourself, is this word or phrase really necessary?
- What happens if I take it out?
- Proofread regularly! Concise writing will become easier.

What you spend most of your time doing WILL NOT form most of your story.

To whom do we write?

Grammar matters

Language matters

Definition of Sentence

- a word, clause, or phrase or a group of clauses or phrases forming a syntactic unit which expresses an assertion, a question, a command, a wish, an exclamation, or the performance of an action, that in writing usually begins with a capital letter and concludes with appropriate end punctuation, and that in speaking is distinguished by characteristic patterns of stress, pitch, and pauses

Sentence Structure

- Style guides contains information on correct sentence structure and word usage.
- There are certain conventions in scientific and engineering writing that we need to observe to get our message through.

What are the components of a sentence?

- Subject and verb
- Sometimes you can even lose one of those:

Sit down.

It is raining.

What makes a good sentence?

- Good structure
- Correct word usage
- Clarity
- Unambiguous

Some definitions:

- A group of words with a subject and verb is a clause.
- If a clause can stand on its own it is known as an independent clause or a simple sentence.
- If a clause cannot stand alone it is a dependent or subordinate clause.
- Two or more simple sentences form a compound sentence.

Verbs

- Active voice vs. passive voice
- Active: the subject of the sentence is the doer of the action
- Passive: the subject is acted upon
- Which one do we use? It depends on the situation.

Active vs Passive

- *We heat the mixture to 80 °C.*
  (present tense, active voice)
- *We heated the mixture to 80 °C.*
  (past tense, active voice)
- *The mixture is heated to 80 °C.*
  (present tense, passive voice)
- *The mixture was heated to 80 °C.*
  (past tense, passive voice)

- Passive voice is most often used in the methods/experimental section of a paper where doer of the action is unknown or unimportant.

Tense

- Simple past tense is used when describing work that has been done.
- Present tense is for statements of fact.
- You will have different combinations of past, present, active and passive depending on the type of document you are writing

Examples

- *Chromium is a metal widely distributed in soil and plants.*

  (present-active; introducing a research area in a journal article)
- *Experimental adsorption isotherms for the treated soils are presented in Figure 1.*

  (present-passive; referring to figure in a paper)

Examples

- *In previous work, we demonstrated that…*

  (past-active; highlighting prior accomplishments say in a research proposal)
- *Samples were analyzed by…*

  (past-passive; describing preliminary work done in the past also for a research proposal)

Subject and Subject-Verb Agreement

- The subject and verb must agree in number: both must be singular or both must be plural.

Tips for agreement

- When we have lengthy phrases between subject and verb it can be difficult to check for agreement.

The ratio of the intensities of these two doublets is 5:1.

The importance of non-additive contributions for the accurate description of the intermolecular interactions is well documented.

Tips for agreement

- When two or more subjects are joined by “AND” or “OR”
- When two or more singular subjects are joined by AND, use a plural term.

  Foam and flavor stability are important considerations for a brewer.
- When two or more subjects are joined by “OR” the verb should take the number (singular or plural) of the closest subject.

  Cesium iodide or polyethylene glycol was employed as a reference compound.

  The appropriate metal ion concentration or the rate constants were used.

Tips for agreement

- Units of measurement take singular verb forms.

  Approximately 2 mg of the sample was placed in aluminium sample cups...

Tips for agreement

- Each and every are followed by singular verb forms.

  Each chemical was tested for a dose range of 0-300 μ M.

  In Figure 6, every molecular species is represented by a single letter for simplicity.

Tips for agreement

- *All*, *none*, *some*, *most*, and *any* can be followed by a singular or plural verb form depending on the object of the preposition (or noun) following it.

  All aldehyde analyses were run in the single-ion monitoring mode.

  Most aldehydes, except formaldehyde, form two geometrical isomers

Some exercises: check these sentences for subject-verb agreement

- Blends of olive oil and hazelnut oil was prepared by mixing these oils.
- Unpaved road dust or aerosols contributes to haze in class I airsheds.
- A stock solution containing a mixture of the standard compounds in ethanol was prepared in the concentration 100 ppb each.
- Some electron-rich nitriles requires higher temperatures.
- Each particle, from dust, soot, or soil, react with light in a unique way.

Sentence modifiers

- Misplaced modifiers are placed next to the wrong word in a sentence.

  We commenced a new round of experiments unable to point to meaningful conclusions.

  Unable to point to meaningful conclusions, we commenced a new round of experiments.

Sentence modifiers

- A dangling modifier is a modifying word or phrase that does not clearly and logically modify another word in the sentence.
- If a modifier precedes the subject of a sentence, it must modify that subject and be separated from it by a comma. Otherwise, it is a dangling modifier.

  Splitting the atom, many new elements were discovered by Seaborg.

  Splitting the atom, Seaborg discovered many new elements.

Sentence construction and word order

- Use affirmative sentences rather than double negatives.
- “Only” will mean different things depending on its placement in a sentence.
- Be clear with antecedents of pronouns.
- Use proper subordinating conjunctions

  Since solvent reorganization is a potential contributor, the selection of data is very important.

  Because solvent reorganization is a potential contributor, the selection of data is very important.

Parallelism

- Words or groups of words of equal grammatical rank: word are connected only to words, phrases to phrases, etc.
- Concepts should be of similar scale and inportance (conceptual parallelism)

Parallelism

In the reaction of 4-fluorophenylboronic acid, the hydrolysis was suppressed to some extent by a reduction in the amount of water and lowering the reaction temperature.

In the reaction of 4-fluorophenylboronic acid, the hydrolysis was suppressed to some extent by reducing the amount of water and lowering the reaction temperature.

Parallelism

The next step was to collect the fraction eluting in the corresponding time interval and subjecting it to prolonged aerial oxidation.

The next step was collecting the fraction eluting in the corresponding time interval and subjecting it to prolonged aerial oxidation.

The next step was to collect the fraction eluting in the corresponding time interval (to)subject it to prolonged aerial oxidation.

Parallelism

The 15-HLO screen is both a robust tool and reliable for reporting lipoxygenase inhibition.

The 15-HLO screen is both a robust tool and a reliable reporter of lipoxygenase inhibition.

Parallelism

This reaction has applications in industry, synthesis, and the creation of amino acid derivatives.

- The three items are not conceptually parallel. *Industry* and *synthesis* are broad terms. *Creation of amino acid derivatives* is a much narrower specific task.

This reaction, which can be used to create amino acid derivatives, has other applications in industry and synthesis.

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