

Thursday, February 6th - 2pm - Davis Auditorium  
Columbia University Libraries Edition

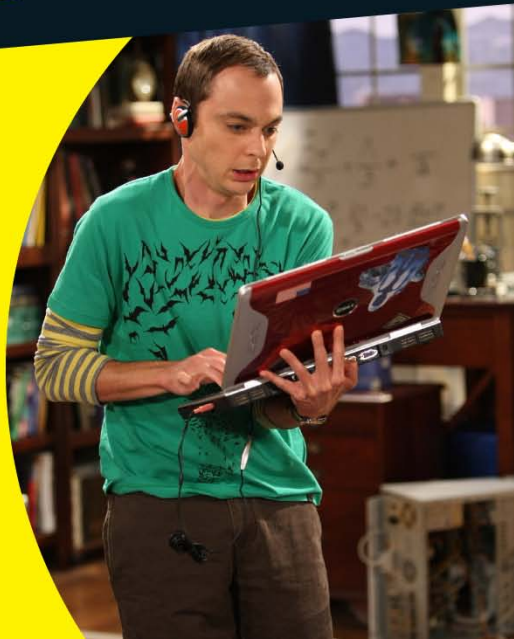
# Grammar, Mechanics, and Style

Writing Basics Everyone Should Know

FOR  
SCIENTISTS &  
ENGINEERS

## Learn to:

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



Thursday, February 13th - 3pm - Davis Auditorium  
Columbia University Libraries Edition

# Social Media for Research

Reddit AMAs, Twitter, Professional Identity

FOR  
SCIENTISTS &  
ENGINEERS

## Learn to:

- Present your work online
- Broaden your impact
- Social media etiquette
- Get credit for research
- Engage the conversation



**Photoshop & Illustrator**

**March 3rd**

**Mendeley & Zotero**

**March 5th**

**Data Visualization**

**March 27th**

# Write Like an Engineer!

Grammar, mechanics, and style

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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.**

# Genres of scientific writing

- **Laboratory reports**
- **Peer-reviewed journal articles**
  - **Research articles**
  - **Communications/letters**
  - **Reviews (Lit. or Research)**
  - **Corrections**
  - **Retractions**
- **Theses/dissertations**
- **Research and grant proposals**
- **Popular-science articles**
- **Poster, Poster Abstract**
- **Conference proceedings**
- **Presentations**
- **Blog**
- **Education**
- **News**
- **Article Reviews, Book Reviews**

**What determines the  
kind of document you  
write?**

# Audience.



# Who are the most common audiences?

- Yourself
- Scientists, Researchers
  - General (OUTSIDE your field)
    - Editor
    - Reviewers, Funding Panel
  - Specific (IN your field)
    - Your Supervisor, PI
    - Your peers, labmates
    - Your friends
- Non-scientists
  - Lay audience, your grandmother
  - Program officer
  - Tenure Committee
  - Potential employers

# The difference knowing your audience makes:

- The piranha generally lives in shallow rivers and streams in South America.
- *Serrasalmus piraya* lives in fresh and brackish intercoastal and proto-arboreal sub-tropical regions between the 45th and 38th parallels.



# Who is your audience and what do they want from you?

- Who is your audience? What do they know?
- Do you have more than one audience?
- What does your audience need, want, and value?
- What is most important to them?
- What is least important to them?
- What kind of organization would best help your audience understand and appreciate your message?
- What do you have to say that might surprise your audience?
- What do you want your audience to think, learn, or assume about you? What impression do you want your writing or your research to convey?

# Your audience will determine:

- what should be included.
- how your ideas should be organized.
- how you should support your argument.
- word choice, tone, terminology, jargon, etc.

**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  $\mu$  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.*

**Research not  
communicated didn't  
happen.**

# Structure of a paper

**IMRD**

**(Introduction-Methods-Results-Discussion)**

# General structure of a peer-reviewed journal article

- Title
- Byline and affiliation
- Abstract
- Introduction
- Materials and Methods/Experimental Methods/Theoretical Basis
- Results
- Discussion
- Conclusions
- Summary
- Acknowledgements
- References
- Supporting Information
- Web-Enhanced Objects



**But that's not how you  
should write it.**

# How to approach writing a peer-reviewed journal article

## **\*Mantra\***

- **Figures (then write around)**
- **References (throughout)**
- **Materials and Methods/Experimental Methods/Theoretical Basis**
- **Results & Supporting Information**
- **Discussion & Conclusions**
- **Summary & Introduction**
- **Title & Abstract**
- **Acknowledgements & Byline and affiliation**
- **Web-Enhanced Objects**

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**Questions?**