

## Carla's Tips on Technical Writing Manual

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This manual helps answer questions pertaining to the composition of a thesis, dissertation, proposal, and/or journal article. The topics are arranged in alphabetical order to help you find answers to your questions quickly. The manual introduces some excellent resources to help you organize your paper and is written to refresh the memory of accomplished writers and to help those brilliant students who are still struggling with English simply because it is their second language. Whether you need a little help or a lot, I hope you find what you need here. –Carla



Carla Roberts

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Because the topics in this manual are arranged in alphabetical order, the first page presents a list of definitions and word choices. You will also find grammar rules, tips on how to organize your research, how to get published, and how to get funded through proposal writing in the following pages.

## ADJECTIVES

An adjective modifies or describes a noun or pronoun. Anyone who has studied English knows that words like large, small, funny or sad are adjectives. However, one key value that isn't mentioned is their ability to eliminate the need for the possessive tense.

**Example:** Benefits are generally explained in terms of individuals' preferences.

Change individuals' (a possessive noun meaning all or several individuals' preferences) to "individual." This converts the possessive noun *individuals'* to an adjective that describes preferences as they relate to all individuals. Adjectives never have an "s" attached at the end. The lack of the possessive ending ('s or s') at the end of *individual* immediately lets the reader know that "individual" is an adjective.

**Example:** Benefits are generally explained in terms of individual preferences.

Another example is: The scouts' hiking trip was postponed. Scouts' is a possessive noun referring to the whole troop. If only one scout from a troop was scheduled to make the trip, you would say the scout's hiking trip was postponed. However, you can do away with the possessive tense by making scout an adjective. The scout hiking trip was postponed. Here we see that whether the scout hiking trip was planned for all the scouts in a particular troop or only one scout—in the end, it was postponed.

## ADVERBS

An adverb modifies a verb, adjective or other adverb word group, expressing a relation of place, time, circumstance, manner, cause, and degree (e.g., gently, quite, then, there). An adverb that modifies another adverb (very quickly) or an adjective (potentially transformative) should appear in front of the word it modifies. An adverb that modifies a verb can appear before or after the verb it modifies (extensively used or used extensively). An adverb can also appear at the beginning of a sentence (Sadly, the experiment failed) or at the end (The project was terminated unexpectedly). The position of the adverb can affect the meaning of a sentence. Richard Nordquist of About.com Grammar and Composition goes into more detail and is an excellent source for grammar questions. See his exposition on how to use adverbs at <http://grammar.about.com/od/ab/g/adverbterm.htm>. Also, for more details about types of adverbs and their position, see <http://dictionary.cambridge.org/us/grammar/british-grammar/adverbs-and-adverb-phrases-position>.

## ADVERBIAL CONJUNCTIONS

The following adverbial conjunctions have more than one function, so punctuation will vary.

accordingly	consequently	however	likewise	otherwise
afterward	finally	in addition	meanwhile	still
again	for example	indeed	moreover	that is
also	further	in fact	namely	then
as a result	furthermore	in particular	nevertheless	therefore
besides	hence	instead	of course	thus

For the most part, they have one purpose: to connect phrases or clauses. They help improve sentence flow. I appreciate them because they simply give me an opportunity to stop and breathe—digest what was just said and then proceed to tackle the ensuing applications.

Some of the words appearing in the table above will not need any punctuation because their only role is to serve as adverbs, which means they modify a verb, adjective or other adverb or adverb word group. In the following examples, the adverb is italicized and the verb (or adjective in the second example) is in boldface:

*However* **frustrated** I might seem, I love my job and am thankful for it.

He was *accordingly* **respectful** during the interview.

He was *further* **encouraged** by a party held in his honor after he completed the race.

In 2006, Martha Kolln and Robert Funk came out with *Understanding English Grammar* (New York: Pearson Publishing). Their presentation of conjunctive adverbs shows how **they can also appear at the start of a sentence or clause to indicate result, concession, apposition, addition, time, contrast, summary, or reinforcement**. In other words, conjugative adverbs have a job to do. Dr. L. Kip Wheeler, an English professor at Carson-Newman University in Jefferson City, TN, shows us what adverbs perform what job on his website at <https://web.cn.edu/kwheeler/index.html>. We are both copying from the Kolln and Funk book (list on p. 280) as we present the following list showing the tasks that conjugative adverbs achieve followed by the specific adverbs that meet their requirements.

**Result:** *therefore, consequently, of course*

**Concession:** *nevertheless, yet, still, after all, of course*

**Apposition:** *for example, for instance, that is, namely, in other words*

**Addition:** *moreover, furthermore, also, in addition, likewise, further*

**Time:** *meanwhile, in the meantime*

**Contrast:** *however, instead, on the contrary, on the other hand, in contrast, rather*

**Summary:** *thus, in conclusion, then*

**Reinforcement:** *further, in particular, indeed, above all, in fact*

Dr. Wheeler's explanation and examples follow:

"When conjunctive adverbs function this way, they are separated from the rest of the sentence with a comma. In such cases, the conjunctive adverb needs a comma after it because it is a phrase appearing before an independent clause. Note the commas in the following sentences.

*Therefore*, I will eat eggs!

*Still*, it sounds like a good idea.

*In other words*, grammar is a useful skill." —L.K. Wheeler

(See [Dr. Wheeler's website](#) for more examples.)

There are times when all a conjunctive adverb has to do is follow the semicolon. The semicolon takes the place of the word "and."

**Example 1:** The semicolon fulfills the role of the conjunction; **consequently**, it joins two complete sentences or independent clauses.

**Example 2:** The second sentence is so closely related to the first that it does not need to start over; **however**, the conjunctive adverb continues the thought by easing the reader into the next complete thought or independent clause (aka a sentence).

In the first example, the conjugative adverb, *consequently*, introduces a result. In the second example, the conjugative adverb, *however*, introduces an extension of the previous thought but it "contrasts" with that thought by adding the new concept of continuance. As noted above, the other conjunctive adverbs can denote concession, apposition, addition, time, summary, and reinforcement. They complete the task of the first independent clause (the beginning of the sentence) by supporting it with a back-up clause—complete with subject and verb—that confirms or extends what was just said. Note that the conjunctive adverb must be followed by a comma. See page 12 for further discussion on how to use the comma and semicolon.

**Example 3:** The conjunctive adverb is a problem for ESL students; **however**, the problem is solved once they understand its purpose.

## **AFFECT OR EFFECT?**

In the sciences, **affect** is a verb and **effect** is a noun. How an experimental application affects the results is determined by the observable effects.

## **ALRIGHT OR ALL RIGHT?**

Alright has never been accepted in technical writing. The correct term has always been “all right” which means adequate or satisfactory. However, common misuse may eventually allow alright to slip into informal writing (blogs, tweets, and fictional vignettes) meaning less than accurate but satisfactory, with “all right” reserved for that which is entirely correct or accurate. For now—the rule is: Do not use alright. All right is the only correct choice in technical writing.

## **ALTERNATE vs. ALTERNATIVE**

**Alternative** as a noun refers to other options. Alternative is synonymous with choice. You may have devised three methods to solve a problem. After you have established your preferred method, you can set that up as the method to follow. However, if other methods remain viable, you can cite them as alternative methods. The second and third methods are alternative methods. In the preceding sentence, alternative is an adjective modifying method.

**Alternate** as a noun refers to a substitute. An alternate juror must sometimes be selected when the first choice is removed. In this case, the new juror is called an alternate and the word is classified as a noun. You may also have to take a substitute or alternate route if a major road is closed. The detour route is an alternate. Alternate as a verb means to take turns or to alternate back and forth. It can also mean to proceed by turns as when students alternate from one computer to another based on their assigned work stations. One can also alternate from one state, action, or place to another. My mood can alternate from happy to sad depending on how well I meet my deadlines.

## **AMONG OR AMONGST?**

In recent years, many authorities (such as the editors of Garner’s Modern American Usage) have deemed *amongst* as old-fashioned and even pretentious. A traditionally preferred English spelling, *amongst* has even fallen out of favor with some British English editors, who are beginning to object to its use. For example: *The Guardian* style guide shows that *among* is the preferred spelling.

## **AMONG vs. BETWEEN**

**Among** involves more than two things. This is especially true when discussing items or even groups that are not aligned with specific organizations or entities. For example: It was difficult to find our way *among* so many unmarked streets. The issue of toxicity causes dissension *among* those who promote clean coal technology and those who want to eliminate coal fired power plants completely. **Between** involves more than two things or groups, but considers each individually. For example: We were on the street *between* red campus and white campus when you called. I’m amazed at the differences *between* those who want to help the coal industry and those who want to destroy it.

## **APPOSITIVE**

An *appositive* is a noun or noun phrase that renames another noun right beside it. The *appositive* can be a short or long combination of words. For example: The mystery guest, *a well-known entertainer from the sixties*, will not be revealed until tomorrow night. In this example, the appositive is *a well-known entertainer from the sixties*. It is in apposition to *mystery guest*. For more examples, see [http://www.grammar-monster.com/glossary/appositive\\_apposition.htm](http://www.grammar-monster.com/glossary/appositive_apposition.htm).

## **ARTICLES (a, an, and the)**

Concerning *a* and *an*. Use the article “a” before words that start with a consonant sound as in *an apple*. Use “an” before words that start with a vowel sound as in *a better day*.

The articles *a* and *an* tell the reader that the author is talking about only one thing—*an* awesome ostrich or *a* delicious bagel. The word “the” tells the reader that the author is talking about a particular ostrich or bagel, as in *the* silly ostrich who ate *the* homemade bagel.

Many ESL students find our use of the plural tense very confusing. I often put *a* or *an* in front of a word and delete the “s” from the word it is modifying because a student wanted to talk about an experiment, but he called his one experiment “experiments.” Most nouns form their plural by adding an “s”. Verbs however do not. Hence, in the sentence “Bees buzz,” both the noun **bees** and the verb **buzz** are plural. In the sentence, “The puppy plays day and night,” both the noun **puppy** and the verb **plays** are singular.

The most common error for all students, both American and international, is overuse of the word “**the**.” If you are referring to “all,” “several,” “some” or “any” when describing a noun, do **not** use “**the**.” The (specific) word “**the**” should only be used when referring to one particular or “specific” activity, process, unit, item, organization, experience, instance or event. If you can put “specific,” “one-of-a-kind,” “special,” “particular” or “only” in front of a word, then use “the.”

Do not insert **the** before the words *figure*, *table*, *equation* or *section* when identified with a number. It is not the Figure 1 (and numbered figures are always capitalized), but it is simply Figure 1. It is not the Equation 5, but simply Equation 5 or Eq. 5.

Laws or places named after persons (e.g., Henry’s Law, Einstein’s theory of relativity, and Cassie’s Cafe) would not require “**the**” as an introductory article. However, if the full name is given as in **the** John F. Kennedy Airport or **the** Sam Tung UK Museum, which is a branch of **the** Hong Kong Museum of History, then “**the**” is needed. If you are referring to a famous document like **the** Declaration of Independence or a specific organization like **the** China National Center for Preservation & Conservation of Ancient Books (NLC), then you should use “**the**.”

When you precede a word with “the,” and use it again in the same sentence, you do not always need “the” in the second usage. In the first example, the Miranda warning and Maranda rights or Miranda rule are all referring to the same thing. The first “**The**” at the beginning of the sentence covers them all.

**Example 1:** **The** Miranda warning, also referred to as Maranda rights or Miranda rule, is a right to silence warning given during the arrest of criminal suspects and before their interrogation to preserve admissibility of their statements in a court of law.

**Example 2:** **The** cohesion (*c*) and interface friction coefficient ( $\tan \varphi'$ ) between **the** soil and side wall were determined by the wall pull-out test.

In Example 2, the word “the” is doing double duty by naming two specific actions at the beginning and middle of the sentence; hence, in **the cohesion** and **interface friction coefficient**—both refer to a related specific action, which means “the” is modifying both cohesion and interface friction coefficient due to their relationship. We also insert an all-inclusive **the** before **soil and side wall** because of this phrase’s separate placement in the sentence as a dual object of the main action. You can see this relationship as the soil and side wall are working together to locate the subject.

Common or non-specific topics often need to be introduced by “The” when they begin a sentence. When you are introducing a new topic at the beginning of a sentence, it becomes a very specific topic that you are going to make uniquely your own through your discussion. However, the key to when to use “the” is whether you introduce your topic as singular or plural. I was asked why I changed a sentence that began with: “Staggered truss framing (STF) system was originally developed .....”

To “**The** staggered truss framing (STF) system was originally developed to . . .”

If the author had said “STF systems **were** originally developed...”, then he would not need “the.” **Putting your subject in the singular tense sets it apart as one, and even when that “one” is universal, it is still specific and unique.** Moreover, the articles *a*, *an*, and *the* are always used when introducing one of something. ESL students often do not have the plural tense in their language. For that reason, the plural tense in English is confusing. Most nouns become plural by adding an “s”. However, verbs do

not form their plural by adding an “s”. Thus, a strong wind roars. Roars is singular here and is agreeing with its singular subject wind. However: Strong winds roar. Here, both winds and roar are plural.

This is confusing, which is why *a*, *an*, and *the* can help. They tell the reader immediately that we are talking about one of something.

[Purdue’s Online Writing Lab](#) has further instructions about the use of **the** (copied for your convenience):

*Geographical use of the—Do not use the before:*

- names of most countries/territories: *Italy, Mexico, Bolivia*; however, *the Netherlands, the Dominican Republic, the Philippines, and the United States* is correct.
- names of cities, towns, or states: *Seoul, Manitoba, Miami*
- names of streets: *Washington Blvd., Main St.*
- names of lakes and bays: *Lake Titicaca, Lake Erie* except with a group of lakes like *the Great Lakes*
- names of mountains: *Mount Everest, Mount Fuji* except with ranges of mountains like *the Andes* or *the Rockies* or unusual names like *the Matterhorn*
- names of continents (Asia, Europe)
- names of islands (Easter Island, Maui, Key West) except with island chains like the Aleutians, the Hebrides, or the Canary Islands

Do use **the** before:

- names of rivers, oceans and seas: *the Nile, the Pacific*
- points on the globe: *the Equator, the North Pole*
- geographical areas: *the Middle East, the West*
- deserts, forests, gulfs, and peninsulas: *the Sahara, the Persian Gulf, the Black Forest, the Iberian Peninsula*

*Omission of Articles--Some common types of nouns that don't take an article are:*

- Names of languages and nationalities: *Chinese, English, Spanish, Russian* (unless you are referring to the population of the nation: “**The** Spanish are known for their warm hospitality.”)
- Names of sports: *volleyball, hockey, baseball*
- Names of academic subjects: *mathematics, biology, history, computer science*

## **ARTICLES & ACRONYMS—Sound the letters out before deciding what article to use.**

Use the article “a” before words that start with a consonant sound. Use “an” before words that start with a vowel sound. This is also true of acronyms where you sound out the letters instead of saying the words they stand for. For example, the professor won *an* NSF award. N is a consonant but when sounded out it has a vowel sound (en). Letters with vowel sounds are F (ef), H (ā-ch) L (el), M (em), N (en), R (ahr), and S (es). Words beginning with “h” are particularly tricky. If the *h* is silent, the word will begin with a vowel sound as in *hour* (pronounced ow'-er) and *herb* (when pronounced ərb). The 2014 IEEE Editorial Style Manual states: “Indefinite articles are assigned to abbreviations to fit the sound of the first letter (e.g., an FCC regulation; a BRI).” The letter U is a vowel and is preceded by “an” in words beginning with “un” like *underprivileged* (e.g., an underprivileged student) or with “up” as in *upward* (e.g., an upward motion). When “u” begins a word like *used*, the beginning sound is “you” and the article should be treated as a consonant; e.g., a used car, a union meeting.

## **ASSURE, ENSURE OR INSURE?**

In technical writing, to **assure** is to give your reader confidence by providing assurance that your conclusion is correct. To **ensure** that your experimental results are correct is to follow a proven protocol, e.g., “The nanoparticles were stabilized using small amounts of hydrochloric acid to **ensure** the solution remained stable for at least three days.” To “insure” is to issue an insurance policy.

## **AVOID “ABOVE, BELOW OR ON THE NEXT PAGE” WHEN REFERRING TO TABLES AND FIGURES.**

Avoid using words which place your figures or tables above, below, on the next page. Often editors

will change your format and make corrections which will change the placement of copy. Just make sure you keep your figures and tables close to the copy they relate to. Also, try not to break a table into two pages. Exceedingly long tables should be put in an appendix.

## CAPITALIZATION RULES

**Sentence case** refers to a capitalization style in which most words other than the first word and proper nouns or acronyms are lowercased.

**TITLE CASE** refers to a capitalization style where the first letter of the first and last word are capitalized as well as all nouns, pronouns, adjectives, verbs, adverbs, and subordinating conjunctions (*If, Because, That, Which*). Capitalize abbreviations that are otherwise lowercase (e.g., use DC, not dc or Dc) except for unit abbreviations. Do not capitalize articles (*a, an, the*) or coordinating conjunctions (*and, but, for, or, nor*). Most short prepositions are lowercase unless they are the first or last word. Prepositions of more than three letters (*before, through, with, without, versus, among, under, between*) should be capitalized.

**CAPITALIZATION of the words “Section, Table, and Figure:** Capitalize the word Section when referring to a numbered section title. Also, capitalize the words Table and Figure when referring to a numbered table or figure.

**CAPITALIZATION IN THE EXTREME:** A novice will capitalize every word he or she thinks is important. Every style guide will tell you to only capitalize proper nouns. A proper noun names specific brand names (Oreo, Mastercraft) the name of a person or an organization (John Doe of the Knights of Columbus), the names of now famous documents, (Declaration of Independence, Emancipation Proclamation) or events (Boston Tea Party, Civil War). Proper nouns also include the names of specific cities, states, countries and continents. Furthermore, even though your job title may be capitalized in the company brochure, in your signature line, and on the website introducing you as a faculty member, company vice president, staff secretary or administrative assistant—all of these titles are not capitalized in a general narrative. When placing an event on a company calendar, it’s okay to capitalize the name of that event. If the event has an official name such as the Centralia, Missouri annual Anchor Fest, then by all means, capitalize the name of that event. However, if you are talking about the annual craft fair, and you do not mention its official name, then it is simply a craft fair, not the Craft Fair. The official name of a college or school, building, park, or airport is considered a proper noun. Proper nouns are always capitalized; however, do not capitalize conjunctions (and, or, but), 2–3 letter prepositions (in, of, on, via) or articles (a, an, the) when they are part of a proper noun title. Also, do not capitalize any word that is not a proper noun. Never assume that words supported by acronyms should be capitalized. They usually are not unless they are a proper noun. Product names should always be spelled just as they are advertised (e.g., MATLAB, LABView).

## CAST VS. CASTED

The concrete industry has always referred to the completion of casting as “cast.” It is both the present tense and past tense form. However, if you look to see how cast is conjugated, you will find casted as an alternative past tense form. Grammarist.com has this to say about casted:

“The verb *cast* is conventionally uninflected in the past tense and as a [past participle](#). **Casted** is an old form—examples are easily found in texts from every century from the 14th to the present—but it has given way to *cast* in modern English. In current usage, however, *casted* is gaining ground, especially where *cast* means either (1) *to assemble actors for a performance*, or (2) *to throw out bait and/or a lure on a fishing line*. (Both these senses have extended metaphorical uses where *casted* is likewise used at least some of the time). Many people object to *casted*, but that doesn’t change the fact that it is catching on and not likely to go away soon.” --Grammarist.com (<http://grammarist.com/usage/casted/>)

## CHINESE AUTHOR RESOURCE CENTER AND TAYLOR & FRANCIS GROUP RESOURCES

The **American Journal Experts** have a Chinese Author Resource Center (<http://www.aje.cn/arc/>) written in Chinese with attention to Chinese author concerns. This is a very helpful resource. Do check the AJE website at [www.aje.com](http://www.aje.com) for additional author resources.

The **Taylor & Francis Group** Author Services team have "**How to**" guides on how to become a successful journal author. The following links are still active and are excellent.

- [How to get published](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to get your research read](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to referee](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to submit your article](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to publish your Ph.D.](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to promote your article](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體
- [How to optimize citations to your article](#)  
[English](#) | [Japanese](#) 日本語 | [Korean](#) 한국어 | [Mandarin](#) 简体 | [Traditional Chinese](#) 繁體

## CITING REFERENCES—IEEE STYLE

The following is copied from the 2014 IEEE Editorial Style Manual, p. 34. This is for the benefit of those who use what I call the *numbers in square brackets* form of in-text citations. See ([http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf)). Please note that IEEE uses the Vancouver style of referencing.

*References in Text:* In text-citations referring to the bibliography often appear in square brackets, *inside the punctuation*. Grammatically, they may be treated as if they were footnote numbers, e.g., as shown by Brown [4], [5]. Research can be referred to as a consecutive range of articles or books [4]–[7] or as a single article [9]. Researchers can be the topic of a sentence where Smith [4] and Brown [5] did groundbreaking research or the names can be left out as when [3] led the way in this phase of research according to [4] and [6]–[9]. Notice that an en dash connects this range of numbers [6]–[9]. When only two numbers are involved as in [2], [3], do not use the en dash. Only use when there are three or more numbers [7–9].

*References within a Reference:* Check the reference list for *ibid.* or *op. cit.* These refer to a previous reference and should be eliminated from the reference section. In text, repeat the earlier reference number and renumber the reference section accordingly. If the *ibid.* gives a new page number, or other information, use the following forms:

[3, Th. 1]; [3, Lemma 2]; [3, pp. 5-10]; [3, eq. (2)]; [3, Fig. 1]; [3, Appendix I]; [3, Sec. 4.5]; [3, Ch. 2, pp. 5-10]; [3, Algorithm 5].



**NOTE:** References should appear in the bibliography in the order that they appear in your text. Bracketed numbers are never put in superscript.

**A sentence can begin with a bracketed number as in:** [8] contributed significantly to the development of this research. Donald Wunsch, a professor and an excellent writer at the Missouri University of Science and Technology, offers the following advice:

‘[27] extended this work to apply...’ is preferred over ‘Jones et al. [27] extended this work to apply...’ The reasons for this preference are:

1. Unless one does the latter for all citations, it gets kind of strange deciding which ones get “name” billing and which don’t.
2. The name-dropping distracts from the scientific contribution.
3. It could be mistaken for currying favor or promotion (which it often is).
4. Authors care more about being cited, which is automatically tracked, than whether they are named in the text. So, they will be happy about any citation unless it is unfairly disparaging.
5. The first author often isn’t the driving force behind the research anyway. Often the last author is the famous one, or sometimes alphabetical order is used.”

However, there are two sides to the story. If historical contributions are being emphasized or the author has good reason to actively suggest viewing a particular paper, explicitly mentioning the author(s) by name makes sense. For example, Dr. Wunsch often recommends a 2014 paper by Schmidhuber, Technical Report IDSIA-03-14 / arXiv:1404.7828 v4 [cs.NE], which is replete with author names because of its tutorial and historical nature.

## **CODING ARTICLES**

Coding validates problematic and contradictory material by inserting the following capital letters or symbols at the beginning and end of the sentence or sentences of interest:

**V** for Validating 🍷; **P** for Problematic 🍷, and **C** for Contradictory 🍷.

Every student will have some misconceptions going into their adviser-assigned field of research. There will be surprises, disappointments and rewards as the student submits to instruction. A daily journal allows the student to record their honest reactions to assignments, experiments and results. Such a record will not only represent the student’s journey, but it can also show his or her transformation from a novice to a highly qualified researcher. This should be a personal journal—not shared with anyone. However, sometimes writing down one’s honest reactions will lead to new ideas that the student will be excited to share with others!

## **CODING FOR ATTRIBUTION (ASSURING AVOIDANCE OF PLAGIARISM)**

### **1) Secure with Quotation Marks. Separate with Space.**

Secure copied material by inserting the appropriate quotation marks at the beginning and end of the quotation.

Separate by dropping the quotation down two lines, single spacing that material, and providing a half-inch margin on each side. Put author, date of publication, and page number in parentheses. This is a Chicago Manual of Style (CMS) in-text citation. Follow up in the next paragraph with the full reference in brackets.

“Insert the appropriate quotation marks at the beginning and end of the material and follow with an in-text citation” (Roberts 2016, 7).

[Roberts, C. (2014). *Carla’s Tips on Technical Writing*, internal communication (provided by email on mo/dd/year)]. Putting the full reference in brackets during the draft stage gives you the material you need to build your bibliography when the time comes to do so. Further review may lead you to decide that you don’t want to use the material for the article you are currently writing—but that it might be something you can use in another article. I recommend copying these quotations and sources in a separate document for future reference and saving that

document as “Quotations for Future Research on . . .”

- 2) **My Summary:** In the draft stage—when paraphrasing or summarizing someone else’s information in your own words—you should take the time to code that material prefacing your summary remarks with *My Summary* followed by an in-text citation so you can quickly refer back to the original text (Jones 1995, 84). In this case, you are simply rewording what the author has said.
- 3) **My Thoughts:** When drafting your personal assessment, preface your personal thoughts with the words *My Thoughts*. These are **not** a rewrite of the author’s findings. They reflect your educated opinion of those findings. Sorting symbols (👍 👎 ☠️) can be used to verify your reaction. You will not use them in your final draft, but they will help you shape and reshape your convictions concerning other author’s work as you become more experienced. In the final version, you can say, “This writer approached the problem from a different perspective . . .” or “This author’s research results determined that . . .” or “My research team and I found the traditional method problematic because . . . Our new method improved performance time by 50% and was 30% more cost effective.”
- 4) **Identify the source of the research you are presenting.** Remember that copying someone else’s work and not giving that person credit is called plagiarism. It can cause a student to suffer disciplinary probation and even suspension or expulsion from the university.
- 5) **Checking for Plagiarism:** Several websites offer plagiarism checks. One free one is <http://smallseotools.com/plagiarism-checker/> by Google. Also see <http://iplagiarism.net>.
- 6) **Self-plagiarism:** Once you have published your work with any publisher, it is unethical to use that paper or any portion of it in another submission. The [American Chemical Society](http://www.acs.org) (ACS) tells us in their author instructions (to authors submitting to *Environmental Science and Technology*: “If you wish to reuse a figure or table, you must cite the original publication and, if required, obtain explicit permission from the publisher. Minor modification of a figure or table solely to avoid self-plagiarism is unacceptable. Authors publishing duplicative text, data, graphics, or tables will be banned from submitting to ES&T.”

## COLLECTIVE NOUNS

Unlike mass nouns, collective nouns are things we can count. Oxford Dictionary defines a collective noun as a noun that denotes a group of individuals (e.g., assembly, family, crew). When referring to a group as a unit or a whole, you should precede that noun with “**the**.” The American Legion meets once a month. The PTA is planning a recruitment drive. A collective noun can represent a group of individuals, but it can also refer to a group of things as in a range of numbers, a pair of socks, a dozen eggs, or a series of events. Here, the article a is the correct choice. That is generally the case, but in some cases (as when you are referring to a specific group), a or an should be replaced with **the**: The majority voted to retain their bylaws and **the number** of dissenters were few. This last sentence is referring to a specific group with a specific number of dissenters. Collective nouns take a singular verb when the group as a whole is meant and a plural verb when referring to individuals.

## COLON

The colon is used to introduce a quotation, a list, an equation and its explanation or any other formal explanation. A colon can be used to introduce anything that can be listed.

**Example:** *These items include (but are not limited to): steps, organizations, methods, problems, names, places, events, and rules.*

**Example:** *The most common mistakes in English grammar are: overuse of the word “the,” misplaced commas, and unnecessary capitalization.*

**The above sentences** are also grammatically correct without the colon. Notice that I used an em dash to set off the word, the, in the second example. I could have also used a comma.

**The colon is used in formal writing.** Few people would use a colon to create a grocery list.

**Do not** capitalize the first word after a colon unless it introduces a quotation, a complete sentence or a proper noun.

**Example:** Theodore Roethke's most quoted lines are from *The Waking*: "I wake to sleep, and take my waking slow. I learn by going where I have to go."

**Example:** *Did you actually hear the valedictorian say: "I'd like to thank Google, Wikipedia, Microsoft Word, and Copy and Paste!"*

Do not capitalize the first word of a phrase or incomplete sentence following a colon. Sometimes, a colon is used to set up a surprise as in:

**Example:** *She only wanted one thing for Christmas: a pink motorcycle!*

Numbered or bulleted items following a colon do not have to be placed in sentence format. This is contrary to what I was taught in school. However, times change, and I must change with them.

According to the *Blue Book of Grammar and Punctuation* by Jane Straus: "If each point is a complete sentence, capitalize the first word and end the sentence with appropriate ending punctuation.

Otherwise, there are no hard and fast rules, except be consistent."

**Examples:**

I provide *Carla's Tips on Technical Writing* free of charge to anyone who asks for the following reasons:

- a. I use my tips in the comments I provide when editing.
- b. I want to serve as more than an editor: I also want to be a writing coach.
- c. I want ESL students majoring in the sciences to have a quick, go-to manual for answers to their questions about English words, punctuation, and grammar.

The following features are provided in my tips manual:

- topics arranged in alphabetical order
- extra information on how to organize research
- specialized information for students majoring in engineering

This is what I expect from graduate students:

1. Don't wait until you are finished with your thesis to ask for help with editing.
2. Let me help you on a chapter by chapter basis from the early stages of writing to completion.
3. Give me three to five days to complete the edit.
4. Don't expect a 24-hour turn around for a 100-page thesis!

Salutations also use the colon in formal letters. Hence, Dear Sir: Gentlemen: Dear Members of the Search Committee: and other forms of address requiring a formal approach should use the colon.

For more information about how to use a colon, please see *The Blue Book of Grammar and Punctuation's* rules on this topic at <http://www.grammarbook.com/punctuation/colons.asp>.

## CONCLUSION VS. CONCLUSIONS

When writing a journal article, you will end your paper with your summation of achievements and plans for future research. I have been asked if this should be presented as Conclusion or Conclusions. If you have more than finding to report or more than one closing thought to offer, then the plural form is the best. Most papers have this section titled "Conclusions."

## COMMAS

No one seems to know what to do with a comma! They are sprinkled liberally throughout most documents like too much pepper on scrambled eggs. The following rules will hopefully help you know when to use a comma and when not to.

### COMMAS AND APPOSITIVES

An appositive is a noun or a noun phrase placed next to another noun or noun phrase to define or modify it. An appositive is always set off by commas. Some examples follow:

#### NONRESTRICTIVE VS. RESTRICTIVE APPOSITIVES

**Nonrestrictive** adds information. The information might be helpful or even essential to some for a personal reason—but the sentence can function without it. In the sentence below, the fact that Lucky was my favorite childhood dog is nice to know, but it's not needed to make the sentence complete. The sentence is still a sentence whether that phrase or added information is there or not.

**Example:** Lucky, my favorite childhood dog, loved to accompany me on bike rides.

If we delete the nonrestrictive phrase, we have: "Lucky loved to accompany me on bike rides." This is a structurally sound sentence with a subject (Lucky), verb (loved) and object (rides).

**A restrictive appositive** is necessary to maintain the meaning of the sentence and does not require commas. Usually, a restrictive appositive is essential to the identity of the preceding word (noun) or words (noun phrase). It "restricts" or narrows the meaning of the word it modifies:

**Example 1:** The musician Alicia Keys completed a *Set the World on Fire Tour* in December of 2013 in support of her latest album *Girl on Fire* released in late 2012.

"Alicia Keys" restricts the general term "musician," and *Girl on Fire* restricts the general term "album."

**Note:** Alicia Keys is such a well known musician with such a huge repertoire that the name of her tour and related album are essential to the meaning of the sentence.

**Example 2:** John Grisham's book *A Time to Kill* is one of the most popular novels of our time.

*A Time to Kill* restricts the general term "book." Like Keys, Grisham is prolific. He has written several novels and the title (a restrictive appositive) representing "one of the most popular novels of our time" is essential to the meaning of the sentence.

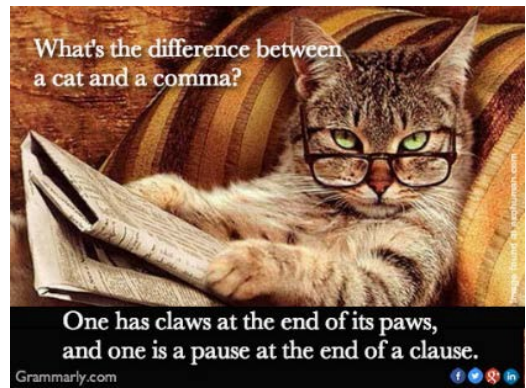
**A nonrestrictive appositive** must be set off with commas because it is naming the **only possibility**. Grisham and Keys had several possibilities when it came to their creative output. If we are discussing an author's specific contributions to his genre, and they represent his or her only contribution as defined—then those titles are nonrestrictive.

**Example 1:** "In 1989, Mikel Dunham published his first mystery novel, *Stilled Life*, followed by its 1992 sequel, *Casting for Murder*."

These titles are nonrestrictive and must be set off by commas. *Stilled Life* refers to his first mystery novel, and *Casting for Murder* refers to his only sequel. The sentence could stand alone without the titles by stating: "In 1989, Mikel Dunham published his first mystery novel followed by its 1992 sequel. The titles are information that most people want to know, but the sentence is structurally sound without them making them nonessential or nonrestrictive. Dunham has written several books but only two mystery novels.

**Example 2:** Dr. Hongbin Ma, director of the MU College of Engineering's Center for Thermal Management, uses nanotechnology to create new ways of cooling electronic devices.

The rather long nonrestrictive appositive refers to Dr. Ma's administrative position. This information is



good to know, but it is not essential to the structural soundness of the sentence. It is a nonessential “nonrestrictive” appositive. It also refers to Dr. Ma’s exclusive leadership position. He is the only director of the Thermal Management Center; therefore, the appositive names the **only possibility** for this position and must be set apart with commas. Remember:

**A Nonrestrictive Appositive** is nonessential because the sentence makes sense without it; hence, it must be set apart with commas because it represents the only possibility.

The nonrestrictive appositive gives us added information (e.g., the name of a book or the title of an administrator). The added information is always helpful and often important to the meaning of the sentence, but the sentence is structurally sound and makes sense without it.

**A Restrictive Appositive** represents essential information and is **not** set apart with commas. The sentence would **not** make sense without it.

**COMMAS IN NONRESTRICTIVE CLAUSES:** Commas **are** used to set off nonrestrictive (*nonessential*) clauses. The sentence would **not** lose its ability to function as a sentence if the nonrestrictive clause or parenthetical phrase were deleted.

**Nonrestrictive Clause Example #1:** The newly appointed professor asked his department chair, *who has had great success in obtaining research grants*, for advice.

The sentence can stand on its own without the clause (who has had great success in obtaining research grants), which merely adds information.

**Nonrestrictive Example #2:** Astronomy, *which is the study of heavenly bodies*, is a fascinating subject. This sentence would still make sense if the clause were removed.

**NO COMMAS ALLOWED IN RESTRICTIVE CLAUSES:** Commas are **not** used to set off restrictive (*necessary or pointing out*) clauses.

**Example:** Only students *who have had an article accepted for publication in the proceedings* will have their trip to the conference paid for.

A restrictive (*no commas allowed*) clause says to the reader: This sentence is about a particular person or group, object or thing and the restrictive clause applies to this sentence’s particular subject—and no other.” No comma is needed in the above nonrestrictive clause because it refers only to students who have had an article accepted for publication—and no other group. **You cannot extract the clause who have had an article accepted for publication in the proceedings without changing the meaning of the sentence.**

**Another Example of a Restrictive Clause:**

We have decided to hire a graduate research assistant *who is familiar with the project*.

In the above sentence, the italicized restrictive clause says we are hiring a particular kind of student—one who is familiar with the project. No other students should apply—not undergraduates and not graduate students who are unfamiliar with the project. Only graduate students familiar with the project should apply.

**RESTRICTING THE FOCUS GENERATES RESTRICTIVE CLAUSES**

You usually use “who” or “that” before a restrictive clause. You do **not** use a comma.

**Example:** Engineering Week organizers ask for posters **that** will spark the interest of visiting high school students.

Only exceptional students can attend conferences **that** offer opportunities for them to win awards based on the quality of their journal articles.

**COMMAS BEFORE PARTICIPIAL PHRASES AT THE END OF A SENTENCE**

A present participle adds *-ing* to a verb (e.g., reading, surveying, building).

A past participle adds *-ed*, *-d*, *-en* or *-t* to the end of a verb (e.g., flipped, taken, said,

broken, kept). This discussion is focusing on the present participles, and our question is:

**Should we place a comma before a participial phrase at the end of the sentence?**

The answer depends on whether the phrase is restrictive or nonrestrictive!

**Nonrestrictive Participial Phrase Example:** Powerful winds delayed our experiment, blowing the biomass away from the staging area.

The above sentence can stand on its own without the participle phrase: “Powerful winds delayed our experiment.” This means the phrase, *blowing the biomass away . . .*, is nonrestrictive or nonessential; hence, the information it adds to this sentence must be set off with a comma.

**Restrictive Participial Example:** A surveillance camera showed the biomass swirling up from the outdoor storage area and across the field.

The participial phrase, *swirling up from the outdoor storage area . . .*, tells us something very specific about what the surveillance camera revealed. This is not extra information. It is essential to the sentence.

**COMMAS—TO USE OR NOT TO USE: THAT IS THE QUESTION!**

The following is an example about a fictitious restaurant chain to be used only as an example. The family-owned restaurant chain, Moxie Tamales, is moving forward with plans for two more restaurants in southwestern Missouri. [The name of the restaurant chain is set off with commas. It is a nonrestrictive appositive, which names the chain.]

Notice in the following examples that subjects have a single underline and their verbs have a double underline.

**Example of a Compound Sentence:** The first restaurant is expected to be operational by 2022, and the second restaurant will begin operation in 2024.

When you take two simple sentences, i.e., independent clauses (which means that each has its own subject and verb) and connect them with the word “and,” you have created a compound sentence. The word “and” is always preceded by a comma in a compound sentence.



**Example of a sentence and its independent clause connected by a semicolon:**

The first restaurant is expected to be operational by 2022; the second restaurant will begin operation in 2024.

If you leave out the word “and,” you can insert a semicolon which takes the place of the word “and” by connecting the two closely related independent clauses. Don’t insert a semicolon unless the second sentence has a close easily understood connection to the first sentence.



**When a Comma is NOT Needed:**

If there is no independent clause after a conjunction (*and* or *or*), do not insert a comma.

**Example #1--**The first new restaurant is expected to be operational by 2022 and the second by 2024. Note the absence of commas here. The verb *is expected* refers to both the first new restaurant and the second. There is no new subject and verb after *and*.

**Example #2--** The drawing on page 2 shows the artist’s conception of Moxie Tamale’s latest new building and includes plans for an outdoor garden and patio area. The subject *drawing* covers the verbs on both sides of *and*; hence, no comma is needed.

## COMMUNITY OF RESEARCH

There are numerous ways you can get acquainted with your community of research. If you are a civil engineer, you can join the American Society of Civil Engineers. There's a professional group for every discipline, and each group has a student membership available for a reduced price. Presenting posters about your research at conferences or submitting articles to a conference's call for papers is another way to increase your publication prowess and become known among your peers. The best way to get known, however, is to have articles about your research accepted by peer-reviewed journals. There are literally thousands of them!

**Elsevier** has 2,721 journal titles which can be accessed by subject area at [http://www.elsevier.com/wps/find/journal\\_browse.cws\\_home](http://www.elsevier.com/wps/find/journal_browse.cws_home).

**Inderscience** has 377 journals covering a variety of STEM and business journals. They invite you to browse their topics at <http://www.inderscience.com/index.php>

**Springer** publishes 2,600 journals for technical writers to choose from; hence, they have a topic search to help authors find the right journal for submission:

<http://www.springer.com/authors/journal+authors/helpdesk?SGWID=0-1723213-12-817204-0>

**Wiley-Blackwell** publishes nearly 1,500 peer-reviewed journals. You can browse their subjects and journal selections at <http://www.wiley.com/WileyCDA/Section/id-302371.html>.

Every discipline has a publisher specifically dedicated to their research.

**Automotive engineers** have several journals to choose from including a few from Elsevier which include the *Journal of Process Control*, the *International Journal of Process Control*, and the *Mechanism and Machine Theory*. SAGE offers the *Journal of Automobile Engineering* and *Journal of Control Engineering*. Inderscience has the *Int. Journal of Vehicle Design* among others.

**Bioengineers** often submit to *Cellular and Molecular Bioengineering*, a Biomedical Engineering Society Publication. See <http://bmes.org/content.asp?contentid=62> for more information about that journal and others. *Frontiers in Neuroenergetics* has several topics at <http://www.frontiersin.org/Neuroenergetics/researchtopics>. The key is to read articles by authors you respect in your field and then look at the reference section to see who they submit to. The possibilities are endless.

The *Journal of Biological Engineering* is the official journal of the Institute of Biological Engineering (<http://www.jbioleng.org/about>) and is published by Springer.

**Civil engineers** look to ASCE, which has 32 journals to choose from. See list at [http://poc.smartlogic.com/demo\\_data/ASCE/pubs.asce.org/journals/index.html](http://poc.smartlogic.com/demo_data/ASCE/pubs.asce.org/journals/index.html).

The International Society for Soil Mechanics and Geotechnical Engineering publishes the *Int. J. of Geoengineering Case Histories*, which is devoted to geotechnical engineering, geotechnical earthquake engineering, environmental geotechnics and engineering geology. This represents the first refereed journal devoted to case histories. See <http://casehistories.geoengineer.org/>

Institute of Civil Engineering (ICE) Publishing also has several journals to choose from. See <http://www.icevirtuallibrary.com/content/journals>.

**Chemical engineers** often rely on the American Chemical Society, which publishes more than 50 journals, lists them at <http://pubs.acs.org/action/showPublications?display=journals>.

With its publishing partner, Wiley-Blackwell & Sons, AIChE publishes the popular AIChE Journal and three other journals which are listed at <http://www.aiche.org/resources/publications/journals>.

**Computer scientists and computer engineers** have the Association for Computing Machinery (ACM), which sponsors a long list of journals at <http://www.acm.org/publications/journals>.

**Electrical and computer engineers** have a preference for the Institute of Electrical and Electronics

Engineers (IEEE), which has more than 154 journals and hosts 1,200 annual conferences. IEEE lists their offerings at <http://ieeexplore.ieee.org/xpl/periodicals.jsp>.

**Industrial Engineers** look to the Institute of Industrial Engineers, which sponsors seven journals that can be accessed at <http://www.iienet2.org/Details.aspx?id=1486>.

**Mechanical engineers** look to the American Society of Mechanical Engineers, which has 26 journals listed at <http://journaltool.asme.org/Content/index.cfm> for a list.

**Nanotechnology engineers** can look to ASME's Nanotechnology Institute for publications at [https://community.asme.org/nanotechnology\\_institute/w/wiki/4212.publications.aspx](https://community.asme.org/nanotechnology_institute/w/wiki/4212.publications.aspx).

**Nuclear engineering students** should consider *Nuclear Engineering and Design* at <http://www.journals.elsevier.com/nuclear-engineering-and-design> as well as *Nuclear Science and Engineering* at <http://www.new.ans.org/pubs/journals/nse/>. There's also *Nuclear Technology* at <http://www.new.ans.org/pubs/journals/nt/>.

**Physics students** examine publications by the American Institute of Physics, which has 18 journals with links to author instructions at <http://journals.aip.org/>. Also authors submitting to Health Physics (HP) and Operational Radiation Safety (ORS) are encouraged to submit manuscripts online through the journal's Web site at <http://hpj.edmgr.com>. *Medical Physics*, aka The International Journal of Medical Physics Research and Practice, has author information at <http://medphys.org/NewInstructions.asp>.

**Astronomy Students** have a number of publications to view including Springer's *Planetary Science* at <http://www.planetary-science.co/authors/instructions> as well as Elsevier's *Astronomy and Computing* at <http://www.journals.elsevier.com/astrophysics-and-computing/> and *Astroparticle Physics* at <http://www.journals.elsevier.com/astroparticle-physics/>.

The previous sources represent a broad overview of the various disciplines in most colleges of engineering. Physics and astronomy are also included. However, the first four publishing companies mentioned, Elsevier, Inderscience, Springer, and Wiley-Blackwell cover most scientific disciplines on both a national and international scale. When reading an article that pertains to your research, look at the references to see who has been cited and note the journals those authors represent. Talk to your colleagues about the best place to send your article, and don't be afraid to send an editor an abstract to see if he or she is interested in publishing your article.

## CONSTRUCTS—THEIR MEANING AND IMPORTANCE

In technical writing, research constructs can refer to images, abstract ideas, or theories. Constructs often seem complex, but are actually made up of a number of simpler elements. Constructs can pertain to the social sciences, psychology, business, engineering, and education. Researchers generally use it to define how well a test or experiment measures up to their expectations. Martyn Shuttleworth explains this concept further in his article on [Construct Validity](#). Click on this link for a good explanation of this concept.

## CONTEXT—ITS MEANING AND IMPORTANCE

Context refers to related information which can tell the reader why the topic is important in light of its interrelated conditions, environment, history or setting. For computer scientists, [A. Dey and G. Abowd](#) of the Georgia Institute of Technology in Atlanta offer a good definition: "Context is any information that can be used to characterize the situation of entities (i.e., whether a person, place or object) that are considered **relevant to the interaction between a user and an application**, including the user and the application themselves. **Context is typically the location, identity and state of people, groups and computational and physical objects.** Another article by [M. DEBES, A. LEWANDOWSKA, and J. SEITZ](#) goes even further in defining context.



## COURTESY TITLES

The APA Style Guide tells us not use courtesy titles such as *Professor, Chancellor, Doctor, or Dr.* on second reference [The Chicago Manual of Style does not address this issue]. The APA Style Guide also tells us to not use *Miss, Mr., Mrs., or Ms.* with first and last names of participants in your proposals or other formal documents. Do not use *Mr.* in any reference unless it is combined with *Mrs.* as in *Mr. and Mrs. James Noble* or *Mr. and Mrs. Noble*.

## CUSTOM-MADE VS. TAILOR-MADE

Custom-made is more applicable to fabricated items in laboratory experiments. Tailor-made is more applicable to clothing and is often used to refer to situations or ideas. See <http://learnersdictionary.com/qa/custom-made-and-tailor-made>

## DASH—EM DASH, EN DASH, OR HYPHEN

An em dash tells the reader to stop—think about what has been said and then go on to concentrate on the material that follows. Notice the difference between a hyphen (-), en dash (–) and an em dash (—). The en dash is best used to indicate inclusive dates and numbers: February 10–12; pp. 26–13. To get the em dash, simply type two hyphens. When you hit the space bar after typing the last hyphen, the dash will automatically take on its full form.

You can also use keystrokes to insert an en dash (Alt+0150) – and to insert an em dash (Alt+0151) —. When using the hyphen, en dash, or em dash, do not put a space either before or after them. The only exception is with a hanging hyphen. For example, the word "nineteenth" in the phrase "nineteenth- and twentieth-century literature" has a space after it but not before it.

## DATA

Data can be either a singular or plural noun, depending on whether the word refers to a collection of data as one unit or whether individual results are implied. However, engineering and other scientific fields usually refer to data in the plural sense and most editors insist on its use as a plural count noun no matter how many units of data are involved. Hence, "the data are compelling."

## DATASETS OR DATA SETS?

Modern day academicians have increasingly showed a preference for *dataset* expressed as one word in technical writing due to the highly complex and very specific nature of their work. However, *data set* is still defined as two words in most dictionaries. The only exception I could find is the MacMillan Dictionary, which defines dataset as: a collection of separate sets of related data that can be dealt with as a single unit by a computer. Data set is defined as an amount of information stored as a file on a computer. I have not found this type of distinction in any other dictionary. At this point, I concede to academia's insistence on dataset as one word.

## DECADES

Many authors refer to past decades or recent decades. This type of writing is too vague. If your literature search covers 1975 to 2015, you can refer to the past 40 years. If you want to refer to one specific decade, do not use an apostrophe when expressing that decade numerically. For example: In the 1970s, nanotechnology was unheard of. You can also say: In the '70s, nanotechnology was unheard of. Nanoscience began in the 1980s with commercial application taking off in the early 2000s.

## DISCUSSION VS. DISCUSSIONS

Discussion is a mass noun which means it can cover many discussions over a long period. Of course, discussion can also be plural (as used in the previous sentence). However, if you look at any peer reviewed journal, almost all of them have a discussion section—and no matter how lengthy or brief, "Discussion," when used as a subtitle, is always singular.

## E (e.g. vs. i.e.)

*e.g.* is Latin for *exempli gratia*, which means *for example*.

*i.e.* is Latin for *id est*, which means *that is, namely, or in other words*.

Both phrases are preceded and followed by a comma when placed in the middle of a sentence.

**et al.** is used in in-text citations when three or more names are given. Do not put any punctuation before or after *et*. However, **always** put a period after *al*. More and more style guides are asking the writer to substitute *et al.* with “and others.” Be sure to find out your style guide’s preference. I italicized *et al.* here for emphasis, but most style guides today ask writers **not** to italicize *et al.*

This editor prefers to see all names spelled out in the reference or bibliography section. However, IEEE says it is okay to use *et al.* in the reference section if there are more than six authors listed in the byline of the publication. Always check the author’s instructions before using *et al.* in any reference or bibliography.

**etc. and so on** stands for *et cetera* meaning literally “and so on.” Some students add “and” in front of “etc.” This is like saying and and so on. This editor discourages the use of *etc.* It is an empty phrase and tells the reader nothing. I would rather see all options or the most important items listed and the “etc.” designation left off. If an item is not important enough to mention, don’t hide it behind “etc.”

## EDITING COSTS

Editing costs vary from service to service. The American Journal Experts pricing can be found at <https://www.aje.com/us/pricing/>. Preferred Copy Editing is way below these costs. We cannot offer all of the services of a larger organization, such as figure formatting, poster preparation, animated figures, custom illustrations and graphing or a video abstract—but we do offer reliable editing of your basic manuscript for \$35 per hour unless it is a proposal. Then it is \$45 per hour. Students are given a discount of \$25 per hour. The last article I edited for a student had 5,520 words. My charge was 4.75 hours @ \$25 per hour or \$118.75. This paper took some extra time because the English was rough and the topic was complex. Most services would charge more.

For example: AJE: For 1501 to 6000 words AJE charges between \$220 and \$425 for 2-7 Business day return service, and more for premium editing, which is 3- 6 days. More information can be found on their website.

Elsevier is one of the most transparent publishers when it comes to the cost of editing. The following prices do not apply to LaTeX documents:” See [http://webshop.elsevier.com/languageservices/languageediting/pages/pricing\\_usd.html](http://webshop.elsevier.com/languageservices/languageediting/pages/pricing_usd.html) for more details.

Word count per manuscript	USD
Up to 500*	\$115.00
From 501 to 1,500	\$255.00
From 1,501 to 6,000	\$285.00
From 6,001 to 12,000**	\$399.00

## EMAIL VS. E-MAIL

The preferred spelling for email leaves out the hyphen. Email was originally spelled with a hyphen after “e” because it represents the word “electronic.” A 2011-2012 search by Google News found that *email* outnumbered *e-mail* six to one. This search pertained to the English-speaking world. However, the non-English world also prefers *email*. See <http://grammarist.com/style/e-mail-email/>.

## ENVISION VS. ENVISAGE

**Envisage** is to picture something in your mind. For a scientist, to envisage is to base one’s preconception on evidence or facts as presented by other scientists. To envisage often refers to

ideas that generate real-world projects such as those ideas envisaged by those participating in a think tank or problem solving committee.

**Envision** is a more hypothetical process and often relies on imagination. Dreamers can envision real-world solutions, but once they start gathering facts for implementation—the concept takes on a more visual form that must be valid, innovative and possible.

## EXPLETIVES

Expletives are defined as 'empty words,' which generally act simply as operators that allow us to manipulate sentences in a variety of ways." (Martha Kolln, *Understanding English Grammar*, 1998). Try to avoid expletives like *there is*, *there are*, *it is*, and *here is*. Also phrases like *it should be noted that* and *according to literature* (without citing references), *as it stands now*, *no doubt* the xx (subject) has . . . , or *it is well known that* . . . are simply taking up space and not telling us anything. Expletives represent a failure to achieve tight, concise writing simply because a sentence can operate very well without them.

## FIGURES AND TABLES

A figure or table is a new presentation to every reader, which always makes it a present tense occurrence. A figure or table can easily serve as the subject of a sentence whereby active verbs like *shows*, *defines* or *illustrates* can draw the reader into the learning experience. One of the best sources of information on how to prepare figures and tables for clarity and usage can be found in Angelika H. Hofmann's book entitled *Scientific Writing and Communication*. Journals will have explicit instructions on how they want you to handle figure placement and formatting. Preparing easy to understand and well defined figures and tables is an important skill in the art of getting published.

## FINDING THE RIGHT PUBLICATION FOR YOUR JOURNAL ARTICLE

There are several content-based recommendation systems designed to help authors find the right publisher to send their articles to. However, a new system has been designed by Renchu Guan of Jilin University in Changchun, China. The new system allows computer science authors to submit their abstract. From that point on, the computer program takes over and will present you with the Top 3 choices or best matches for your work. To access their website, go to <http://ml.jlu.edu.cn/prs/>.

Other recommendation systems such as the ACM Content-based recommendation systems at <http://dl.acm.org/citation.cfm?id=1768209> provide tools for the author to search. The site provided by Dr. Guan is called the Content-based Journals & Conferences Recommender System on computer science, and this site does the searching for you.

There's an interesting site provided by Omics, which recommends journals and conferences based on topics for engineering professors from automobile engineering, material sciences, aerospace engineering, civil engineering, electronic engineering, mechanical engineering, and information technology. That site can be found at <http://www.omicsonline.org/engineering-journals.php>. For authors in the electrical and computer engineering field, other databases of interest can be found at <http://libguides.nwu.ac.za/electrical-engineering-potch/databases>.

## FIRSTLY, SECONDLY, AND THIRDLY – OR – FIRST, SECOND, AND THIRD

Editors generally agree that *firstly* is acceptable, but they still prefer *first* because it is shorter and more commonly used. *Firstly* is more British than American. See Lynch's guide to grammar rule at <https://andromeda.rutgers.edu/~jlynch/Writing/f.html>. Adding the -ly to second, third, fourth, etc. is somewhat archaic. Most style guides prefer that today's writers drop the -ly ending.

## FORWARD SLASH AKA VIRGULE/WHACK/SOLIDUS/SLANT/SEPARATRIX

The forward slash can represent the word *per* as well as *and* or *or*. **Please avoid using the slash.** Technical writing is difficult enough without having to stop and decipher the meaning of a slash. A slash has three principal uses: 1) To separate numbers in dates (9/22/2001), 2) to denote fractions

(½), and 3) to denote the original line breaks in quoted poetry (“So much depends / upon / a red wheel / barrow / glazed with rain / water / beside the white / chickens.” –William Carlos Williams, 1883-1963). These are the original line breaks in the poem as printed in its first publication. Do not use a slash in place of the word *per*. Avoid using expressions such as *and/or*, *he/she*, and *his/her*. Write these terms out instead.

## Greek Letters

### HEADINGS AND SUBHEADING

ALT Codes for Greek Letters		
Alt Code	Symbol	Description
Alt 224	α	Alpha
Alt 225	β	Beta
Alt 226	Γ	Gamma
Alt 235	δ	Delta
Alt 238	ε	Epsilon
Alt 233	Θ	Theta
Alt 227	π	Pi
Alt 230	μ	Mu
Alt 228	Σ	Uppercase Sigma
Alt 229	σ	Lowercase sigma
Alt 231	τ	Tau
Alt 232	Φ	Uppercase Phi
Alt 237	φ	Lowercase Phi
Alt 234	Ω	Omega

These codes are used on a daily basis by most students and professors in the sciences. Many use equation editor or the pull-down Symbols menu to find these Greek letters. All you need is a keystroke. Hold down the Alt key and then type the number to get the code you want.

For a more detailed chart that also contains **ASCII codes**, both HTML character references (decimals) and entity references (symbolic names) if available, go to the Keynote Support webpage at <http://www.keynotesupport.com/websites/greek-letters-symbols.shtml>.

It's amazing how much help can be found online. This site tells us: Not all codes work in all programs. To enter a code, make sure Num Lock is on and press the ALT key as you type the number on the *numeric keypad*. The HTML codes are entered into HTML documents.

### HEADING AND SUBHEADINGS:

Every style of writing has its own way of formatting the topics (headings) and subtopics (subheadings). There are some very good instructions online which will help you use the right outline. Journals usually have their own authors' instructions. Always use those instructions as your guide when writing for a specific journal. Most importantly, when composing your headings and subheadings, make sure they are short, understandable, and parallel.

### HENCE vs. HOWEVER

**Hence** is another way of saying “for that reason.” It tells us why.

“Hence” indicates that you have presented a problem or situation which needs an explanation.

**Example:** My friend is on a gluten-free diet; hence, I will need to explore gluten-free recipes if I am to invite her over for lunch.

**However** is another way of saying, “Wait! We have a problem.” Or, wait! There are other options.

**Example:** I invited my friend over for lunch. However, I am worried about not being able to serve the gluten-free menu needed to make sure she stays on her diet. However can also mean *on the other hand*.

**HIGHLIGHTS AS SPECIFIED BY ELSEVIER** <http://www.elsevier.com/authors/journal-authors/highlights>  
 Elsevier publishes a wide variety of scientific journals. One of their most common requirements is to include highlights. These highlights are an excellent way of telling the reader exactly what the

research article is all about in three to five very concise sentence. They not only help the reader, but they also force the writer to select the most important findings of his or her research. It establishes the focal points around which the whole paper is built. The following is copied directly from the Elsevier instructions:

Highlights are a short collection of bullet points that convey the core findings and provide readers with a quick textual overview of the article. These three to five bullet points describe the essence of the research (e.g. results or conclusions) and highlight what is distinctive about it.

Highlights will be displayed in online search result lists, the contents list and in the online article, but will not (yet) appear in the article PDF file or print.

**Author instructions:** Highlights should be submitted as a separate source file in EES (i.e. Microsoft Word not PDF) by selecting "Highlights" from the drop-down list when uploading files. Please adhere to the specifications below

- Include **3 to 5 highlights**.
- There should be a maximum of 85 characters, including spaces, per highlight.
- Only the core results of the paper should be covered.

**Example** from [Journal of Health Economics, Volume 29, Issue 4, July 2010, 524-535](#)

#### Highlights

- We model two hospitals which have regulated prices and compete on quality.
- We examine changes in the level of information about hospital quality.
- Increasing information will increase quality if hospital costs are similar.
- Increasing information will decrease quality if hospital costs are very different.
- Welfare effects depend on ex-ante or ex-post assumptions about quality information.

More examples can be found at the Elsevier website. The reason for including these highlights in this manual is to encourage technical writers to restrict their topics and learn how to focus on what's important. If you prepare a list of highlights at the beginning of the writing process and incorporate them into an overall outline, you will learn a lot about developing and organizing a research outline and keeping your content focused on your primary objectives.

#### **HYPHENATED MODIFIERS:**

A hyphenated modifier is a compound adjective or adverb created by hyphenating multiple words that work together as one word describing or modifying the word they precede. Examples: real-world applications, over-the-top designs, and word-of-mouth advertising. When using a hyphenated modifier in a title that is set in title case, use the Chicago Manual of Style rules will have you capitalize all words that make up the modifier.

**Example 1:** Missouri Tigers Proved Defenseless Against Tre Mason's **304-Yard, Four-Touchdown** Performance in the SEC Championship Game.

**Example 2:** Heat Transfer Characteristics of the **Jacket-Type** Radial Heat Pipe Without Wick

I used to say the second word in the title-case bold face words above should be set in lower case. Different style guides have different ways of doing some things and rules on hyphenation in titles change. The Chicago Manual of Style is considered a choice guide among engineers, so CMS wins. Their latest 6th edition settled the upper-case issue by changing previous exceptions. The general rule about not capitalizing articles (*a, an, the*) or coordinating conjunctions (*and, but, for, or, nor*) still stands. Most short prepositions are lowercase unless they are the first or last word. Prepositions of more than three letters (*before, through, with, without, versus, among, under, between*) should be capitalized. Their update states: "For titles capitalized headline-style, Chicago now prefers capitalizing the second element in hyphenated spelled-out numbers (e.g., Twenty-Five). And, in general, Chicago no longer recommends making exceptions for short or unstressed words or to avoid the occasional awkward appearance. **8.157–59.**" See [http://www.chicagomanualofstyle.org/about16\\_rules.html](http://www.chicagomanualofstyle.org/about16_rules.html).

## HYPHENATING PREFIXES

Words with prefixes (such as re-, un-, de-, non-, under-, over-, in- and out-) should **not** be hyphenated in your narrative. If you look up the word you want to hyphenate in an article doing a simple Google search, you will not find words like nonlinear and underrepresented hyphenated. Even dictionaries are not hyphenating (or breaking words into syllables) for online patrons. This is due to the automatic hyphenation built into word processing software. However, the un- and non- prefixes are too often hyphenated in the papers I receive for editing. Don't do it!

## HYPHENS WHEN NUMBERS ARE SPELLED OUT

Use a hyphen between the tens and unit number when writing out the numbers twenty-one to ninety-nine in words.

**Example:** Seventy-six trombones led the big parade.

Once numbers are expressed in the hundreds, hyphens are no longer needed.

**Example:** One hundred and ten cornets were right behind.

When a fraction is written out in words, no hyphen is needed.

**Example:** Two thirds of the class left the room immediately when they realized the professor had not shown up.

On the other hand, if the fraction is an adjective—a hyphen is needed.

**Example:** Hence, a two-thirds majority showed a no-tolerance policy for tardiness!

Note that in the last sentence “two-thirds” is an adjective modifying majority.

Sentences do not normally start out with a number expressed in digits. Years are an exception.

1976 was a bicentennial year in the United States. You do not have to write: Nineteen seventy-six was a bicentennial year.

When a number is part of the general narrative—the numbers *one* to *nine* are spelled out. Numbers from 10 up are expressed as modern Arabic numerals.

## IN DETAIL

The phrase "in detail" means: covering every feature or aspect; fully.

Example: "We will have to examine the proposal in detail."

## IN vs. INTO

**Into** and "**in to**" do not mean the same thing. The word "**Into**" leads us into a movement, action or transformation; however, "**in to**" simply means "in order to." When *in* and *to* are used as separate words, they are not a combined phrase. Here are some examples:

**Example #1:** I decided to bring my potted plants **in to** protect them from the forecasted frost.

**Example #2:** I'm hoping all our hard work will transform this old house **into** a sweet cottage that friends will want to visit.

**Example #3:** The higher surface roughness when the Fe<sub>2</sub>O<sub>3</sub> content exceeded 1% was due to the agglomeration of the nanoparticles before they were embedded into the membrane surface.

When the word **into** is used in a sentence where **in to** is meant, the resulting statement can be ridiculous. For example: 1) He turned his timesheet **in to** the supervisor (correct) OR 2) He turned his timesheet **into** the supervisor. In the second sentence, the timesheet is magically transformed into the supervisor! Yikes!

## INSIGHT

**Insight** is formed from the prefix *in-* plus the English word *sight*; hence, the literal meaning is *seeing inward*. For that reason, when you are using **insight** to show how it gave you a deeper understanding, you will usually follow the word *insight* with “into” which tells the reader how the new knowledge enabled you to go into a new level of reasoning making the concept clearer and

more applicable. The Merriam-Webster dictionary gives the following definition with synonyms (which are also defined).

1. the power or act of seeing into a situation: **penetration** (the act of going through or into something);
2. the act or result of **apprehending** (to notice and understand) the inner nature of things or of seeing intuitively.

**Example 1:** A study on cancer rates in twins provided **new insight into** the genetic risk of cancer.

**Example 2:** Experimental investigation of the Hox gene network can provide important insights into the patterns and reasons behind human disease.

It is not wrong to say:

**Example 3:** Research can give new **insights on** the genetic links to cancer.”

**Example 4:** The researchers’ post-grant meeting revealed who had contributed the most useful **insights to** the project.

In both Examples 3 and 4, you are talking about the results (projected (3) and final (4)) of studies in general and how they apply to everyone that is interested. However, when talking about the discovery process of one researcher and his or her discovery on a personal level, “insight into” is always preferred. In fact, “insight into” is the most common usage and will generate the least questions as to its legitimate use.

## **IT—DOES ANYONE KNOW WHAT “IT” MEANS?**

Unfortunately, authors writing very complex articles often begin their sentences with *it*. Even if the definition of *it* is in the preceding sentence, I highly recommend letting the reader know what *it* is by giving the sentence a proper subject and making the meaning of *it* clear from the beginning. Few readers actually read every word of a scientific article. Scholars reading scientific journals will look for keywords. Don’t let “it” keep scanners from finding all of your keywords.

## **JOURNAL ARTICLES—A CAPSULE SUMMARY OF YOUR THESIS**

For student’s, their first journal article is usually based on their thesis. However, this role can be reversed. If you are a good researcher and a good writer (the two go and in hand because they both rely on your organizational skills), you may write your first journal article long before you complete your thesis. The major components of both documents are the same. The difference is in the detail provided and how carefully you restrict your focus. A journal article can summarize the whole process or it can zero in on one aspect of the research project. A poster presentation is an ideal way to capture an outline for your first journal article. You will emphasize what is most important to the point you are trying to get across. All good writing is precise and to the point. The following discusses all the components of both a good journal article and a good thesis.

## **JOURNAL ARTICLE’S OVERALL STRATEGY**

Weixiong Zhang, a professor of computer science and a professor of genetics at Washington University in St. Louis compiled some rules, which this editor feels are simply stellar. See (<http://www.cse.wustl.edu/~zhang/>). His work has been published and can be cited as:

W. Zhang, [Ten simple rules for writing research papers](#), *PLOS Computational Biology*, 10(1):e1003453, 2014.

**Please go to Zhang’s website for a full explanation. His basic rules are:**

- 1) Make it a driving force.
- 2) Less is more.
- 3) Pick the right audience.
- 4) Be logical.
- 5) Be thorough and make it complete.
- 6) Be concise,
- 7) Be artistic
- 8) Be your own judge
- 9) Test the water in your own backyard
- 10) Build a virtual team of collaborators

## JOURNAL ARTICLE'S ABSTRACT

The abstract can introduce what the audience is about to discover in the present tense. However, when you summarize the final deliverable or results in the last sentence or two (the conclusion) you should switch to the past tense showing that the featured achievement was accomplished. Just make sure you can answer the questions below. Abstracts normally have a word limit between 150 and 400 words. A good abstract will answer the following questions in the order presented:

- 1) *What is the purpose of the work?* (Objective and its Importance)
- 2) *What procedures or methods did you use?* (Methodology)
- 3) *What are the key findings?* (Results)
- 4) *What is your Conclusion?* (Value, Applications, and/or Societal Benefit)

The abstract's summation of your methodology is not a step-by-step account. After all, you only have 1-2 sentences to answer each question. You can say you used the Monte Carlo method to achieve your purpose or the Analytic Hierarchy Process decision analysis to compare systems, but in the end, work scope and methodology are separate processes. When writing an abstract, use concise but complete sentences, and get to the point quickly. Use past tense when referring to completed work. Most journals want you to place your abstract in a single paragraph. That paragraph should clearly state the objective and its importance, the method used, key findings, and conclusion so that readers can determine whether the full text will be of interest to them. Write your abstract in easy-to-understand language for a general audience—those who have an interest in your field of study, but who are not experts. Do not include jargon, equations, in-text citations or refer to a figure or table in an abstract.

## JOURNAL ARTICLE'S INTRODUCTION

After the abstract comes the introduction. Here, you introduce your subject and present a condensed literature review.

- Immediately let your reader know why you are writing this article. For example:
  - ♣ “The rapidly decreasing demand for (what?) is triggering important changes in (what?) ” (which your research addresses by doing what?) or
  - ♣ “In this research, we examine . . . , link . . . , and estimate . . . to achieve (what?).
  - ♣ Let the reader know why there is a problem and what you intend to do about it.
- Explain what makes your research different from your peers.
- Define your hypothesis.
- Establish why your research is important?
  - ♣ Does it add a missing piece to a puzzle that needs solving?
  - ♣ Does it address a societal need?

### Journal Article's Introduction Cont.

- Let the reader know what specific void your research fills.
  - ♣ Present the background or context for your paper by establishing the key progress prior to your intervention (mini-literature search featuring only the most important prior research). Show how previous research recognized important variables which laid a foundation for the new research presented.
  - ♣ Show how previous research was limited. Show how previous research recognized the same problem that you are addressing but did not offer a solution.
  - ♣ Read as many articles about your subject as you can find. Look up the sources listed in those articles. Download articles that pertain to your research for future reference. Highlight and code the paragraphs that pertain to your research
  - ♣ Organize those articles in electronic folders. See section entitled “Organizing Your Thesis.



## JOURNAL ARTICLE'S METHODOLOGY

Description should make readers feel as though they could repeat the process themselves if given the chance. The methods section can describe:

- study site,
- study design (controls, treatments, variables),
- protocol for collecting data, and
- how the data were analyzed (name of method used).
- If you have developed a new method—name it! Identify it as your own.

### Results:

- Present results objectively without interpretation
- Stress the key results which provide answers to the questions investigated
- Use tables and figures to illustrate results in an orderly and logical sequence
- Report shortcomings, surprises, and disappointments if applicable.

## JOURNAL ARTICLE'S DISCUSSION

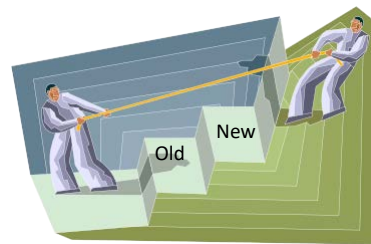
- 1) Do your results provide answers to your testable hypotheses?  
If so, how do you interpret your findings?
  - 2) Do your findings agree with what others have shown? If not, do they suggest an alternative explanation or perhaps an unforeseen design flaw? Answering this question will kick off your more detailed literature review which will:
    - identify a lack of information or inability to solve your chosen research problem,
    - justify the need for more study, and
    - convince the reader that you know what you are talking about because . . .
- ♣ you are an expert in your field (Don't be afraid to cite your own publications!);
  - ♣ you have studied the work of your peers and predecessors (Cite their studies.);
  - ♣ you have tested alternative methods and found them lacking.

## JOURNAL ARTICLE'S LITERATURE REVIEW

### ESTABLISHES FOUNDATIONAL FRAMEWORK

Foundational theories and/or methods help strengthen your research plan and allow you to advance your new theory or method by:

- providing the reasoning behind your research.
- showing how your new methodology can create new opportunities **or** provide a new theory that can advance current research.



### A Literature Review verifies the framework.

- Compares previous interventions and how they apply to your comparatively successful or more successful intervention.
- Compares how traditional practices are carried out and why your practice is exceptional.
- Explains history of practice. Show how tradition can play a part in a theory or method's continuance even when practicality dictates a new direction.

## JOURNAL ARTICLE'S DISCUSSION

- Convince the reader that your research plan will provide a verifiable framework for going forward. You've compared your work with others. Make sure your work stands out:
- Explain advantage of your research and how it could meld with current practices.
  - ♣ Identify biases that might be a hindrance to going forward in your field of research.

- ♣ Let the reader know what still needs to be done and mention any plans for completion.

## JOURNAL ARTICLE'S CONCLUSION

- Ideal opportunity to review the main points
- Do not simply repeat (or copy) the information presented in your abstract.
- Do emphasize the importance of your work or
- Suggest applications and extensions.

## JOURNAL ARTICLE'S ACKNOWLEDGMENT

Some journals want the funding agency to be acknowledged in a footnote on the first page with the final Acknowledgment section reserved for collaborators or persons who contributed significantly with time, in-kind or financial support. Check with journal guidelines to see how the journal you are submitting to wants to handle acknowledgments. Normally, acknowledgments are at the very end of a paper right before the references. If you have an appendix, the acknowledgments will appear before the appendix. The references are always the last item in a research paper or proposal.

## JOURNAL ARTICLE'S APPENDICES

If there is more than one appendix, they should be identified as A, B, etc. Always check author instructions. Appendices may or may not be allowed. If you include tables and figures, be sure to number them beginning with Table 1A and Figure 1A. Do not try to continue the numbering in your main document. Table captions are always placed immediately above the table. Figure captions are always placed immediately below the figure. Note that IEEE prefers the spelling Appendixes.

## JOURNAL'S CALL FOR PROPOSALS

Some journals have a call for papers, e.g., ACM Transactions on Intelligent Systems and Technology (See <http://tist.acm.org/index.php>). ASCE's list is at <http://ascelibrary.org/page/callforpapers>. ASME's list is at <https://www.asme.org/shop/journals/administration/call-for-papers>. However, there are literally thousands of journals out there to choose from. Elsevier, Springer, and Wiley-Blackwell are the leading publishers for scientific journals. See pp. 12–14 of this manual for links to their sites.

## LIE OR LAY?

To lay is to place something (an object) somewhere. To lie is to rest. An electrical engineer might discuss how a major difference between common-source and common-gate configurations **lies** in the value of the input impedance. In this case, the verb *lie* is synonymous with the verb *rest*. The word *lie* is never followed by an object, but it is often followed by a prepositional phrase (*in* the value of). The word *lie* is metaphorical when referring to an inanimate object (a fact or occurrence) *lying* in the result of another fact or occurrence.

The following table shows correct verb form:

Lay vs. Lie

Infinitive Form	Definition	Present	Past	Past Participle	Present Participle
to lay	to put or place	lay(s)	laid	laid	laying
to lie	to rest or recline	lie(s)	lay	lain	lying

**Example of to lay:** The student was asked to lay the book down. It laid there until others complained that it had laid there longer than necessary. It was laying in a place reserved for experiments.

**Example of to lie:** The student chose to lie down in the middle of the floor. He lay (rested) there until others began to complain that he had lain there too long. He was lying down in a place meant for study. (Note that “down” is a preposition. It is not an object.)

## OVERLAY VS. OVERLIE

**Overlie:** One of my clients did an experiment where he overlaid 10 meters of clayey soil over a foundation of weathered sandy slate in vibration tests. **To overlie means to rest upon or lie on top of something. It denotes passive location.** If I were to visit the site, I would want to see the area where the clayey soil “overlies” the sandy slate.

**Overlay:** To overlay means to spread over or across, to lay something on top of something else. It denotes the action of placement.

**Summation:** So if you are talking about a clayey soil that is placidly resting on top of a sandy slate foundation, it is **overlying** the sandy slate, not **overlying** the sandy slate. The heavy equipment operators who moved the clayey soil to the test site and applied it did all of the overlaying.

## MASS NOUNS

Most nouns in English are *countable* meaning they have a singular and plural form. Uncountable nouns do not have a plural form. They are inherently plural because they refer to all of something or to a body of information or group of things. Therefore, they do not need an “s.” Examples of mass nouns are research, literature, grammar, people, equipment, software, freight, furniture, advice, support, information, attention, progress, concrete, dust, energy, and criticism.

## MASTER’S DEGREE/BACHELOR’S DEGREE

Use an apostrophe when referring to master’s and bachelor’s degrees. Notice that the words, *master’s* and *bachelor’s*, are not capitalized. However, the formal degree is capitalized. The formal title of your degree is usually followed by your area of expertise as in Master of Science in Physics. Notice that there is no apostrophe when presenting the formal title. An associate of arts degree or associate of science degree does not have an apostrophe. He is working toward an associate of arts degree. She received her Associate of Arts in Business.

Use uppercase without periods for most abbreviated degrees: AA, AAS, BA, BS, MS, MFA, etc. (Exceptions are Ph.D., B.Tech., Ed.D., M.Arch., and some medical degrees. Note: MD no longer uses periods.)

## MECHANISM

A mechanism in a technical paper should describe the function, appearance, and operation of a device or model. This should be done as concisely and as precisely as possible. If you are talking about a machine, then you must define your invention or modification and state its purpose or operation principle. Your description will depend on your audience. Technical Report Writing.org has a good description entitled [Planning the Mechanism Description](#). Please follow link in title.

**In computer science**, mechanism refers to the functionality of the model or algorithm you have created. It’s breaking down the functional components and explaining each one. Georgios Varsamopoulos, Computer Science Professor at Arizona State University states:

If you describe a distributed algorithm, explain the protocol-specific part (message format, etc.) separately from the semantics and decision-making part of the algorithm. It is both important and useful to provide figures demonstrating the functionality of your solution. Make the figures look similar to the system model figure, if applicable, and exploit the similarities and differences to point out important aspects of your solution. –Varsamopoulos, G., (2004), “[How to Write a Technical Paper: Structure and Style of the Epitome of Your Research](#),” an online article that is brief and easy to understand.

## MODIFIERS—DANGLING AND MISPLACED

**Dangling Modifiers have nothing to modify because their companion word is Missing in Action (MIA):** Conventionally, a participial phrase, prepositional phrase, infinitive phrase, or an appositive phrase modifies the nearest word in the *same* sentence. The same is true for adjectival or adverbial phrases. If that noun appears in an earlier sentence or doesn’t appear at all, the reader will become

confused. This situation is called a **dangling modifier**. In the case of adverbs, adverbs should modify the nearest verb or the subsequent adverb or adjective in the *same* sentence. If not, it also is a dangling modifier. When a phrase does not have a companion word to modify—I classify that phrase's companion or subject as **missing in action!**

**Example 1:** Trying to carry too many packages, my I-Phone fell into a puddle of water. (Was the *I-Phone* trying to carry too many packages?)

Notice that the subject is missing. Who was carrying too many packages?

**Corrected Example:** Trying to carry too many packages, I dropped my I-Phone, which fell into a puddle of water.

**Example 2:** After ordering the wrong chemicals, **the experiment** was doomed to failure.

Once again, the subject is missing. In the above sentence, the experiment ordered the wrong chemicals. The prepositional phrase, "After ordering the wrong chemicals, does not have a proper subject to modify. Hence it becomes a dangling modifier. Who ordered the wrong chemicals?

**Corrected Example:** After ordering the wrong chemicals, I realized that the experiment was doomed to failure.

[http://web.cn.edu/kwheeler/gram\\_dangling\\_mod.html](http://web.cn.edu/kwheeler/gram_dangling_mod.html) has an excellent explanation of dangling and misplaced modifiers.

## MISPLACED MODIFIERS

A misplaced modifier is a word, phrase, or clause that is improperly separated from the word it modifies or describes. If a phrase describes, renames, or elaborates upon a specific word, good writers do two things: 1) They place this modifier immediately beside the word it modifies. 2) They make sure the word being modified actually appears in the sentence!

**Example:** Complaining loudly, her impatience did not help Mary achieve her task more quickly. This sentence suggests that Mary's **impatience** was complaining loudly. Misplaced modifiers can usually be **corrected by moving** the modifier to a more sensible place in the sentence, generally next to the word it modifies.

**Corrected:** Complaining loudly, Mary found that her impatience did not help her achieve her task more quickly.

**Example:** Jason was given a multi-colored neighbor's quilt, also called a crazy quilt because of its haphazard pattern and asymmetrical design.

Hopefully the quilt did not belong to a multi-colored neighbor! Instead, the quilt itself is multi-colored. To rewrite this sentence with the modifier of "quilt" in its correct place, we would say: Jason was given a multi-colored quilt by a neighbor who said it was a crazy quilt because of its haphazard pattern and asymmetrical design.

Several more examples can be found at <http://www.towson.edu/ows/moduledangling.htm>. The most dangerous misplaced one-word modifiers are: *almost, even, hardly, just, merely, nearly, only, and simply*.

**Example 1:** I almost burn the beans every time I cook. (This means that although the beans get really dry before I remember to add water, I manage not to burn the beans)

**Example 2:** I burn almost every pot of beans I cook. (This means I burn more beans than I cook.)

## MINUS SIGN AND MULTIPLICATION SYMBOL

For the minus sign, use keystroke Alt+8722 to get –. For a multiplication symbol, use Alt+0215 to get ×. For an en dash use Alt+0150 for –. For an em dash, use Alt+0151 to get —.

## NIST Checklist

The National Institute of Standards and Technology (NIST) has an excellent [Guide for the Use of the International System of Units \(SI\)](#), which you can download from the title link. This guide is 90 pages, which is why their checklist beginning on p. v is especially helpful. The following check list is intended to help NIST authors review the conformity of their manuscripts with proper SI usage and the basic principles concerning quantities and units. (The chapter or section numbers in parentheses indicate where additional information may be found.)

- (1)  Only SI units and those units recognized for use with the SI are used to express the values of quantities. Equivalent values in other units are given in parentheses following values in acceptable units *only* when deemed necessary for the intended audience. (See Chapter 2.)
- (2)  Abbreviations such as sec (for either s or second), cc (for either cm<sup>3</sup> or cubic centimeter), or mps (for either m/s or meter per second), are avoided and only standard unit symbols, SI prefix symbols, unit names, and SI prefix names are used. (See Sec. 6.1.8.)
- (3)  The combinations of letters “ppm,” “ppb,” and “ppt,” and the terms part per million, part per billion, and part per trillion, and the like, are not used to express the values of quantities. The following forms, for example, are used instead: 2.0 µL/L or 2.0 × 10<sup>6</sup> V, 4.3 nm/m or 4.3 × 10<sup>-9</sup> l, 7 ps/s or 7 × 10<sup>-12</sup> t, where V, l, and t are, respectively, the quantity symbols for volume, length, and time. (See Sec. 7.10.3.)
- (4)  Unit symbols (or names) are not modified by the addition of subscripts or other information. The following forms, for example, are used instead. (See Secs. 7.4 and 7.10.2.)  

V <sub>max</sub> = 1000 V a mass fraction of 10 %	<i>but not:</i> V = 1000 V <sub>max</sub> <i>but not:</i> 10 % (m/m) or 10 % (by weight)
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- (5)  Statements such as “the length l<sub>1</sub> exceeds the length l<sub>2</sub> by 0.2 %” are avoided because it is recognized that the symbol % represents simply the number 0.01. Instead, forms such as “l<sub>1</sub> = l<sub>2</sub> (1 + 0.2 %)” or “Δ = 0.2 %” are used, where Δ is defined by the relation Δ = (l<sub>1</sub> - l<sub>2</sub>)/l<sub>2</sub>. (See Sec. 7.10.2.)
- (6)  Information is not mixed with unit symbols (or names). For example, the form “the water content is 20 mL/kg” is used and not “20 mL H<sub>2</sub>O/kg” or “20 mL of water/kg.” (See Sec. 7.5.)
- (7)  It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity because forms such as the following are used. (See Sec. 7.7.)  

35 cm × 48 cm 1MHz to 10 MHz or (1 to 10) MHz 20 °C to 30 °C or (20 to 30) °C 123 g ± 2 g or (123 ± 2) g 70 % ± 5 % or (70 ± 5) % 240 × (1 ± 10 %) V	<i>but not:</i> 35 × 48 cm <i>but not:</i> 1 MHz – 10 MHz or 1 to 10 MHz <i>but not:</i> 20 °C – 30 °C or 20 to 30 °C <i>but not:</i> 123 ± 2 g <i>but not:</i> 70 ± 5 % <i>but not:</i> 240 V ± 10 % (one cannot add 240 V and 10 %)
---	--

- (8)  Unit symbols and unit names are not mixed and mathematical operations are not applied to unit names. For example, only forms such as  $\text{kg/m}^3$ ,  $\text{kg} \cdot \text{m}^{-3}$ , or kilogram per cubic meter are used and *not* forms such as  $\text{kilogram/m}^3$ , kg/cubic meter, kilogram/cubic meter, kg per  $\text{m}^3$ , or kilogram per meter<sup>3</sup>. (See Secs. 6.1.7, 9.5, and 9.8.)
- (9)  Values of quantities are expressed in acceptable units using Arabic numerals and the symbols for the units. (See Sec. 7.6.)  
 $m = 5 \text{ kg}$  *but not:*  $m = \text{five kilograms}$  or  $m = \text{five kg}$   
the current was 15 A *but not:* the current was 15 amperes.
- (10)  There is a space between the numerical value and unit symbol, even when the value is used as an adjective, except in the case of superscript units for plane angle. (See Sec. 7.2.)  
a 25 kg sphere *but not:* a 25-kg sphere  
an angle of 2°3'4" *but not:* an angle of 2 °3 '4 "
- If the spelled-out name of a unit is used, the normal rules of English are applied: "a roll of 35-millimeter film." (See Sec. 7.6, note 3.)
- (11)  The digits of numerical values having more than four digits on either side of the decimal marker are separated into groups of three using a thin, fixed space counting from both the left and right of the decimal marker. For example, 15 739.012 53 is highly preferred to 15739.01253. Commas are not used to separate digits into groups of three. (See Sec. 10.5.3.)
- (12)  Equations between quantities are used in preference to equations between numerical values, and symbols representing numerical values are different from symbols representing the corresponding quantities. When a numerical-value equation is used, it is properly written and the corresponding quantity equation is given where possible. (See Sec. 7.11.)
- (13)  Standardized quantity symbols such as those given in Refs. [4] and [5] are used, for example,  $R$  for resistance and  $A_r$  for relative atomic mass, and not words, acronyms, or ad hoc groups of letters. Similarly, standardized mathematical signs and symbols such as are given in Ref. [4: ISO 31-11] are used, for example, "tan  $x$ " and not "tg  $x$ ." More specifically, the base of "log" in equations is specified when required by writing  $\log_a x$  (meaning log to the base  $a$  of  $x$ ),  $\text{lb } x$  (meaning  $\log_2 x$ ),  $\text{ln } x$  (meaning  $\log_e x$ ), or  $\text{lg } x$  (meaning  $\log_{10} x$ ). (See Secs. 10.1.1 and 10.1.2.)
- (14)  Unit symbols are in Roman type, and quantity symbols are in italic type with superscripts and subscripts in roman or italic type as appropriate. (See Sec. 10.2 and Secs. 10.2.1 to 10.2.4.)
- (15)  When the word "weight" is used, the intended meaning is clear. (In science and technology, weight is a force, for which the SI unit is the Newton; in commerce and everyday use, weight is usually a synonym for mass, for which the SI unit is the kilogram.) (See Sec. 8.3.)
- (16)  A quotient quantity, for example, mass density, is written "mass divided by volume" rather than "mass per unit volume." (See Sec. 7.12.)
- (17)  An object and any quantity describing the object are distinguished. (Note the difference between "surface" and "area," "body" and "mass," "resistor" and "resistance," "coil" and "inductance.") (See Sec. 7.13.)

- (18)  The obsolete term normality and the symbol *N*, and the obsolete term molarity and the symbol *M*, are not used, but the quantity amount-of-substance concentration of *B* (more commonly called concentration of *B*), and its symbol *c<sub>B</sub>* and SI unit mol/m<sup>3</sup> (or a related acceptable unit), are used instead. Similarly, the obsolete term molal and the symbol *m* are not used, but the quantity molality of solute *B*, and its symbol *b<sub>B</sub>* or *m<sub>B</sub>* and SI unit mol/kg (or a related SI unit), are used instead. (See Secs. 8.6.5 and 8.6.8.)

## NUMBERS

Numbers under 10 are spelled out unless you are dealing with several numbers in a series or explaining an equation or referring to a number-unit combination as in 7 bit or 6 mW. Arabic numerals are used for percentages, decimals, dates, and numbers followed by abbreviations. However, knowing how to handle numbers isn't always easy. Here's a question that took a long time for me to address: Why do so many authors leave out the commas when writing out numbers larger than 1,000? I didn't find out the answer, but I did find out that it's okay! Ben Mudrak in his online article [Editing Tip: Using Numbers in Scientific Manuscripts | AJE | American Journal Experts](#) answered my question:

“Here are two other ways to make sure that your numerals are consistent within your manuscript. Consistency in your formatting choices is one way to demonstrate your attention to detail. Always consult your target journal's style sheet to see what they prefer. When using numbers larger than 1000, be sure to format them all in the same way. For example, *156000*, *156,000*, and *156 000* are all acceptable, but use only one format in your document.”

Please see Dr. Mudrak's entire article for excellent advice on how to handle other problems with numbers.

## NUMBERING LINES

**To add page and line numbers to a Word file for your manuscript/article:**

1. Click the View Tab and use Print Layout view.
2. Click the Insert Tab. In the Header and Footer section, click Page Numbers. Insert page numbers at the top right of each page.
3. Click the Page Layout Tab. In the Page Setup section, click Line Numbers. Select “Continuous.” This will insert continuous line numbering from the beginning to the end of your document.
4. Alternative line numbering format (every 5 lines): Click on Line Numbers and select “Line Numbering Options.” This will open a dialogue box. Click “Line Numbers” in the bottom right corner. A second box will open. Click the “Add line numbering” check box and fill in the following options:
  - > Start at: 1
  - > From text: Auto
  - > Count by: 5
  - > Numbering: Continuous
  - > Click on the “OK” button.
  - > Save your document.

## OPTIMAL VS. OPTIMUM

Optimal denotes the best or most effective, while optimum indicates the amount or degree of effectiveness. (Definition from [The Society of Petroleum Engineers](#) Style Guide, p. 5)

## OVERUSE OF THE WORD “OF”

The word “of” is a reader’s speed bump. When used too many times, it distracts from the flow of thought. Try to put the object or item that “of” refers to in a possessive position whenever possible to avoid overusing “of.” Instead of saying: The overpopulation of the world has led to . . . Try saying: The world’s overpopulation has led to . . . or the world’s population explosion has led to . . .

**Bad Example:** The tools **of** my neighbor became a point of contention due to his continual habit **of** leaving them to rust in various locations **of** our shared property.

**Instead:** The following rewrite completely eliminates the word *of*: My neighbor’s tools created contention due to his insistence on scattering them throughout our shared property and leaving them to rust.

## OXFORD COMMA

The serial or Oxford comma comes right before the conjunction (*and* or *or*) when three or more items are listed in a sentence. For example, “My heart beats true for the red, white, and blue.” American preference keeps the comma before “and.” The British preference is to leave it out. Since most technical articles are prepared for American journals, I encourage you to leave it in. In fact, all of the major style guides including the Chicago Manual of Style, the American Psychological Association (APA) Style Guide, and the Modern Language Association (MLA) Style Manual, say that the Oxford comma should be retained. Only the Associated Press (AP) has discontinued approval of its use. For a wonderful infographic on this subject, see <http://www.onlineschools.com/in-focus/oxford-comma>

## PARALLEL CONSTRUCTION:

Parallel ideas are easier to understand when expressed in parallel grammatical forms. Single words should be balanced with single words, phrases with phrases, and clauses with clauses. Notice in the before and after example below, the improvement that comes when the writer utilizes the consistent use of participles thereby establishing the parallel connectivity needed for sentence flow.

**Before:** The agenda for this month’s meeting **will include** discussion on buying a new steam chamber or fix the one we have. **Attending** the upcoming ASCE conference **will be discussed**, and bids received for the construction of our new lab **have been printed for distribution**.

**After:** This month’s agenda will include discussion on **buying** a new steam chamber or **repairing** the old one, **attending** the February ASCE meeting, and **selecting** the best bid for construction of our new lab.

**Parallel construction** is useful when giving step-by-step instructions. In this case, imperative active verbs give the consistency needed to clarify the methodology behind cashew chicken!

**Combine** soup, soy sauce, and ginger in 4-quart slow cooker. **Stir** in chicken tenders, mushrooms, celery, carrots, and water chestnuts. **Cover** and **cook** on low-heat for 6-8 hours or on high-heat for 3-4 hours. **Stir** cashews in to chicken mixture.

Whether you are writing recipes or technical instructions, using active verbs with the steps listed in order is an example of parallel construction. Notice in the recipe above that it’s not the use of verbs alone that makes this parallel, it’s the fact that every verb is active and in the same imperative tense. Consistency of grammatical form is the key to parallel construction.

## PASSIVE VOICE (IN DEFENSE OF)

The passive voice is indispensable when the action is more important than the doer, when the doer of the action is not known, or when the writer wants to place the emphasis on the recipient of the action rather than the doer. It can also be used to protect the doer!

**Example:** “All my strawberries have been eaten.” This sentence protects the guilty culprit who was asked not to eat all the strawberries. If we want to use the active tense, we simply say: “Jimmy ate all of the strawberries.”



Use the passive voice when the readers do not need to know who or what performed the action.

**Example:** “Dandelion seeds are dispersed in such a way that no lawn can be totally free from them.”



The passive voice is preferable if the performer cannot easily be named or if the performer is irrelevant to the discussion. However, one common problem is authors putting the passive verb at the end of a sentence:

**Example:** In particular, both unsupervised and supervised techniques for automatically scoring disease resistance to southern leaf blight in maize from imagery of important leaves **were developed**.

This sentence does not need “In particular.” It’s long enough, but the main problem is the subject (techniques) and its verb (were developed) are not together. A better rendition would be:

**Better Example:** Both unsupervised and supervised techniques were developed for automatically scoring disease resistance to Southern Leaf Blight in maize by using imagery of important leaves.

#### **THE ACTIVE VOICE—STILL AN OPTION:**

Another approach to writing this sentence is to put the emphasis on the authors. This would allow the use of the **active voice**. If you are writing about someone else’s work, you can say:

**Example:** Jones et al. used imagery of important maize leaves to develop both supervised and unsupervised techniques for automatically scoring disease resistance to Southern Leaf Blight.

You could also say

**Example:** “We used imagery of important maze leaves to develop . . . ”

The use of “we” is commonly seen in journal articles. The third person isn’t always the best choice. Many journal editors are telling their authors that “we” is okay simply because it is too awkward to say “The authors of this article developed both unsupervised and supervised techniques.”

## **PHENOMENON**

A phenomenon is an observable fact or situation, especially one whose cause or explanation is not easily understood. A sense of the extraordinary is usually inferred. Phenomenon is overused in technical writing and should be avoided.

## **PREPOSITIONS**

Prepositions connect or show relationships between nouns or pronouns and their objects. Most show a relationship of *position* (*on, beside, near*). Others show relationships of *reference* or *separation* (*from, beyond, but, concerning*). Prepositions are very difficult for ESL students to master because different prepositions can change the meaning of the same word. For example:

**Differ *with*:** He differs *with* his partner over a matter of importance. In other words, they disagree.

**Differ *from*:** His methodology differs *from* her methodology in many ways. It is different.

**Different *from*:** The written instructions are different *from* those in the book. [Note: Different *from* is preferred. Different *than* was at one time deemed incorrect. The use of *than* with *different* is accepted now, but this editor would still like to ban *different than* from technical writing.

Prepositions are confusing! Consider the use of “**on**” and “**in**.” When a person devotes time to a project they will spend time **on** that project. You would not normally say a person will spend time **in** a project unless you are talking about his or her personal involvement. For example: He became so involved **in** the project that he would often forget to eat. His expertise is **in** aerospace management. There are 150 prepositions. An online English Club provides the [English Prepositions List](#). This site also offers a \$10 [prepositions ebook](#), which is helpful.

## **PRINCIPAL vs. PRINCIPLE**

**A principal** is a person who presides (as in the principal of a school or a **principal investigator** of a research project). Another definition is: capital or property before interest. As an adjective, it would refer to the primary or most important area of interest as in a *principal area of concern*, or *principal objective*.

**A principle** is a rule, truth, or law.

## PROPOSAL REJECTION: NIH LIST OF REASONS WHY

From <http://www.studygs.net/proposal.htm>

**The National Institute of Health (NIH) analyzed the reasons why over 700 research proposal applications were denied. Their findings as to the cause of rejection are worth reviewing:**

1. Nature of the Problem (18%)
  - i. It is doubtful that new or useful information will result from the project (14%).
  - ii. The basic hypothesis is unsound (3.5%).
  - iii. The proposed research is scientifically premature due to the present inadequacy of supporting knowledge (0.6%).
2. Approach to the Problem (38.9%)
  - i. The research plan is nebulous, diffuse and not presented in concrete detail (8.6%).
  - ii. The planned research is not adequately controlled (3.7%).
  - iii. Greater care in planning is needed (25.2%).
    - a) The research plan has not been carefully designed (11.8%).
    - b) The proposed methods will not yield accurate results (8.8%).
    - c) The procedures to be used should be spelled out in more detail (4.6%).
3. A more thorough statistical treatment is needed (0.7%).
  - i. The proposed tests require more individual subjects than the number given (0.7%).
4. Competence of the Investigators (38.2%)
  - i. The applicants need to acquire greater familiarity with the pertinent literature (7.2%).
  - ii. The problems to be investigated are more complex than the applicants realize (10.5%).
  - iii. Applicants propose to enter area of research for which they are not adequately trained (12.8%).
  - iv. The principal investigator intends to give actual responsibility for the direction of a complex project to an inexperienced
    - v. co-investigator (0.9%).
  - vi. The reviewers do not have sufficient confidence in the applicants to approve the present application, largely based on the past efforts of the applicants (6.8%).
5. Conditions of the Research Environment (4.8%)
  - i. The investigators will be required to devote too much time to teaching or other non-research duties (0.9%).
  - ii. Better liaison is needed with colleagues in collateral disciplines (0.4%).
  - iii. Requested expansion on continuation of a currently supported research project would result in failure to achieve the main goal of the work (3.5%).

**Based on the above analysis,** a carefully designed, well-reasoned proposal will overcome these common pitfalls. It also represents an important credibility statement about the investigator.

**More on Proposal Rejection:** [The Bureau of Occupational and Vocational Education conducted a study comparable to the preceding NIH study as to why grant applications are rejected.](#)

Based on a sample of 353 research grant applications:

- |   |   |
|---|---|
| -- 18% forgot to number the pages.                        | -- 25% had no resume for the principal investigator.    |
| -- 73% forgot to include a table of contents.             | -- 66% included no plan for project evaluation.         |
| -- 81% had no abstract.                                   | -- 17% forgot to identify the project director by name. |
| -- 92% failed to provide resumes of proposed consultants. | -- 20% failed to list the objectives of the project.    |

## QUESTION MARK MANIA

Question marks and exclamation points go outside quotation marks only if the entire sentence is a question or exclamation, rather than just the quoted text.

**Example #1** Do you have a copy of “The ACS Style Guide”?

**Example #2:** Her love for her roll-top desk was based on a childhood vision where she said: “Every full moon brought a video of silhouettes; my man in the moon came in a door and sat down at a roll-top desk—he worked for a few minutes and then left; I thought everyone saw him”!

**Example #3:** What do you think of Edvard Munch’s “The Scream”?

If the whole sentence provides a quote that asks a question or makes an exclamation, then the question mark goes inside the end quotation mark. No period is needed after the end quotation mark.

**Example 1:** When his son quit looking for work, the father had to ask: “What are your career goals?”

**Example 2:** My daughter once asked, “If a turtle doesn’t have a shell, is he homeless or naked?”

If a question ends with a quoted statement that is not a question, the question mark will go outside the closing quotation mark.

**Example:** Was it Bill Gates who said: “Be nice to nerds. Chances are you’ll end up working with one”?

### When a Question Ends with an Exclamation Mark

If a question ends with a quotation containing an exclamation mark, the exclamation mark will supersede the question and suffice to end the sentence. Notice that the whole sentence is a question even though it ends with an exclamation point, which means the exclamation point goes outside the end quotation mark. If this were not an exclamatory sentence, the question mark would still be placed outside the end quotation mark.

**Example:** Was it Erma Bombeck who said, “In two decades I’ve lost a total of 789 pounds. I should be hanging from a charm bracelet”!

## QUOTATION MARKS:

### SINGLE vs. DOUBLE QUOTATION MARKS

Single quotations are used when the quoted material inserts another quotation by someone else. For example, if you wanted to submit an article on the history of the Caterpillar Company, you might write:

A Production Technology article about the inventor, Benjamin Holt, tells us, “Company photographer Charles Clements had observed that the tractor crawled like a caterpillar. Holt responded, ‘Caterpillar it is. That’s the name for it!’ ”

Of course you would cite the Production Technology article (<http://www.techdirections.com/Holt.pdf>). Notice that at the end of the sentence you have a single quotation mark after the exclamation mark followed by a double quotation mark indicating the closure of the complete quotation. A thin space was put between the single and double quotation marks to separate and identify and separate both marks. The easiest way to insert the needed space is to insert the letter “l” instead of a space and then change the font color to white after reducing the size of that “l” to the size you think looks best. “Holt responded, ‘That’s the name for it!’ ” There is an “l” inserted right after the single quote; it is sized at 4 pt. Calibri and if you change the font color back to black, that “l” is barely visible.

### COMMAS AND PERIODS *INSIDE* THE END QUOTATION MARKS

The 2014 IEEE Editorial Style Manual (p. 27) states: “Punctuation always goes inside quotation marks, except for the colon and semicolon.” Use single quotation marks around quotes within quotes.

In American writing, one should place commas and periods *inside* the quotation marks, regardless of logic. For example: “Marian,” mom interrupted, “put that book down and help me in the garden.”

This rule applies even when the unit enclosed is at the end of the sentence and consists of just a single word rather than an actual quotation: Staples tells us to press the button marked, “Easy.”

The only *exception* to the placement of commas and periods *inside* quotation marks is when that last

item enclosed in quotation marks is one letter or a number, in which case the period or comma will go *outside* the closing quotation marks: The buried treasure was marked on the map with a large "X".

Remember though, that the above "X" is in quotation marks. If the last item in the sentence is a number in brackets, the punctuation goes inside the quotation mark. The Institute of Electrical and Electronics Engineers (IEEE) Editorial Style Manual (p. 5) at <http://www.ieee.org/documents/stylemanual.pdf>, states: In-text references should appear in square brackets, inside the punctuation, e.g., "as demonstrated in [3]; according to [4]."

## **RADIUS ITS PLURAL FORM**

This Latin word can form its plural by adding –es (radiuses). However, the traditional radii (pronounced ray-dee-eye) is still preferred—especially in technical writing.

## **REDUCED CLAUSES**

Please consider the following cause and effect sentences.

*The more we laughed, the more we cried. The more we tried, the more frustrated we became.*

Each sentence is each made up of two reduced clauses. They represent a correlative comparative in the form of a paired construction. Each clause is syntactically alike and separated by a comma.

Notice that each example of a reduced clause above has a verb on at least one side of the comma. That is not the case in the next sentence.

*The more time spent on the road, the higher the chances of encountering accidents.*

There is no verb in this sentence, which technically makes it a sentence fragment. However, American catchphrases like: "The hotter the oven, the better the pie." or "The sooner, the better" and "The more, the merrier" have given us some liberty in modern-day expressions. Adding verbs in this instance does not clarify. The meaning is obvious. However, I strongly advise against omitting a verb in any other instance. If we want to be grammatically correct, we would say:

*The more time we spend on the road, the higher our chances of encountering accidents become.*

Another acceptable practice would be to make sure at least one verb rests in the beginning clause, while the comparative clause rides on the power of its delivery. In other words, the meaning of the subsequent related phrase is obvious.

*The longer the bridge is out of service, the more congested the detoured traffic.*

## RESEARCH DELIVERABLES

Research is the common bond that unites the goals of editors, advisers and funding agencies. The end results are called research deliverables. Research deliverables are based on what a funding agency wants. These same deliverables can be found in journal articles, theses and dissertations.

Journal articles report the results of successful research. Theses and dissertations are based on research that is either funded by grant agencies or is seeking funding by grant agencies. Journal articles serve to unite the research community by providing updates on advances and needs. In the end, professors, journal editors and funding agencies are interdependent forming a never-ending cycle of requests for research deliverables from the entire research community.

<b>What Journal Editors and Advisers Want</b>	<b>What a Funding Agency Wants</b>
Journal Editors want deliverables in the form of articles on innovative projects that address the interests and needs of their publication. Study their website and follow their authors' instructions. Look for Calls for Papers and study the publications themselves. Read articles about your area of interest with a desire to build your knowledge and your literature survey base.	Funding agencies want deliverables in the form of original solutions to costly national or international problems. Sponsors will sometimes give you more than one research goal (topic) to choose from. Check out agency websites for lists of upcoming solicitations. Give yourself at least two months to prepare any proposal you are interested in applying for.
An adviser expects a student to follow his or her lead in an ongoing research project, which will form the basis of a thesis or dissertation. You may be asked to go to a conference which will require you to write a paper based on your thesis study. This paper will be published in a conference proceedings.	Funding agencies will clearly define their deliverables according to specific parameters in their requests for proposals (RFPs). Read all instructions. If the RFP recommends you read a supplemental grant proposal guide—read it! Not following the rules can result in a proposal returned without review!
Advisers often want their student's research to supplement an award. This can result in a salary or stipend for graduate students.	Multi-disciplinary research and collaboration with industry is essential in today's national and global outreach.

## COMPARING NSF AND NIH CRITERIA

The following discusses the parallel research criteria of the National Science Foundation and the National Institutes of Health, two of the leading US funding agencies for researchers in every field of science. If you have an idea that solves a national problem, has not been done before, is cost efficient, and contributes to your field of research with the potential to change the way things are done—you will get funded.

### **Does it have intellectual merit? (A National Science Foundation Criteria)**

- Does it contribute to the body of knowledge sought after by your community of research?
- Does it provide a potentially transformative concept? (Will it change the way your peers think about your topic? Will it change the way things are currently done because it offers more efficient or more cost effective methods?)
- Does it provide a missing piece to a puzzle that needs solving? Does it strengthen a foundational premise?
- **Does it have broader impacts?** (Another NSF Criteria)  
Does it have societal value? Will it help others? How will your new knowledge be applied to solve real-world problems?
- **Is it commercially viable?** Is it patentable? Can you break down the complexity of your subject to where even a first-year college student can grasp the basic concepts behind what you are doing? Have you discussed commercialization with the university's patent office?

- **Can you get others excited about what you are doing?** Remember that the primary funding agencies for most scientists want you to be able to reach out to K-12 students by creating innovative and exciting experiments, videos, games or any other creative way of catching students' interest. In the U.S., lack of proficiency in science, technology, engineering and mathematics or what is commonly called the STEM subjects has become a national crisis.
- **Always be thinking about ways to simplify your explanation so that it can be understood by the general public.** Your readers are looking for specific information, and for many, English is their second language. A large part of your reading audience is made up of brilliant researchers from all over the world; however, they don't want to have to look up every other word in a dictionary because you are trying to show off your vocabulary. Likewise, they do not want to have to guess at what you are trying to say because you have assumed everyone has a basic knowledge of the protocol that drove your research. Don't leave out essential steps and whenever possible, allow the reader to mentally walk through the process by providing word descriptions that let them visualize what you are talking about.

### CREATING A RESEARCH LOG

Use a Research Log to keep track of when you search, where you search, how you search, what you find, ideas that generate new approaches, and other notes. I recommend keeping one log for online articles and another for print publications. Using Excel frees you from having to worry about page margins. (See sample on next page). The Research Log notes section should have super brief summaries of relevant information. More extensive notes can be made in documents stored in your electronic file.

#### RESEARCH LOG FOR URLS or DOIs

Date & Place	Database (db), Free Internet Site (fs)	DB Service (name & URL), Citation Information, or Site Title & URL	Search Terms or Search Statements	Search Tips	Related Terms	Notes

See [http://www.tarleton.edu/departments/library/library\\_module/unit3/3log\\_lm.html](http://www.tarleton.edu/departments/library/library_module/unit3/3log_lm.html) for more information.

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#### RESEARCH LOG FOR PRINT SOURCES

Author(s) or Editor(s)	Date of Publication or Year of Conference	Title	Name of book, Journal or Conference for Proceedings	Publisher's Name and Location	Edition, Volume, Issue # Page(s)	Notes

The Research Log for Print Sources is of my own creation based on information needed in the bibliography required for all formal research writing. There's nothing more frustrating than to not have an issue number or edition number or some other missing component when you set up your reference section. A research log will force you to fill in the blanks.

## RESPECTIVELY

“Respectively” means in the order given; hence, it defines the order of a series. Putting a comma before “respectively” tells the reader to stop and look at the order of the items just mentioned. There will always be one order of items followed by a second order (usually the parameters of the first items). Always put a comma before the word *respectively*. *Respectively* is usually put at the end of a sentence so the reader can relate the order of the last items to the order of the first items.

**Example 1:** POLYCAT® 5 and POLYCAT® 8 were used as the blowing catalyst and gelling catalyst, *respectively*.

**Example 2:** To facilitate drainage, P5 filter paper (Fisher Scientific) and a nonwoven geotextile were placed on the top and bottom of the sample, *respectively*.

This tells us that the P5 paper was placed on the top and the nonwoven geotextile was placed on the bottom.

**When we have two or more parallel sets of parameters within a single sentence**, to maximize clarity, *respectively* should be placed before the first set of parameters with no comma needed before or after *respectively*.

**Example 3:** The concrete compressive strength, tensile strength and elastic modulus were designed *respectively* as 32.4 MPa, 2.64 MPa and  $3.35 \times 10^4$  MPa for the columns and 29.6 MPa, 2.51 MPa and  $3.45 \times 10^4$  MPa for the shell body.

Notice that the example below is a two-part description where the first sentence uses *respectively* in the traditional sense and ends with *respectively* preceded by a comma. The second sentence uses the parallel rule where *respectively* is placed before two sets of parameters without the comma.

**Example 4:** When one-dimensional coupled heat and moisture transport in concrete has the thickness of  $L$ , the initial temperature and relative humidity are  $T_0$  and  $RH_0$ , *respectively*. Meanwhile the ambient temperature and relative humidity on both sides of the concrete are *respectively*  $T_1$  and  $RH_1$  and  $T_2$  and  $RH_2$ . The values of LM1 and LM2 **are *respectively*** 12.6 nH and 30 nH with chip areas of  $260 \times 260 \mu\text{m}^2$  and  $360 \times 360 \mu\text{m}^2$ .

For more examples, on how to use *respectively*, see ACS discussion at <https://www.aje.com/en/arc/editing-tip-respectively-revisited/>).

### When *respectively* is NOT needed:

**Example:** Kunitz and Roethke both taught at Bennington College in Vermont, ~~*respectively*~~.

The sentence above illustrates a common error. I put a strike through *respectively* because Bennington College is one unit, and there is no comparison based on two places of service or the order of service.

**RESPECTIVE** is an attributive adjective which refers separately to individual items, persons, or groups.

**Example 1:** The decorated eggs went into their *respective* gift boxes and were delivered to all the elementary schools in the area.

**Example 2:** The brothers gave up their *respective* jobs to join forces and start a television reality show.

In this editor’s opinion, *respective* is not needed and like an expletive, the word simply takes up space! You could just as easily say: The eggs were put into different gift boxes and delivered . . .

Or: Each brother gave up his job to . . .

## RESPONDING TO REVIEWERS' COMMENTS

Very few journal articles will be accepted after the first review. Most writers will receive an email asking them to "Revise and Submit." If the reviewers state that the article is not in line with their journal's mission and objectives, then look for another journal! However, always examine reviewers' comments carefully and see if you can improve your paper based on the criticism offered.

When you respond to a journal's review, address each comment separately. Do not be overly condescending. You do not have to praise each reviewer for his or her insightfulness, especially when that reviewer (in your opinion) did not understand what you were trying to say and responded inappropriately! Do thank the editor and reviewers in your cover letter. Let them know that you appreciate the comments and have addressed each one with care and a detailed response to their concerns.

### Responding to Reviewer's Comments:

When you begin your document entitled **Response to Reviewer's Comments**, simply begin each block style (justified) paragraph as follows:

**Reviewer 1 (1<sup>st</sup> Comment):** Copy that reviewer's comment here, and directly underneath the copied criticism, type your response.

**Response:** Be professional and make sure that you don't insult them by inferring that they should have understood what you were saying. Redefine and add any information needed to make sure that no one will misunderstand your intent this time. After your explanation, I recommend copying the revised paragraph into the comment by setting it apart with a ½" left and right margin and a subtitle. Put at least 6 pts of space between your explanation and the next Reviewer Comment:

**Revision as it now appears on page(s) xx.** You can also number the lines of your resubmission and refer to the line numbers.

**Reviewer 1 (2<sup>nd</sup> Comment):** This is simply a continuation of my effort to encourage an easy-to-follow format when creating your responses. Follow the journal's guidelines or editor's instructions for resubmission, and always be thinking about how you can improve your article. No article is perfect.

**Response:** Articles undergo several revisions. A copy editor helps but the honest criticism of co-authors and peers are essential to the success of the final submission.

## SEMICOLONS: CLEARING UP SOME CONFUSION

If you want to go from one independent clause to the other **without** inserting "and," you have to use a semicolon instead of a comma to separate the two thoughts. The semicolon signifies the end of a complete thought (one that contains both a subject and verb); it also tells us that the next complete (independent) thought or clause is closely related to what was just said.

**Example:** The most difficult task in a perennial garden is separating the weeds from the flowers; my cone flowers were falsely identified, and yes, I pulled them—a terrible sin. I will miss them.

You will also use a semicolon when you want to connect two independent clauses wherein the second clause, i.e., the complete thought with its own subject and verb is preceded by an introductory word like "however" or "for example."

**Example:** Learning grammar can be a drawn out and tedious process; however, one cannot claim to be a master of technical writing if they are not willing to master grammar.

**Semicolons** should **not** be used to separate items in a series unless they are separating items that already contain commas.

**Example:** We thank Dr. Yadong Li, Jackson State University, for providing test results; Hongbin Ma, University of Missouri-Columbia, for providing helpful consultation; and Jason Burlage, Gundlach Machine Company, for technical support.



## SI UNITS (SYSTÈME INTERNATIONALE UNITS)

All technical journals want you to use SI units. There are several online sources which list these international units and their meanings. *Système Internationale* (SI) units are the most widely and officially recognized system of metric units. SI units represent the primary system of weights, dimensions, and other physical measures. You can download the NIST [Guide for the Use of the International System of Units \(SI\)](#) from the title link. I have reprinted the checklist in this manual on pp. 25-27. Notice Checklist #10, which tells us to always put a space between the number and the unit.

## SENTENCE FLOW

The natural word order of an English sentence is subject, verb, and direct object. Modifiers, phrases, or clauses crammed between these essential parts make it harder for the reader to understand a sentence.

**Example:** Each corpus, *which is a collection of written or spoken communication used for language research*, includes haptic or tactile data beyond what can be acquired via point-and-touch interface, *and in the population of interest, a new data collection effort was undertaken*.

The italicized phrases above clutter the sentence. They are like boulders in a river—they hinder the sentence flow. The definition of corpus should be given in the introductory material. The last phrase is completely unnecessary. It not only states the obvious, but it also ends with a passive verb (was undertaken). The phrase does not add to the value of the sentence nor does it tell the reader something he or she doesn't already know. The fact that the author had initiated and completed a new data collection effort had already been established as the objective of his thesis. All we really need here is the following:



Each corpus includes haptic or tactile data beyond what can be acquired via point-and-touch interface. Placing the subject at the front of the sentence with its active verb followed by the direct object tells the reader quickly and succinctly the main point. The remainder of the sentence prepares the reader for the material that follows. With a strong topic sentence, the paragraph can now flow.

## SIGNIFICANTLY—WHEN TO USE

Significantly should not be used unless it refers to statistical significance and can be given a *P* value. If you have used it to refer to the value of a concept as it relates to the topic at hand, then consider replacing it with *substantially*, *notable* (or *notably*), or *markedly*.

## SPECIES

Species is both singular and plural. Whether you are talking about one species or several species, the spelling is the same. The only time it is spelled without an “s” at the end (specie) is when it is referring to a form of money, particularly coins.

## SPLIT INFINITIVES

Mignon Fogarty (Grammar Girl) calls the split infinitive rule an imaginary rule that was forced into English grammar during the Victorian age because you could not split an infinitive in Latin. Most grammar experts agree that when a sentence flows well—even when an adverb splits or separates “to”

from its verb—as when Star Trek fans were told "to **boldly go** where no one has gone before," it's okay! See <http://www.quickanddirtytips.com/education/grammar/split-infinitives?page=all>

The split infinitive rule also applies to verbal phrases which thanks to the multi-faceted adverb can tell us how, when, how often, where, and to what extent. This means we can put an adverb between the auxiliary verb and the main verb. For example: The parameters were subsequently measured. Subsequently is an adverb telling when. The students were constantly reminded of the deadline for their assignments.

See Placement Options for Adverbs at [http://www.grammar-quizzes.com/adv\\_split.html](http://www.grammar-quizzes.com/adv_split.html). This site gives an example of a U.S. chief justice who rewrote the presidential oath of office to satisfy the antiquated split infinitive rule. Type "The Inaugural Stumble" in your search engine for the rest of the story.

## STYLE GUIDES

A freelance writer, Sarah Grace Del Rosario, sent me the following URL which provides examples of four of the major style guides. This is a great resource! Sarah is now working as a community outreach personnel at Open Colleges. Thank you Sarah for this contribution!

<http://www.opencolleges.edu.au/informed/teacher-resources/style-guide-resources-mla-apa-cse-chicago/> This link covers the Modern Language Association (MLA) style guide, the American Psychological Association style guide, the Chicago/Turabian style guide and the Council of Science Editors Style (CSE) style guides. There is also an excellent guide to citing government publications at

<http://www.memphis.edu/govpub/citweb.php>. The most important thing for those writing journal articles is to look at the journal's author instructions. Journals often have their own style guide.


For a look at how **all the major style guides** handle the answer to a tricky punctuation question, please visit <http://www.grammarly.com/answers/questions/4726-quotation-marks-and-other-punctuation-inside-or-outside/>

The following publications can provide useful guidance in preparing your manuscript.

- **ACS Style Guide** is in the form of a book, which is an excellent reference and can be purchased on the ACS website, but if you need some quick free help on how to handle in-text citations and references, Williams College Libraries has what you need at <http://library.williams.edu/citing/styles/acs.php>.
- **The Council of Science Writers Handbook** covers the author(s) name-year in-text citation/reference at [http://writing.wisc.edu/Handbook/DocCSE\\_NameYear.html#intext](http://writing.wisc.edu/Handbook/DocCSE_NameYear.html#intext) is the same as the ASCE style guide, which can be found at <http://engineering.missouri.edu/civil/files/asce-author-guide-journals.pdf> and the Harvard style guide which can be found at [http://guides.is.uwa.edu.au/ld.php?content\\_id=13183324](http://guides.is.uwa.edu.au/ld.php?content_id=13183324)
- **The Vancouver style** of citing and referencing can be found at <http://guides.lib.monash.edu/citing-referencing/vancouver>. This editor is very impressed with this aid. However, it is written for writers outside of the US. I added some material to accommodate authors writing for US publications. The entire aid with my additions in red are at the very end of this manual.
- **The IEEE Editorial Style Manual** [http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf) follows the Vancouver style and is a great source.
- **American Mathematical Society. A Manual for Authors of Mathematical Papers.** 8th ed. Providence: American Mathematical Society, 1990. See the official [AMS Website](#) and the [AMS Author Handbook](#) website, which has different rules for different types of publications. Follow the [AMS Author Handbook](#) link to get to all options. To download the guide specifically for journals, go to [http://www.ams.org/publications/authors/tex/Author\\_Handbook\\_Journals.pdf](http://www.ams.org/publications/authors/tex/Author_Handbook_Journals.pdf).
- **The American Medical Association (AMA) Manual of Style** is becoming more and more popular. This involves the use of superscripts, and is similar to the Vancouver style of citing. See

[www.lib.jmu.edu/citation/amaguide.pdf](http://www.lib.jmu.edu/citation/amaguide.pdf). Use commas to separate multiple citation numbers in text, like you see between references 2 and 3. Unpublished works and personal communications should be cited in the text (and not on the reference list). Superscript numbers are placed outside periods and commas,<sup>1</sup> and inside colons and semicolons<sup>2</sup>; when citing the same source more than once, give the number of the original reference, then include the page number (in parentheses) where the information was found.<sup>3(pp41-44)</sup> Other examples are in this manual under SUPERScript NUMBERING—CAN IT BE USED FOR IN-TEXT CITATIONS (see page 38).

Go to [AMA Manual of Style](#) for more information or for access to chapters, go to <http://www.amamanualofstyle.com/view/10.1093/jama/9780195176339.001.0001/med-9780195176339>. For information on subscription, go to <http://www.amamanualofstyle.com/>.

- **American Institute of Physics. [Style Manual for Guidelines in the Preparation of Papers](#)**. 4th ed. New York: American Institute of Physics, 1990. Follow title link to download complete guidelines.
- **[The American Society of Agricultural and Biological Engineers \(ASABE\) Style Guide](#)** may be used for research papers in the fields of agriculture, biochemistry, and biosystems engineering.
- **The American Society of Civil Engineers** has recently updated their author information. They now have an e-book, which can be downloaded on a chapter by chapter basis entitled [Publishing in ASCE Journals: A Guide for Authors](#). The style guide is [Chapter 5 Manuscript Submission and Revision Requirements](#), which can be downloaded at [PDF with Links](#).
- **The American Chemical Society (ACS) Style Guide** is the premier source for Chemical Engineers. Published by the American Chemical Society, it covers the complete range of writing concerns from grammar and punctuation to how to use the International System of Units.
- **The American Society of Mechanical Engineers (ASME)** has all of their information online. A good place to start is <http://journaltool.asme.org/Help/AuthorHelp/WebHelp/JournalsHelp.htm>.
- **The Chicago Manual of Style** (University of Chicago Press) has been a respected source by engineers for many years. There is a humanities CMS style and a sciences CMS style. For the sciences CMS style go to [Chicago Style Quick Guide \(Author-Date References\)](#). This uses the author/year citation and is similar to the [Harvard](#) or [Council of Sciences style guide](#). Be sure to check the journal you are submitting to for their instructions on style guides, which are often found in Author Information Packages on the journals' websites.
- **Elsevier** has an  [Author information pack](#) that is available to all who submit articles to their journals. Be sure to check the author information link of the journal you choose to submit to. It may have a different source. However, all of the articles that I have edited have used this guide up to this point. This is the publisher that requires Highlights. See page 18 of this manual.
- **The Geological Society of America** has a very brief style guide at <http://www.geosociety.org/pubs/geosphere/gsguide4.htm> which is applicable to all of their journals.
- **NIH US National Library of Medicine:** The [International Committee of Medical Journal Editors \(ICMJE\)](#) offers guidance to authors in its publication [Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals \(ICMJE Recommendations\)](#), which was formerly the Uniform Requirements for Manuscripts. The recommended style for references is based on the National Information Standards Organization [NISO Z39.29-2005 \(R2010\) Bibliographic References](#) as adapted by the National Library of Medicine for its databases. Details are in [Citing Medicine](#).
- **National Institute of Standards and of Standards and Technology [Guide for the Use of the International System of Units \(SI\)](#)** has an especially helpful checklist which I am including in this manual, see pages 24-26.
- For assistance with citing US Government reports, standards, and other publications, go to the University of Indiana-Bloomington Libraries' site, [Guide: Citing U.S. Government Publications](#).

They have an online help based on *The Complete Guide to Citing Government Information Resources: A Manual for Writers and Librarians* by Diane L. Gapner and Diane H. Smith.

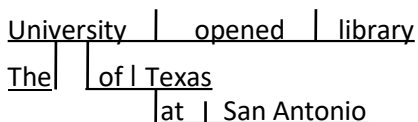
- **The Society of Petroleum Engineers** has a 2015-2016 edition, which can serve as an excellent source of technical writing information for anyone in any discipline. See <http://www.spe.org/authors/docs/SPE-Style-Guide-2015-16.pdf>.
- **Taylor & Francis Group** will tell you to go to the specific journal you are submitting to and look for the author guidelines. I did that and found that they have a very different approach to the Vancouver style than other journals. From author instructions for the [\*Journal of Environmental Science and Health, Part B\*](#): Please cite references in the text by number only superscripted in bracket. At the end of the article, list the references in the order they appear in the text. See example on the next page.

**Example:** Kaufman et al.<sup>[1]</sup> showed that 81% of the nearly 2600 participants had taken one medication in the past week and 25% had taken 5 or more medications. Much of the pharmaceutical dose used therapeutically is not completely degraded in the human body.<sup>[2-3]</sup> Heberer <sup>[4]</sup> showed that indeed, many pharmaceuticals are excreted unchanged or as conjugates of metabolic transformation (e.g. gluconurides, sulfates). Note the reference number citation particularly at the end of sentence.

## SUBJECTS AND VERBS

A sentence is a word or group of words that express a complete thought. Every sentence must have a subject and verb. Without these two components, the sentence is a sentence fragment. Sentence fragments are unacceptable in any kind of writing.

**Example:** The University of Texas at San Antonio opened the nation's first college campus bookless library in 2010.



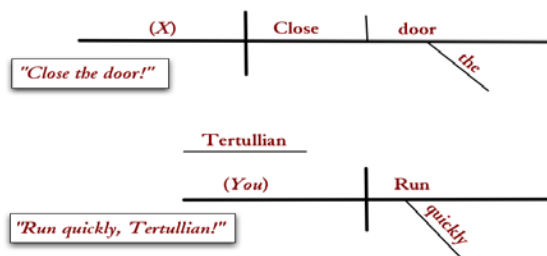
I am not going to diagram the rest of the sentence here because our emphasis is on the subject (University) and the verb (opened).

The only time you **cannot** see the subject in a sentence is when it is the invisible "you."

**Examples:** Jump at your own risk! Don't push the panic button.

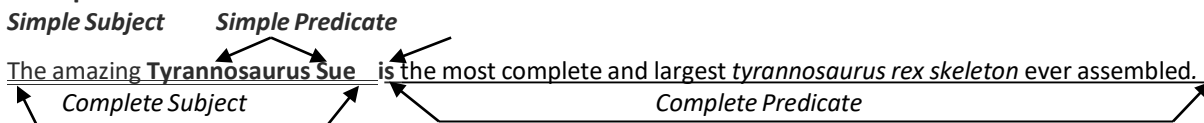
The subject in both sentences is "You." (You) jump at your own risk! Don't (you) push the panic button. An imperative (command sentence) will always have "you" as the subject.

When diagramming a sentence, we would write "(You)" or "(X)" in the subject slot to indicate the subject, whereas the one being addressed (vocative) floats by himself on a separate line. The following is from [http://web.cn.edu/kwheeler/diagram\\_gram03.html](http://web.cn.edu/kwheeler/diagram_gram03.html).



Every sentence has a subject and a predicate. The simple predicate is the sentence's verb. The complete subject is the part of the sentence about which an assertion is made. The predicate describes the subject. Because Tyrannosaurus Sue is the dinosaur's full name, the simple subject is made up of two words instead of one.

**Example 1:**



**Example 2:** The cow jumped over the moon. (Here, “cow” is the simple subject and “jumped” is the simple predicate.)

**SUBJECT-VERB AGREEMENT**

**Basic Rule.** The basic rule states that a singular subject takes a singular verb, while a plural subject takes a plural verb. How can you know whether the subject is singular or plural? *Answer:* Verbs do **not** form their plurals by adding an *s* as nouns do. To determine which verb is singular, ask what **he or she** would say. To determine what is plural use the word **they**.

*Example:* **He** talks—but: **They** talk Therefore, *talks* is **singular**, and *talk* is **plural**.

ESL Help: For students having trouble with verb conjugation (how a verb changes to show a different person, tense, number or mood), Grammarly Handbook has an excellent explanation of how to handle both singular and plural pronouns and the verbs that go with them. See how it delineates the conjugation of *to be* at <http://www.grammarly.com/handbook/grammar/verbs/23/verb-conjugation/>

**SINGULAR PRONOUNS AND GENDER ISSUES**

When a pronoun is the subject of a sentence, that pronoun must agree with the main verb in number. This means you must be able to recognize the singular and plural forms of each pronoun on sight.

	Singular	Plural	These pronouns are always singular	These pronouns are always plural
First Person	I	we	anyone, either, neither,	both, many
Second Person	you	you	anything, everyone, no one,	several, others
Third Person	he/she/ it	they	whatever, what	Few

**Example Problem:** *Everyone on the project (has/have) to come to the meeting.*

There is only one pronoun in this sentence: Everyone. It is acting as the subject of the sentence, so we must check for agreement with the main verb. Referring to the chart above, you can see that the pronoun “everyone” is singular and requires the singular form of the verb, so:

**Answer:** “Everyone on the project **has** to come to the meeting.

**Gender Issues (He or She/ His or Her?)**

The current emphasis on gender neutral wording has led to some writers assigning the universal representative of humanity to a woman. Rather than saying “Each has **his or her** role to play in the success of this team effort,” some will simply say Each has **her** role to play... in an attempt to avoid giving males any false superiority. This is foolish! The subject of humanity has always had its all-encompassing “mankind” to cover both men and women when discussing our common plight. I have never been offended by assigning an unknown subject the masculine gender. When I read, “The traveler checked his map to make sure he was going in the right direction,” I am not offended because the traveler was automatically assigned masculinity. In fact, if the automatic assumption was that the traveler had to check “her” map, I might ask if the author was implying that all women have no sense of direction. It’s really quite silly to have to think about such matters, which makes it tempting to include both males and females by using the plural pronoun “their” with singular subjects like *each, everyone, whoever,* and *anything*. Unfortunately, **that is incorrect**. If the subject is singular, the accompanying pronoun must also be singular. We have to choose. Each has **his** . . . Each has **her** . . . or Each has **his or her** . .

## STORY VS. STOREY

In American English, a single floor or level of a building is called a **story**. Different floors or levels of a building are referred to as **stories**.

In other countries, **storey** is preferred and the plural of the *storey* is **storeys**.

## SUBJECT AND VERB—PLEASE KEEP THEM TOGETHER

Always try to keep your subject and verb together, and *if possible, please* avoid ending your sentence with a passive verb. In the examples below, the subject has a single underline. The verb has a double underline.

**Example:** Challenges in sorghum transformation and possible strategies to overcome some of these challenges are discussed.

**Corrected Example:** This article will address challenges in sorghum transformation and possible strategies to overcome some of these challenges.

To say that this article will address gives this sentence a more direct (and stronger) approach. You can also say “The authors will address . . .”

Journals are also accepting the use of “we” and “I,” but few actually use “I.” See page 48 for further discussion on using the first person in technical writing.

**Example 1:** We finished at the top of the group competing in hard template-based human modeling category and third in refinement prediction, finishing overall in the top 15 at the 10<sup>th</sup> Critical Assessment of Techniques for Protein Structure Prediction competition.

**Example 2:** The MU College of Engineering protein structure prediction team, MUFOLD, finished at the top of the group competing in the hard template-based human modeling category . . .

Giving your team or research project a name when results are ready for publication increases recognition and eliminates the problem of anonymity where team members are hidden behind the all inclusive “we.” In a thesis, team members should not only have a team name, but they should be recognized individually. A thesis is about one member’s research, but if the other members played a part, they should be given recognition for the part they played in getting the research completed.

Keeping your subject and verb together allows the reader to grasp the action immediately and absorb the details later. That’s the natural order of logical thinking. It should also be the natural order of sentence structure.

## SUBORDINATING CONJUNCTIONS:

A subordinating conjunction joins a subordinate (or dependent) clause to the independent clause. Some of the most common subordinating conjunctions are:

after	even if	that
as	even though	though
as if	how	unless
as long as	if	until
as much as	in as much	when
as soon as	in order that	whenever
as though	lest	where
how	now that	wherever
till (or 'til)	provided that	while
although	since	
because	so that	
before	than	

The above list is from *English Plus*, which is an excellent source of grammar help. For a complete explanation and examples, go to <http://englishplus.com/grammar/00000377.htm>.

A **subordinate clause** cannot stand alone because it is completely dependent on the rest of the sentence for its meaning. In engineering papers, this editor often sees the subordinating conjunction “where” capitalized after an equation. Math teachers will tell you that math is a language, and an equation always makes a statement. It is usually introduced by the words “which can be calculated as: (followed by the equation and then continued with the word “where” which continues to explain what the different components of the equation represent. It is all one sentence, and “where” should never be capitalized.

## **SURVEYS AND STATISTICS**

Every university follows a strict protocol regarding contacting participants for a survey and for handling the information you collect. Always contact your university’s Research Office or Office of Sponsored Programs and find out what office can help you with your training. At the University of Missouri-Columbia, the Institutional Review Board handles training for everyone who does any kind of research involving human subjects—including preparing surveys.

The most important measure of success for anyone conducting a survey is to have enough participants respond to their survey for credible results. A good answer to the question: “How many survey participants do I need?” can be found at a very user friendly *Science Buddies* site:

[http://www.sciencebuddies.org/science-fair-projects/project\\_ideas/Soc\\_participants.shtml](http://www.sciencebuddies.org/science-fair-projects/project_ideas/Soc_participants.shtml).

If you are preparing a survey for your thesis or dissertation, make sure you get as much help as possible before creating the survey. Make sure it is approved by your institutional review board and adviser. Most importantly, you should know what is expected from a survey before you begin.

### **SUPERSCRIPT NUMBERS—When and How to Use—That is the question!**

Like most organizations, IEEE uses superscript numbers for footnotes. The IEEE Editorial Style Manual tells us “Footnotes should be numbered in consecutive order throughout the text. The **footnote numbers are superscripts in text and in the actual footnotes.** In text, place the superscript footnote numbers after the punctuation such as periods, commas, and parentheses, but before colons, dashes, quotation marks, and semicolons in a compound sentence. The footnotes should be placed at the bottom of the text column in which they are cited.”

([http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf)). A sample of how numbers appear in brackets and are thereby linked to references in the bibliography is well illustrated in the 2015 IEEE Editorial Style Manual. The IEEE information has been copied and inserted into this manual under **Citing References-IEEE Style**.

### **SUPERSCRIPT NUMBERING—CAN IT BE USED FOR IN-TEXT CITATIONS?**

This was written before adding the Monash University material at the end of this manual. I am leaving it in because it is a simple explanation of how to handle superscript numbering. For me, the differences in the way authors handle superscript citations has been one of the most frustrating parts of my job. The most commonly recognized style manuals do **not** use superscript numbers for in-text citations. However, the practice is becoming more common; hence, we see engineers using the American Medical Association (AMA) style guide, which uses superscript numbers for in-text citations in their articles. AMA sources are numbered consecutively, and refer to the sources listed in the “References” at the end of a paper.

**Examples:** The report<sup>1</sup> found that... As has been noted previously,<sup>2</sup>

This argument was refuted in another study.<sup>3</sup>

Other reports<sup>4,5</sup> confirm these findings. (**Note: Two sources are cited.**)

“...as has been the conclusion of this author.”<sup>6</sup> (**Note: Use after direct quotation.**)

In recent reports<sup>1,3-5,9</sup> surgical outcomes have been...(**Note: Multiple sources cited.**)

You may cite the same source more than once by using the same endnote number. However, when you repeat a number, you should include a page number, in parentheses, next to the note number. The

following example is from <http://library.stkate.edu/citing-writing/ama>. Also see notes on superscripts in the Vancouver Style manual at the very end of this manual.

#### **Example of citation with page number**

Of the respondents, 95% felt that discharge arrangements were adequately explained to them.<sup>4</sup> Further examination of the data in this study revealed other significant discrepancies.<sup>4(p275)</sup>

#### **Example of AMA Reference**

4. Cleary M, Horsfall J, Hunt GE. Consumer feedback on nursing care. *J Adv Nurs*. 2003; 42:269-277.

For more references see

<http://www.amamanualofstyle.com/view/10.1093/jama/9780195176339.001.0001/med-9780195176339-chapter-3>

**TECHNICAL WRITING** is not like writing a mystery novel!

- Let your reader know what your objective is immediately.
- Don't hide facts for a surprise ending!
- Let your heading and subheadings be like mile markers that that assure a safe destination.
- The best destination is a conclusion, which convinces your readers that the trip was worth the journey.
- Write short easy-to-understand sentences. Avoid long introductory phrases. Journal editors hate sentences that look like paragraphs!
- Avoid loading your sentences with prepositions. Strive to make the subject a doer.

**Technical writing says what needs to be said quickly and concisely.**

**Incorrect:** *Successful adoption of a new research protocol for our lab depends on the leadership of our adviser and the cooperation of participants in following the new procedures.*

**Correct:** We will adopt the new research protocol and follow our adviser's instructions.

The incorrect sentence is cluttered with six unnecessary prepositions. In the corrected sentence, the subject "we" performs the action expressed by its verbs: **will adopt** and **follow**.

Overly long sentences are not liked by editors, especially when they are the first sentence of an abstract or introduction. A good rule is to always strive to keep your sentence length down to no more than 30 words. NIH says their ideal sentence has no more than 21 words. What we want, however, is clarity. Popping in extra phrases is like inserting speed bumps. They not only slow us down, they can cause the reader to seek an alternative route if they are too annoying. In other words, if a paper isn't easy to read and understand, it won't get read.

**TECHNICAL WRITING IS NOT OBSCURE VERBOSITY—IT IS INFORMATION!**

Your readers are in a hurry. They want to extract what they need from your article as quickly as possible so they can continue with their own research. Make sure your abstract has the key words that your audience is looking for. The more you are cited, the quicker your name will be recognized as a person of worth—someone who has important ideas to contribute to their community of research.

**Technical Writing Lets the Subject be the Doer and Keeps the Verbs Active**

It is not a sin to use passive verbs. In fact, they are preferred when the action is more important than the person or persons implementing that action. However, a sentence is always stronger and more vibrant when the active voice is used. See section in this manuscript entitled "Passive Voice—In Defense of" and "Voice—Active vs. Passive." I use Grammar Duck in my seminar series. The following slide shows his disapproval of too many words and not enough action!



### Fixing Sentences with Long Abstract Subjects:

The questions that should be answered here are who or what is the true subject.



**Success** in applying the rules of technical writing **is** limited without a means for **understanding** what **is needed** in a formal paper in regard to **setting** a professional tone.

<b>Who are the main characters?</b> (Students)	<b>What is the main action?</b> ( <b>Understanding</b> and <b>learning</b> how to set a professional tone)
---	---

#### Better Sentence:

**Students** cannot **understand** technical writing or **learn** how to set a professional tone without instruction.

Note that the “means for understanding” is “instruction.” This sentence was so convoluted, it had to be rewritten to convey the message more concisely.

### TECHNICAL WRITING CUTS OUT UNNECESSARY WORDS

Removing passive *to be* verbs usually makes the sentence more concise. Don't be afraid to perform surgery on your sentences!

#### Cutting out Expletive Constructions:

An expletive construction involves “there” and “it” followed by a *to be* verb such as *is*, *was*, or *were*. Expletives are considered excess verbiage. Verbiage is speech or writing that contains too many words or that uses words that are more difficult than necessary.

**Expletive Example 1:** *There were* some excellent results to this experiment in social work.

**Corrected Sentence:** The social work experiment produced excellent results.

**Expletive Construction Example 2:** *It was* too hot to get any work done.

**Corrected Sentence:** We could not work in such intense heat.

Notice how giving Example 2 the subject, “we,” allows us to follow up with an active verb “could not work,” and makes for a more interesting sentence.

### TECHNICAL WRITERS MUST CONSIDER THE NEEDS OF THEIR SPECIFIC AUDIENCE

Who are your peers? Will they think your research is important? Can you tell potential readers how your new approach or method it be applied?

- Your peers are those who share your interests. Don't be afraid to broaden your interests because the only certainty in research and technology is uncertainty and change. You will undoubtedly be forced to change your course or at least expand your focus numerous times throughout your career.
- Study the journals which publish articles relating to your research interests –what you are doing and what you would like to do. They will help you discover who the current experts in your field are and will help you keep up with changes, which are a natural part of the research process.
- Always anticipate the question: **So what?** Be prepared to explain why your topic is important.

## TECHNICAL WRITING SHOULD TAKE THE READER ON A GUIDED TOUR

Many writers assume their readers know as much as they do about their research! This simply does not make sense. When key information is left out causing the reader to misunderstand a methodology or research process, then the author is doing one of three things: 1) assuming the reader is as much of an expert in this field as he or she is; 2) skipping steps or 3) failing to introduce the process or concept properly by defining related terms.

**Try taking your readers on a guided tour through the written word.** Assume that you are introducing them to a subject they know very little about. Once you introduce the material, then you can slip into the more technical details. Follow these five steps to create your tour:

1. Define the terms needed to understand the process in your introduction.
2. Show how you handle each step in your process in the order of its occurrence.
3. Enumerate the steps
4. Use language that is understandable to anyone from the undergraduate level on up.
5. Use lots of figures and tables to illustrate your points.

## TECHNICAL WRITING TIPS FROM JOHN OWENS

John Owens, a professor of electrical and computer engineering at the University of California-Davis has written some excellent aids, which include: [Advice to Graduate Students and Researchers](#) and a list of [Common Errors In Technical Writing](#) (many of which are LaTeX specific). In his Common Errors discussion, I particularly enjoyed the following:

**First person, passive voice:** Please write in first person and avoid the passive voice. Academic writing does not have to be stilted and boring. Chicago Manual of Style: "When you need the first person, use it. It's not immodest to use it; it's superstitious not to." Simon Crowley: "Every time you use the passive voice, a kitten is killed by God."

Avoiding the first person used to be considered proper, but now it's considered very formal, if not old-fashioned. It's not a question of correctness, however; both styles are correct. If you feel strongly that the first person is out of place in your work, don't use it. —Chicago Style Q&A, December 2010

—John Owens, *Common Errors in Technical Writing*

## TEMPERATURE: SPACING BETWEEN NUMBER AND DEGREE SYMBOL

Always place a space after the number, as in 24 °C This is recommended by [International Bureau of Weights and Measures](#), which is where SI units began.

## TENSE

When writing about basic principles that are still true, use the present tense. When writing about completed work and observations, use the past tense. When discussing your results, you will use the past tense with phrases like we found or tests showed, new evidence was found, or the sample exhibited. . . (Subject has single underline; verbs have double underline).

The present tense is used for general truths or statements and conclusions (when you form your conclusion in the form of a recommendation). In your conclusion, you might say the authors (or we) recommend or suggest further research in this area and plan to . . .

Many writers use an award's proposal as a springboard for their report or journal article. They are comparing what they said they were going to do (written in future tense) with what was done. In the process, they sometimes transfer (copy) sentences from their proposal to their article without changing the tense. I am truly surprised that this happens so frequently in the manuscripts I read. This tells me that the writer simply got in too big of a hurry.

One pet peeve of this editor is the use of the word *could*. This word implies doubt. If you use it to indicate that success *could* happen if others follow your research plan, you are casting doubt on the results. Replace the word *could* with *can* to show confidence in your results.

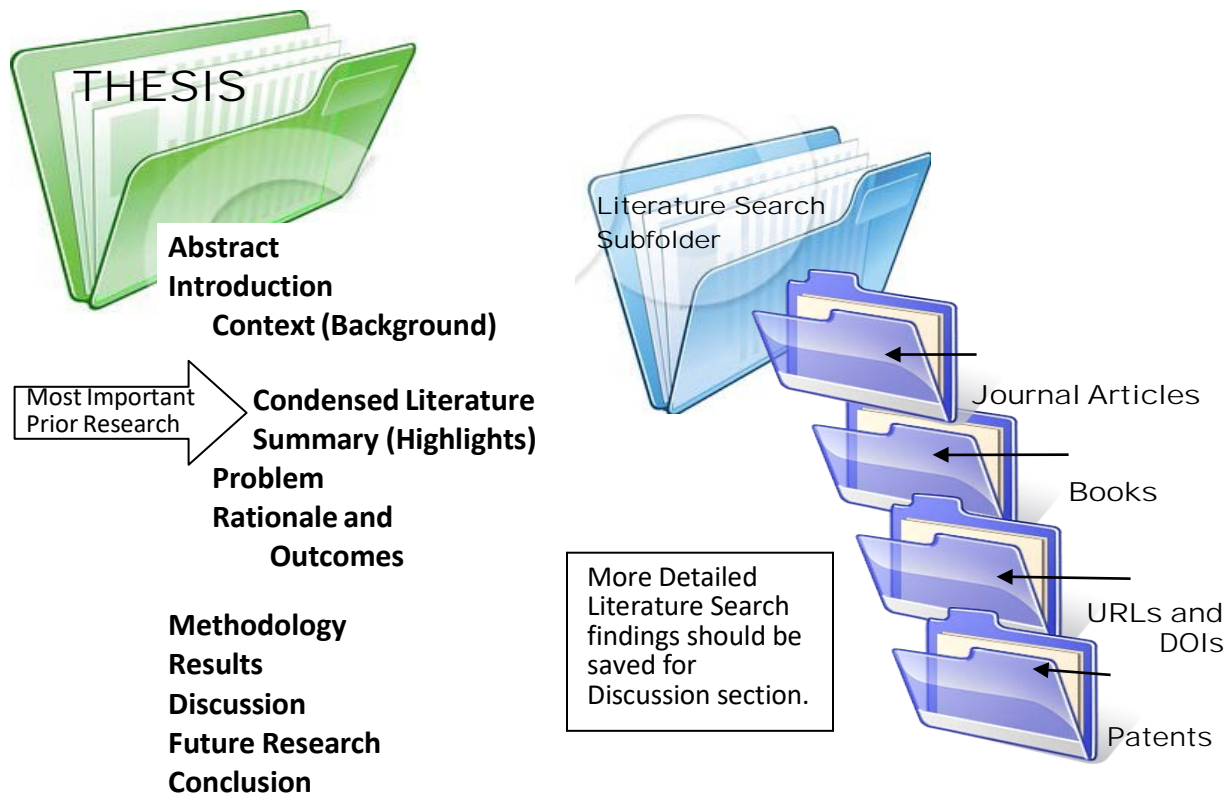
When using a figure or table to illustrate your point, use the present tense, e.g., Figure 1 shows the importance of . . . Table 2 gives the breakdown of . . . Figures and tables are showing readers new information. That makes them present tense occurrences.

## THESIS ORGANIZATION

Organizing what your literature and thesis notes can easily be done through the use of electronic folders (see next page). You can't summarize your work until you have finished it! You have to be able to step back after you have organized all of your thoughts and findings into sections. The sections are ordered according to their appearance in your manuscript; hence the abstract folder is the first folder under the primary thesis folder. However, the abstract will be the last item you complete. It will undergo many revisions before it can be put into its final form. Each folder for each topic will contain your notes and the notes of others. Always summarize everything you read into your own words. These summaries will be the core of your literature search after you have organized and categorized your findings. Many writers create a table of authors whom they refer to throughout their literature search. The following is one example.

Literature Review Summary Table			
Source	Study Description	Purpose	Results
Author(s), year, title as it will appear in your bibliography	Brief Summary of what article is about.	How it applies to your research	Most relevant findings compared to your research.

## THESIS ORGANIZATION



The Literature Search subfolder(s) can feed your thesis or articles throughout your studies. You should put everything that pertains to prior research in these folders, which are subdivided above to fit the types of research you access. You will not necessarily use everything you save, but having instant access to something that wasn't all that important when you first looked at it—but suddenly becomes very important toward the end of your study—will save you a lot of time.

The introduction tells the reader why your research is important. It will also explain what others have done to solve the problem or problems you are studying. That information is shown above as your condensed literature summary. The illustration focuses on the importance of the literature search. The discussion section will include more detailed findings from your literature search.

If you are coming in as a team member on a research project that has been years in the making, and your thesis is covering the progress to be made during your time as a graduate student, then you need to research the history of your project, its motivation and accomplishments. More importantly, you need to define your role in the project and find out early what your adviser's expectations are.

Every journal article is divided into sections. Those same sections are in your thesis—only your thesis will go into more detail as you expand your research and make sure your efforts are worthy of the degree you are seeking.

## TILDE—TO USE OR NOT TO USE

APA rules tell us to: Use tilde (~) to mean *approximately equal to*. It is used by some to indicate a range of numbers, but it is not used for this purpose in most American journals. I advise against using it for this reason.

## TIMELINES AND GANTT CHARTS

Every funding agency wants a timeline for projected tasks. A two-year research project should have quarterly goals and these goals should be easy to follow and illustrated in a Gantt chart or timeline. Free PowerPoint templates can be found online. A brief and easy-to-follow article on using Excel to create a Gantt chart can be found at <http://office.microsoft.com/en-us/excel-help/create-a-gantt-chart-in-excel-HA001034605.aspx>. The following Gantt charts were prepared by Carla to give you a basic idea of what is needed.

### Timeline for Year 1: June 1, 2015-May 31, 2016 and for Year 2: June 1, 2016-May 31, 2017

Year 1: Tasks	Jan.-Mar.	Apr.-Jun.	July-Sept.	Oct.-Dec.
Literature Search, Consortium Planning Sessions				
Preliminary Tests and Analysis of Results				
Data Management Plan and Final Tests				
Analysis of Year 1 Test Results;				
Preparation and submission of Year 1 Report				

### Timeline for Year 2, June 1, 2016-May 31, 2017

Year 2: Tasks	Jan.-Mar.	Apr.-Jun.	July-Sept.	Oct.-Dec.
Preparation of Year 1 Report to Consortium				
Build Prototype				
Plan & hold Conf., Recruit more sponsors				
Write Commercial Plan; Submit Phase II proposal				
Test Prototype, complete and submit final reports				

Work Plan (From mo/dd/yr to mo/dd/yr)	Year 1	Year 2	Year 3	Year 4	Year 5
Task 1					
Subtask 1.1 (General Task name here.)					
Subtask 1.2 (Details in narrative.)					
Task 2					

Don't forget the proposed start date and end date. NSF usually starts funding an award six months after the final proposal due date. Research duration is usually between two and five years. If the application does not say when applicants will be notified of success or failure, allow between 9 and 12 months after proposal submission to establish your start date. The research team should meet to finalize the definition of each person's role and responsibilities. You may not be able use current students due to graduation, but you should indicate that a graduate research assistant or an honors undergraduate student will perform certain tasks. The paragraph on timeline tasks should include a brief overview of each team member's responsibilities.

## TITLES MATTER

The title, abstract, and keywords are the gateway to your research for anyone seeking information on your topic through a literature search. The title is all some people read when determining the value of an article, but most use keywords to find topics related to their areas of interest. The abstract closes the deal. If you can capture your peers' interest with the title, the abstract will determine whether they will purchase your article if they are outside of academia or if they will read it and possibly cite it in their own literature survey.

A title must be descriptive and concise. Short-titled articles generally have higher viewing and citation rates than those with longer titles. Velany Rodrigues in an online article entitled "[How to write an effective title and abstract and choose appropriate keywords](#)" stated:

Good research paper titles (typically 10–12 words long) use descriptive terms and phrases that accurately highlight the core content of the paper (e.g., the species studied, the literary work evaluated, or the technology discussed). —[Editage Insights](#)

Your abstract should contain a strong statement on your research objective or achievement. This is always the “core” of a title. Answer the question: Why is my article important? Think about the research community you are writing for. Don’t assume they have an expert’s knowledge of your topic.

If you want to highlight the value of a new application and the benefit of its results, you will certainly want to mention the name of the catalyst, process, or technology that is novel or innovative.

A title does not have to be a headline—although I personally prefer those types of titles. In other words, you don’t have to have a subject and verb in the lead announcing the discovery. (e.g., CMOS variable gain amplifier improves linearity and lowers power consumption). You can use the label approach which simply states the accomplishment (e.g., “[A high dynamic range CMOS variable gain amplifier for mobile DTV tuner.](#)” The latter title is the one that was chosen and it was able to capture the approval of the editors. It was written for electrical engineers studying ways to improve mobile DTV tuners. This article appeared in the IEEE JOURNAL OF SOLID-STATE CIRCUITS, VOL. 42, NO. 2, FEBRUARY 2007 and was written by Jianhong Xiao, Iuri Mehr, and José Silva Martinez. If you follow the link in the title, you will see that the accomplishments are so many it would be hard to state them in a succinct title.

## TOPIC SENTENCES AND THE PARAGRAPHS THEY INTRODUCE

The first sentence of your paragraph is a topic sentence, and it represents the central idea of that paragraph. Technical articles are complex and tedious to most readers. Readers seldom read every word of an article, but instead, they search for key words pertaining to their particular interest. Every paragraph should encapsulate an idea that can stand on its own. Do not begin a topic sentence with a pronoun. Completely identify the subject. Say what you want to say up front and build on that thought until you are ready for the next concept (e.g., the next paragraph).

**Topic Sentence Success:** A precise concise topic sentence makes a definite assertion or asks a direct question. It contains the key words that give the topic its substance and clearly states the value of the topic. Do not make the reader guess your intention.

**Coherence:** Make sure that your supporting sentences back up and develop the central idea in your topic sentence by providing the needed details. Ask yourself, “Does this sentence do anything to clarify the topic and move my thoughts on the subject forward? If it does not, cross it out or move in to other supplementary information that can be developed into another paragraph. Each sentence should lead naturally to the next. That is what editors call coherence.

**Emphasis:** Your concluding sentence should summarize your topic sentence. Let the reader know the primary fact you want him or her to remember in this paragraph.

## VERB TENSES

As technical writers, you hear a lot about active and passive verbs (see next topic discussion on **Voice—Active vs. Passive**). However, the main thing to remember is that all verbs are grouped into six tenses, which show action (edit, conducts, analyzed) or states of being (I am, you are, he is or they are). Knowing the differences between the **six tenses of English verbs** will give you **six keys to success** in mastering English and getting published. The following is a brief discussion of these tenses—three of which are *simple tenses*. The other three are *perfect tenses*.

### I. SIMPLE TENSES

Simple tense verbs cover three basic time frames: past, present, and future.

1. **Simple present tense verbs** show actions that occur regularly or they are presently occurring. These actions are ongoing.
  - a) We present the results of our lab work in a monthly meeting with our adviser.
  - b) Dr. Liu schedules a trip to a Beijing conference once a year.
2. **Simple past tense verbs** show actions that occurred in the **past**.
  - a) We presented the results of our lab work in this month's meeting with our adviser.
  - b) Dr. Liu scheduled his annual trip to a conference in Beijing.
3. **Simple future tense verbs** show actions that have not yet occurred. These actions will take place in the **future**.

We will present this month's results of our lab work next Wednesday.  
Liu will give the keynote speech at this year's Beijing conference on pipelines.

### II. PERFECT TENSES

The three perfect verb tenses are: Present perfect tense, past perfect tense, and future perfect tense, all of which are formed with the helping verbs *have, has, had, will* and *shall* and the past participle of the verb.

1. **Present perfect tense verbs** show an action or actions that were completed at some point in the past but extend to the present. These use *has* or *have*.
  - a) We have finished the NSF award's planned tasks.
  - b) Several studies on the bond behavior between rebars and concrete have been conducted [15-21].
  - c) There has been low acceptance of combined heat and power (CHP) technology despite its technical and economic potential.
2. **Past perfect tense verbs** use the word *had* and show an action that occurred before a related past event, which may affect or has affected the outcome or status of any related activities that follow. Past perfect tense verbs were once referred to as *pluperfect*, but this term is now obsolete.
  - a) Despite its benefits, the product line has had low acceptance.
  - b) They were asked questions about how their FFA program had grown since the convention.
  - c) He could not take advantage of his pre-planned discount because the offer had expired.
3. **Future perfect tense verbs** show actions that will happen before other future actions happen. These use *will have* and *shall have*.
  - a) By this time tomorrow, we will have completed the race.
  - b) According to this training program agenda, I shall have mastered the national lab's software by September 22nd and will be ready to set up training in my department lab for immediate implementation.

### III. PROGRESSIVE OR CONTINUOUS VERB FORMS

Both simple and perfect verb tenses can be made into *progressive* verb forms also known as *continuous* verb forms. They show an activity that is happening now or is ongoing. To form this type of verb, you add the present participle form of a verb (ending in *-ing*) to a "to-be- verb," e.g., *is, am, are, was, were, be, being, and been*. The following shows the different progressive verb forms for the first person plural pronoun "we" with the present participle "studying."

- a) We are studying. (present progressive)
- b) We were studying. (past progressive)
- c) We will be studying. (future progressive)
- d) We have been studying. (present perfect progressive)
- e) We had been studying. (past perfect progressive)
- f) We will have been studying. (future perfect progressive)

### IV. REGULAR VERBS

These verbs do not represent different tenses, but they are important. Verbs that add *-d* or *-ed* to form the past tense are regular verbs. Sample sentences with regular verbs follow: He *finished* the course. He *showed* the class how to calculate radian angles. She *graduated* with honors. She *distributed* the samples.

### V. IRREGULAR VERBS

An irregular verb is irregular because it does not take the *-ed* ending. [USEnglish.com](http://www.usenglish.com) is an excellent guide for ESL students. Their definition of the word *irregular* notes that: "Some irregular verbs do not change; e.g., *put, put, put*, while others change completely. See *buy bought, bought* and how it is conjugated at <http://conjugator.reverso.net/conjugation-english-verb-buy.html>.

### VI. FUTURE PROGRESSIVE TENSE

These verbs indicate ongoing or continuing action. They can indicate that something will happen in the future. This tense uses the modal "will" plus "be," plus the present participle of the verb (with an *-ing* ending): "I will be voting in the election. Current events indicate that Hillary Clinton will be winning the spot as the nation's first woman president." (Entry made 10/10/2016).

For a more extensive discussion of irregular verbs, please go to <http://www.usenglish.com/glossary/irregular-verb.html>. Another great source, [Grammar Revolution](http://www.english-grammar-revolution.com/verb-tenses.html). Their lesson on verb tenses can be found at <http://www.english-grammar-revolution.com/verb-tenses.html>. It's **fun** and easy to understand. Also see [http://grammar.ccc.commnet.edu/grammar/tenses/present\\_progressive.htm](http://grammar.ccc.commnet.edu/grammar/tenses/present_progressive.htm) for some basic illustrations of auxiliary verbs.

### VOICE—ACTIVE vs. PASSIVE

In a sentence that utilizes the active voice, the subject performs the action.

**Example 1:** Fire destroyed the storage building.

**Example 2:** The assistant mailed the letter.

A sentence using the passive voice shows the subject being acted upon. The passive voice is often used in scientific writing and is not only acceptable but unavoidable when the action is more important than the actor.

**Example 1:** Prototypes were designed with an emphasis on portability and cost efficiency.

**Example 2:** The device was built on a glass substrate with gold electrodes.

The passive voice is often used when the actor is unknown, unimportant, or in some instances, in need of anonymity for protection.

**Example 1:** Mistakes were made. (This protects the persons responsible for the mistakes.)



**Example 2:** Area schools were closed due to the snow. (The names of the administrators who announced the closings are not relevant. Furthermore, since this is past tense, the urgency in knowing what schools were closed is gone.)

## **WE OR I—IT'S OKAY TO USE THE FIRST-PERSON PLURAL IN A SCIENTIFIC PAPER!**

Students writing their thesis often use “we” to describe the teamwork behind their research. This can give anonymous credit to a group when, in fact, the work discussed is one person’s work. The person who did the work should get the credit.

The use of the first person “I” is not as common as “we.” It’s okay to say “I” did it! Thesis writers are especially cautious about using “I,” but they often overuse “we,” and they fail to mention who “we” is!

If you want to mention your team by saying “We determined that . . .,” please define who that team is. I recommend introducing those who helped you develop the research at the beginning of the thesis or dissertation. This is not necessary in journal articles where authors are clearly defined in the byline.

In 2011, David M. Schultz, a Professor of Synoptic Meteorology at The University of Manchester, wrote a [blog](#) featuring his book on how to become a better scientific writer stating that first-person pronouns are acceptable in limited contexts. Schultz states:

In *Eloquent Science* (pp. 76-77), I advocate that first-person pronouns are acceptable in limited contexts. Avoid their use in rote descriptions of your methodology (“We performed the assay...”). Instead, use them to communicate that an action or a decision that you performed affects the outcome of the research.

NO FIRST-PERSON PRONOUN: Given option A and option B, the authors chose option B to more accurately depict the location of the front.

FIRST-PERSON PRONOUN: Given option A and option B, we chose option B to more accurately depict the location of the front.

Schultz then provided some quotes from other writers who expressed their opinion on this matter. Only one author disagreed with using I or we (Hans F. Ebel in *The Art of Scientific Writing*). Most of the quotes that Schultz shared are as follows:

“Because of this [avoiding first-person pronouns], the scientist commonly uses verbose (and imprecise) statements such as “It was found that” in preference to the short, unambiguous “I found.” Young scientists should renounce the false modesty of their predecessors. Do not be afraid to name the agent of the action in a sentence, even when it is “I” or “we.”” — *How to Write and Publish a Scientific Paper* by Day and Gastel, pp. 193-194

“Who is the universal ‘it’, the one who hides so bashfully, but does much thinking and assuming? “*It is thought that...* is a meaningless phrase and unnecessary exercise in modesty. The reader wants to know who did the thinking or assuming, the author, or some other expert.” — *The Science Editor’s Soapbox* by Lipton, p. 43

“I pulled 40 journals at random from one of my university’s technical library’s shelves.... To my surprise, in 32 out of the 40 journals, the authors indeed made liberal use of “I” and “we.” — *Style for Students* by Joe Schall, p. 63

Schultz summarize this topic by saying: Thus, first-person pronouns in scientific writing are acceptable if used in a limited fashion and to enhance clarity.

## WHICH OR THAT?

**Which:** A phrase beginning with *which* may be essential to what you are trying to say. However, if the sentence is structurally sound with a subject and verb preceding the additional information provided by “which,” then the clause beginning with *which* is not essential, which makes it nonrestrictive.

For example: I love my amethyst necklace, which was given to me on my 40<sup>th</sup> birthday.

The subject (I) and verb (love) along with the object (necklace) makes this sentence complete in the sense that it can stand alone without any added information. The fact that it was given to me on my 40<sup>th</sup> birthday is nice to know, but it is not essential to the construction of the sentence.

**That:** If you have a phrase that specifically restricts some other part of the sentence—so much so that the meaning of the sentence would change without it—then the relative pronoun, *that*, is needed

For example: The amethyst necklace that my daughter gave me was stolen last month.

It wasn't just any necklace (nonrestrictive), but the necklace “that” my daughter gave me (restrictive).

See pp. 9-10 of this manual for more information on restrictive and nonrestrictive clauses and when to use *which* and *that*. Also see <http://www.grammarbook.com/grammar/whoVwhVt.asp> and [http://www.kentlaw.edu/academics/lrw/grinker/LwtaThat\\_Versus\\_Which.htm](http://www.kentlaw.edu/academics/lrw/grinker/LwtaThat_Versus_Which.htm) for rules on when to use *which* and *that*.

## WIDOWS AND ORPHANS

**Widow:** You will often see where a paragraph extends to the next page. The paragraph's last line goes forward to the beginning of the following page or column and is separated or “widowed” from the rest of its text. This separation is called a widow. Like a widow in the true sense of the word, it continues to support its family (the paragraph) and completes the paragraph's work after the separation.

**Orphan:** When the first line of a new paragraph heading appears by itself at the bottom of a page or column—then that line is called an orphan. A word, part of a word, or a very short line which is separated from the rest of the paragraph it is related to is called an orphan. The orphan then is left behind until you move it to the next page so it can join its related text.

Orphans are always at the bottom of the page. Widows always complete their discussion in one line at the top of the next page. Orphans should be avoided. Keep the paragraphs with their subheadings together on one page or the other.

## WRITER'S BLOCK AND THE FIVE Ws

Every investigative reporter is taught to ask the five Ws—who, what, why, when, where—as well as how. A good researcher is designated as the principal investigator of funded projects. Every good investigator knows how to ask questions and find the answers. To solve the writer's block dilemma, make sure you have asked all the questions that can be asked pertaining to the topic you are pursuing. Assume the role of an investigative reporter by answering:

- **Who** established the foundational theories of my research?
- **Who** are the experts?
- **Who** else is seeking to accomplish the same mission with different methods?
  - **What** are they doing?
  - **What** am I doing that's different?
  - **What** am I bringing to my research community that is new or valuable or potentially transformative?
  - **Why** is my research important?
  - **Why** are my methods better than others?
  - **What** journals will I review this week as I perfect my literature search?

## WRITING OUT DESCRIPTIONS of EQUATIONS AND OTHER NUMERICAL TOPICS

Notice that IEEE puts a space between the number and its unit. This is demonstrated in their discussion of hyphenating compound adjectives. The following is copied from the 2014 IEEE 2014 Style Manual available at [http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf)

“Numbers and units used as compound adjectives may be hyphenated only if needed for clarity: 10-kV voltage, 5-in-thick glass. Do not insert a hyphen when they are not used as adjectives: a current of 2 A, a line 4 in long, a length of 3.05 mm.”

The **minus sign** – is a little higher than an en dash –. **Type Alt + 8722** to get the minus sign. If that does not work, you can also go to the Insert tab icon, choose Symbol, then More Symbols and **type 2212 in the Character Code box**.

Notice the difference between a hyphen (-), en dash (–) and an em dash (—). For the minus sign, use keystroke Alt+8722 to get –. (See page 14 for dash keystrokes and discussion on the different types of dashes). It is important to use the correct marks. When using any kind of dash, do not put a space before or after the mark.

**Nonbreaking Spacing:** When a line is justified, it often stretches out spaces to accommodate the block style paragraph. This often separates the parts of an equation by splitting it from one line to the next. To prevent that, when typing the spaces between symbols and units or between the +, –, = or < and > signs, use the keystroke **Ctrl+Shift+Spacebar for a nonbreaking space**, which is designed to keep the number and unit on one line by not allowing a line break before the equation or parameter is completed.

A minus or plus sign should have a space after it. If the space is too large, you can also use the **nonbreaking space** to tighten the line.

Use the keystroke **Alt + 0177 to get ±**. For a **multiplication symbol**, use **Alt+0215** to get ×.

For a **percent symbol**, the Chicago Manual of Style advocates no space between the unit and the % symbol. Since the CMS is the primary style guide for engineers, the space is usually left out. However, the International System of Units manual (chapter 5) states: **“A space separates the number and the symbol %.”** The ISO 31-0 standard also specifies a space, and the TeX typesetting system encourages using one. This is in accordance with the general rule of adding a nonbreaking space between a numerical value and its corresponding unit of measurement. I recommend checking the journal you are submitting to. Look at the articles associated with your journal of interest and see how they express percentages; then use their practice as your standard for the papers you submit to that journal.

For an excellent set of rules pertaining to writing out equations in the narrative and in Equation Editor, go to p. 29 of the 2014 IEEE Editorial Style Manual found at [http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf).

From [The Society of Petroleum Engineers](#) Style Guide, p. 11

For units of time, use the customary abbreviations “sec” (second), “min” (minute), “hr” (hour), and “yr” (year).

Use the metric abbreviations “s” (second), “min” (minute), “h” (hour), “d” (day) in metric units only. Use “D” with nonmetric units, and “a” (year), **in combined units only**. Otherwise, spell out the term.

42 m/3, *but* 42 days      34 ft/D, *but* 34 days      12 cm/s, *but* 12 seconds

## Quick reference guide

# Vancouver Citing & Referencing style

\*\*\**(For more comprehensive information consult the Citing & Referencing library guide)*\*\*\*

<http://guides.lib.monash.edu/citing-referencing/vancouver>

**A note from Carla:** This aid is provided by Monash University. If you go to the page featuring the Vancouver style you will also find links to style guides from APA, Chicago, CSIRO, IEEE, Harvard, Law, MLA, MHRAT, and Turabian. This is a wonderful resource. I am including their information on the Vancouver Style with some additional information from IEEE, and some information based on my own experience with Vancouver using various style guides. Remember that many journals provide their own style guides. When submitting to a journal, always check its author information resources and see what style(s) its editors recommend. Always follow the journal's recommendation.

**I marked copy that deviates from the Monash presentation by showing the first sentence of the new additional commentary paragraph in red.** In one instance, I provided a table showing citation differences between UK and American citation requirements.

---

Vancouver is a numbered referencing style commonly used in medicine and science, and consists of:

- citations to someone else's work in the text, indicated by the use of a number
- a sequentially numbered reference list at the end of the document providing full details of the corresponding in-text reference

It follows rules established by the International committee of Medical Journal Editors, now maintained by the U.S. National Library of Medicine. It is also known as Uniform Requirements for Manuscripts submitted to Biomedical Journals.

**Before using this guide check with your faculty, school or department for their specific referencing guidelines**

### In-text citations

- Insert an in-text citation:
  - when your work has been influenced by someone else's work, for example:
    - ◆ when you directly quote someone else's work
    - ◆ when you paraphrase someone else's work
- General rules of in-text citation:
  - A number is allocated to a source in the order in which it is cited in the text. If the source is referred to again, the same number is used.
  - Use Arabic numerals (1,2,3,4,5,6,7,8,9)
  - Either square [ ] or curved brackets ( ) can be used as long as it is consistent. Please check with your faculty/lecturer to see if they have a preference. For consistency in this guide we have chosen to use round brackets for our examples
  - Superscripts can also be used rather than brackets e.g., ...was discovered.<sup>1,3</sup>
  - Reference numbers should be inserted to the left or inside of colons and semi-colons.
  - Reference numbers are generally placed outside or after full stops and commas - however check with your faculty/journal publisher to determine their preference. For consistency in this guide we are placing reference numbers after full stops.
  - Whatever format is chosen, it is important that the punctuation is consistently applied to the whole document.

### Multiple works by the same author:

Each individual work by the same author, even if it is published in the same year, has its own reference number.

### Citing secondary sources:

A secondary source, or indirect citation, occurs when the ideas on one author are published in another author's work, and you have not accessed or read the original piece of work. Cite the author of the work you have read and also include this source in your reference list.

#### In-text citation examples

The in-text citation is placed immediately after the text which refers to the source being cited:

**Unfortunately, this gets confusing when you are quoting material and are writing for both American and international journals.** In the U.S. the period always goes inside (or to the left of the end quotation mark). However, when an in-text citation number comes between the end quotation mark and the period, the period should go to the outside of the bracketed citation number.

The exception to the rule comes when you are using superscript numbers. Superscript numbers should not be followed by a superscript period, and it is too awkward to change the period from superscript to regular type every time you insert a citation number. The period (in US submissions goes before the end quotation mark in this case. The international formatting provided by Monash University is shown in the right-hand column and has not been altered.

<b>For American Journals (Carla's Addition)</b>	<b>For Intl. Journals (Orig. Monash U. Copy)</b>
<b>Using round brackets:</b> ...as one author has put it "the darkest days were still ahead"(1).	<b>Using round brackets:</b> ...as one author has put it "the darkest days were still ahead".(1)
<b>Using square brackets:</b> ...as one author has put it "the darkest days were still ahead"[1].	<b>Using square brackets:</b> ...as one author has put it "the darkest days were still ahead".[1]
<b>Using superscript:</b> ...as one author has put it "the darkest days were still ahead." <sup>1</sup> The author's name can also be integrated into the text: Scholtz <sup>1</sup> has argued that...	<b>Using superscript:</b> ...as one author has put it "the darkest days were still ahead". <sup>1</sup> The author's name can also be integrated into the text: Scholtz <sup>1</sup> has argued that...
<b>Please Note:</b> Without the quotation marks, the darkest days won't be ahead if you simply put the period before the superscript. <sup>1</sup> Sentences without superscripts or quotation marks using the full-size bracketed number will always end with a period [2].	

**Because this guide is for writers submitting to American publications,** the editor (Carla Roberts of Preferred Copy Editing) is showing the correct referencing format according to American copy editing rules in the left-hand column and in the bottom notation.

**Including page numbers with in-text citations:** (The Monash UK style has not been altered here. To add a page number in the American style above, simply add the page number as shown here: "the darkest days were still ahead."<sup>(1, p.23)</sup> In American journals, separate the regular size citation number and page number in brackets or parentheses with a comma, e.g., [1, p. 23] or (2, p. 27).

**Monash University Instructions continued:**

Page numbers are not usually included with the citation number. However, should you wish to specify the page number of the source, the page/s should be included in the following format:

...as one author has put it "the darkest days were still ahead"<sup>1(p23)</sup>

...as one author has put it "the darkest days were still ahead".(1 p23)  
Scholtz (1 p16–18) has argued that...

**Citing more than one reference at a time:**

The preferred method is to list each reference number separated by a comma, or by a dash for a sequence of consecutive numbers. There should be no spaces between commas or dashes.

For example: (1,5,6–8)

**Please note that Taylor-Francis Group deviates from all the other publishers by allowing bracketed numbers to appear in superscript.** To see how they handle this, please go to p. 40 to see how they handle this method.

**Reference List** ([See example Reference List on last page](#))

- References are listed in numerical order, and in the same order in which they are cited in text. The reference list appears at the end of the paper.
- Begin your reference list on a new page and title it 'References.'
- The reference list should include all and only those references you have cited in the text. (However, do not include unpublished items such as correspondence).
- Use Arabic numerals (1, 2, 3, 4, 5, 6, 7, 8, 9).
- Abbreviate journal titles in the style used in the [NLM Catalog](#)
- Check the reference details against the actual source - you are indicating that you have read a source when you cite it.
- Be consistent with your referencing style across the document.
- For additional information you may wish to consult [Citing Medicine, 2nd ed.](#)

**Scholarly journal articles**


- Follow these examples closely for all layout, punctuation, spacing and capitalization. These general rules apply to both print and electronic articles.
- Enter author's surname followed by no more than 2 initials (full stop).
- If more than 1 author: give all authors' names and separate each by a comma and a space.
- For articles with 1 to 6 authors, list all authors. For articles with more than 6 authors, list the first 6 authors then add 'et al.'

- Only the first word of the article title and words that normally begin with a capital letter are capitalized.
- Journal titles are abbreviated (to decipher/find correct abbreviations see: [PubMed Journals Database](#))
- Follow the date with a semi-colon;
- Abbreviate months to their first 3 letters (no full stop)
- Give the volume number (no space) followed by issue number in brackets
- If the journal has continuous page numbering through its volumes, omit month/issue number.
- Abbreviate page numbers where possible, e.g., 123–29.

### Digital Object Identification (DOI) and URLs

The digital object identifier (DOI) is a unique identifier, and should be provided in the reference where it is available. This alphanumeric string is usually located on the first page with other referencing elements in the article. More recent electronic journal articles will be displayed as permanent URL's. They will look something like this - <http://dx.doi.org/10.1037/a0024996>. Both formats are acceptable, use the form as it appears in your source.

0260-6917/\$ – see front matter © 2012 Elsevier Ltd. All rights reserved.  
<http://dx.doi.org/10.1016/j.nedt.2012.12.006>

Nursing Ethics  
 2014, Vol. 21(8) 916–928  
 © The Author(s) 2014  
 Reprints and permission:  
[sagepub.co.uk/journalsPermissions.nav](http://sagepub.co.uk/journalsPermissions.nav)  
 10.1177/0969733014521095  
[nej.sagepub.com](http://nej.sagepub.com)  


### Print articles

<b>Article with 1 to 6 authors</b>	Author AA, Author BB, Author CC, Author DD. Title of article. Abbreviated title of journal. Date of publication YYYY Mon DD; volume number(issue number):page numbers.
	Petitti DB, Crooks VC, Buckwalter JG, Chiu V. Blood pressure levels before dementia. Arch Neurol. 2005 Jan;62(1):112-6.
<b>Article with more than 6 authors</b>	Author AA, Author BB, Author CC, Author DD, Author EE, Author FF, et al. Title of article. Abbreviated title of journal. Date of publication YYYY Mon DD; volume number (issue number): page numbers.
	Hallal AH, Amortegui JD, Jeroukhimov IM, Casillas J, Schulman CI, Manning RJ, et al. Magnetic resonance cholangiopancreatography accurately detects common bile duct stones in resolving gallstone pancreatitis. J Am Coll Surg. 2005 Jun; 200(6):869–75.

### Electronic journal articles (continued on next page)

### Electronic journal articles

- The word [Internet] in square brackets should be inserted after the abbreviated journal title.
- The date cited [in square brackets] must be included after the date of publication.
- The URL (web address) must be included at the end of the reference.
- For electronic journal articles with a DOI, include the DOI (digital object identifier) at the end of the reference, after the URL

<b>Electronic journal article</b>	Author AA, Author BB. Title of article. Abbreviated title of Journal [Internet]. Date of publication YYYY MM [cited YYYY Mon DD]; volume number(issue number):page numbers. Available from: URL
	Stockhausen L, Turale S. An explorative study of Australian nursing scholars and contemporary scholarship. J Nurs Scholarsh [Internet]. 2011 Mar [cited 2013 Feb 19];43(1):89-96. Available from: <a href="http://search.proquest.com.ezproxy.lib.monash.edu.au/docview/858241255?accountid=12528">http://search.proquest.com.ezproxy.lib.monash.edu.au/docview/858241255?accountid=12528</a>
<b>Electronic journal article with DOI</b>	Author AA, Author BB, Author CC, Author DD, Author EE, Author FF. Title of article. Abbreviated title of Journal [Internet]. Year of publication [cited YYYY Mon DD]; volume number(issue number):page numbers. Available from: URL DOI
	Kanneganti P, Harris JD, Brophy RH, Carey JL, Lattermann C, Flanigan DC. The effect of smoking on ligament and cartilage surgery in the knee: a systematic review. Am J Sports Med [Internet]. 2012 Dec [cited 2013 Feb 19];40(12):2872-8. Available from: <a href="http://ajs.sagepub.com/content/40/12/2872">http://ajs.sagepub.com/content/40/12/2872</a> DOI: 10.1177/0363546512458223

**Note: Carla added thesis information from IEEE Editorial Style Manual**

### Thesis and Dissertations

From [http://www.ieee.org/documents/style\\_manual.pdf](http://www.ieee.org/documents/style_manual.pdf)

<b>Thesis</b>	Author, AA, Title of thesis, M.S. thesis, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year
	Kawasaki, N, Parametric study of thermal and chemical nonequilibrium nozzle flow, M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.
<b>Dissertation</b>	Author AA, Title of dissertation, Ph.D. dissertation, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.
	Williams, JO, Narrow-band analyzer, Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.



## Books and book chapters

- Follow these examples closely for all layout, punctuation, spacing and capitalization.
- Enter author's surname, followed by no more than 2 initials.
- Give **all** authors' names and separate each by a comma and a space.
- Enter all authors' names in the order in which they appear in the original source.
- Only the first word of the article title and words that normally begin with a capital letter are capitalized.
- For book chapters abbreviate page numbers to p. eg p.12-25. Where appropriate abbreviate thus: p. 122-8.
- For electronic books include the DOI (Digital Object Identifier) if it is given and place it after the URL (web address).
- Abbreviate months to their first 3 letters
- The formats for Tables and Figures (see below) can also be applied to charts, photographs, graphs etc.
- For more detailed information go to: <http://www.nlm.nih.gov/citingmedicine>

<p><b>Book :</b>  <b>a.) Print book</b>  <b>OR</b>  <b>b.) Electronic book</b></p>	<p><b>a.)</b> Author AA. Title of book. # edition [if not first]. Place of Publication: Publisher; Year of publication. Pagination.</p> <p><b>b.)</b> Author AA. Title of web page [Internet]. Place of Publication: Sponsor of Website/Publisher; Year published [cited YYYY Mon DD]. Number of pages. Available from: URL DOI: (if available)</p>
	<p><b>a.)</b> Carlson BM. Human embryology and developmental biology. 4th ed. St. Louis: Mosby; 2009. 541 p.</p> <p><b>b.)</b> Shreeve DF. Reactive attachment disorder: a case-based approach [Internet]. New York: Springer; 2012 [cited 2012 Nov 2]. 85 p. Available from:</p>
	<p><a href="http://ezproxy.lib.monash.edu.au/login?url=http://dx.doi.org/10.1007/978-1-4614-1647-0">http://ezproxy.lib.monash.edu.au/login?url=http://dx.doi.org/10.1007/978-1-4614-1647-0</a></p>
<p><b>Chapter :</b>  <b>a.) in an edited book</b>  <b>OR</b>  <b>b.) in an edited electronic book</b></p>	<p><b>a.)</b> Author AA, Author BB. Title of chapter. In: Editor AA, Editor BB, editors. Title of book. # edition. Place of Publication: Publisher; Year of publication. p. [page numbers of chapter].</p> <p><b>b.)</b> Author AA, Author BB. Title of chapter. In: Editor AA, Editor BB, editors. Title of the book [Internet]. Place of publication: Publisher's name; Year of publication. [cited YYYY Mon DD]. p. #. [page or chapter number/s]. Available from: URL DOI [if available]</p>

	<p><b>a.)</b> Blaxter PS, Farnsworth TP. Social health and class inequalities. In: Carter C, Peel JR, editors. Equalities and inequalities in health. 2nd ed. London: Academic Press; 1976. p. 165-78.</p> <p><b>b.)</b> Halpen-Felsher BL, Morrell HE. Preventing and reducing tobacco use. In: Berlan ED, Bravender T, editors. Adolescent medicine today: a guide to caring for the adolescent patient [Internet]. Singapore: World Scientific Publishing Co.; 2012 [cited 2012 Nov 3]. Chapter 18. Available from: <a href="http://www.worldscientific.com/doi/pdf/10.1142/9789814324496_0018">http://www.worldscientific.com/doi/pdf/10.1142/9789814324496_0018</a></p>
--	--

**Government and other reports**

- Follow these examples closely for all layout, punctuation, spacing and capitalization.
- Enter author's surname, followed by no more than 2 initials.
- Give all authors and separate each by a comma and a space.
- Where the author is an organisation, quote the full name of the organisation, omitting the word "The" if preceding the name. Follow the name with the country of origin in parenthesis ( ) using only the two letter country code. See [Appendix D](#) of Citing Medicine.
- Where an author and organisation are cited, use the author's name. Add the organisation's name at your discretion.
- If there are no authors, only editors, list all editors, followed by a comma and the word editor(s)
- Only the first word of the article title and words that normally begin with a capital letter are capitalized.
- The place of publication is the city in which the report was published. For US and Canadian cities follow with the two letter state code in [Appendix E](#) of Citing Medicine for all other cities use the two letter country code in [Appendix D](#) of Citing Medicine
- Include page numbers in an abbreviated format. e.g.: p. 12-25. Where appropriate abbreviate e.g. p. 241-8
- For electronic reports include the DOI if it is given and place it after the URL.
- Abbreviate months to their first 3 letters

<b>Government reports</b>	Author AA, Author BB. Title of report. Place of publication: Publisher; Date of publication. Total number of pages. Report No.:
	Rowe IL, Carson NE. Medical manpower in Victoria. East Bentleigh (AU): Monash University, Department of Community Practice; 1981. 35 p. Report No.: 4.

## Dictionaries and encyclopedias

- Follow these examples closely for all layout, punctuation, spacing and capitalization.
- Include the DOI at the end of the reference if it is available.

<b>Article from online reference work</b>	Title of encyclopedia [Internet]. Place of publication: Publisher; year. Title of article; [updated YYYY Mon DD; cited YYYY Mon DD]; [# of pages/screens]. Available from: URL
	A.D.A.M. medical encyclopedia [Internet]. Atlanta (GA): A.D.A.M., Inc.; c2005. Ear barotrauma; [updated 2006 Oct 20; cited 2006 Nov 16]; [about 4 screens]. Available from: <a href="http://www.nlm.nih.gov/medlineplus/ency/article/001064.htm">http://www.nlm.nih.gov/medlineplus/ency/article/001064.htm</a>
<b>Article from electronic drug guide</b>	Title of work [Internet]. Place of publication: Publisher/Website; year. Name of drug: [revision/review date; cited YYY Mon DD]; [# of pages/screens]. Available from: URL
	AHFS consumer medication Information [Internet]. Bethesda (MD): American Society of Health-System Pharmacists, Inc.; ©2008. Protriptyline; [revised 2007 Aug 1; reviewed 2007 Aug 1; cited 2008 Oct 2]; [about 5 p.]. Available from: <a href="http://www.nlm.nih.gov/medlineplus/druginfo/meds/a604025.html">http://www.nlm.nih.gov/medlineplus/druginfo/meds/a604025.html</a>

## Audio visual media

<b>DVD's</b>	Author A. Title [Format]. Place of publication: Publisher; year of publication. Item description.
	Subbarao M. Tough cases in carotid stenting [DVD]. Woodbury (CT): Cine-Med, Inc.; 2003. 1 DVD: sound, color, 4 3/4 in.
<b>Video file e.g Web streaming video</b>	Author, A. Title [format]. Place of publication: publisher; date of publication [date it was viewed]. Available from: website address
	Silverstein O. Mothers and sons: the crucial connection [web streaming video]. Hanover (USA): Microtraining Associates; 2005 [cited 2010 May 27]. Available from: <a href="http://ctiv.alexanderstreet.com/View/536289">http://ctiv.alexanderstreet.com/View/536289</a>

**From the Internet**

- Follow these examples closely for all layout, punctuation, spacing and capitalization
- Author names should be listed in the order they appear on the site.
- Reproduce the title of a homepage as closely as possible to the wording on the screen
- Place the word Internet in square brackets following the title (and content type if present)
- Place of publication is defined as the city where the homepage is published. If place, publisher, date unknown use [place unknown], for example.
- Publisher is defined as the individual or organization issuing the homepage.
- Use the date of publication as the date the page was first published on the internet, always give the year.
- Date of up-date/revision - Always give the year and include the date/month, if provided, after the year.
- Include the date that you saw the page on the internet.
- Begin with the phrase "Available from". Insert the URL in its entirety. End with a period only if the URL ends with a slash, otherwise end with no punctuation
- For a more detailed guide to referencing website information please consult:  
Patrias K. Citing medicine: the NLM style guide for authors, editors, and publishers [Internet]. 2nd ed. Wendling DL, technical editor. Bethesda (MD): National Library of Medicine (US); 2007 [updated 2009 Oct 21; cited 2010 Jan 8]. Available from: <http://www.nlm.nih.gov/citingmedicine>

<p><b>Web page: a.) homepage b.) part of website</b></p>	<p><b>a.)</b> Author/organization's name. Title of the page [Internet]. Place of publication: Publisher's name; Date or year of publication [updated yr month day; cited yr month day]. Available from: URL</p> <p><b>b.)</b> Title of the homepage [Internet]. Place of publication: Publisher's name; Date or year of publication. Title of specific page/part; Date of publication of part [Date cited of part]; [location or pagination of part]. Available from: URL</p>
	<p><b>a.)</b> Diabetes Australia. Diabetes globally [Internet]. Canberra ACT: Diabetes Australia; 2012 [updated 2012 June 15; cited 2012 Nov 5]. Available from: <a href="http://www.diabetesaustralia.com.au/en/Understanding-Diabetes/Diabetes-Globally/">http://www.diabetesaustralia.com.au/en/Understanding-Diabetes/Diabetes-Globally/</a></p> <p><b>b.)</b> Australian Medical Association [Internet]. Barton ACT: AMA; c1995-2012. Junior doctors and medical students call for urgent solution to medical training crisis; 2012 Oct 22 [cited 2012 Nov 5]; [about 3 screens]. Available from: <a href="https://ama.com.au/media/junior-doctors-and-medical-students-call-urgent-solution-medical-training-crisis">https://ama.com.au/media/junior-doctors-and-medical-students-call-urgent-solution-medical-training-crisis</a></p>

<b>Image from web</b>	<p><b>Note:</b> If the title of the image is not shown construct a title that describes the image shown. Use enough words to make the constructed title meaningful. Place the constructed title in square brackets.</p> <p>Author or organization. Title [Image on internet]. Place of publication: Publisher's name; date of publication [date cited]. Available from: URL</p>
	<p>Centres for Disease Control and Prevention. Shingles on face. [Image on internet]. 2011 [updated 2011 Jan 10; cited 2012 Nov 6]. Available from: <a href="http://www.cdc.gov/shingles/about/photos.html">http://www.cdc.gov/shingles/about/photos.html</a></p>

### University course materials

**Note:** Not all lecturers approve the citation of unit materials, such as lecture slides, in assignments. Check with your lecturer first to see if these resources are acceptable

<b>Lecture notes on Moodle</b>	<p>Author, A.A. Title of lecture [format]. Place of Publication: Publisher; Date of Publication [Date cited]. Available from: 'website address'</p>
	<p>Cloe, J. The normal distribution [Lecture notes on internet]. Melbourne: Monash University, Faculty of Medicine, Nursing and Health Sciences; 2012 [cited 2012 Jun 26]. Available from: <a href="http://moodle.vle.monash.edu.au">http://moodle.vle.monash.edu.au</a></p>
<b>Custom textbook or unit reader</b>	<p>Author, A.A. Title of article. Publication details including original pages. Reprinted in: Smith, B editor, Title of course material. Place of publication: Publisher; Year of publication.</p>
	<p>Shaffer, E, Brenner J. International trade agreements: hazards to health? International Journal of Health Services. 2004;34(3):467-481. Reprinted in: BTW3201 International Trade Law course materials 2011. Melbourne: Monash University; 2011.</p>

## **Sample reference list**

### **REFERENCES**

1. O'Campo P, Dunn JR, editors. Rethinking social epidemiology: towards a science of change. Dordrecht: Springer; 2012. 348 p.
2. Schiraldi GR. Post-traumatic stress disorder sourcebook: a guide to healing, recovery, and growth [Internet]. New York: McGraw-Hill; 2000 [cited 2006 Nov 6]. 446 p. Available from: <http://books.mcgraw-hill.com/getbook.php?isbn=0071393722&template=#toc> DOI: 10.1036/0737302658
3. Halpen-Felsher BL, Morrell HE. Preventing and reducing tobacco use. In: Berlan ED, Bravender T, editors. Adolescent medicine today: a guide to caring for the adolescent patient [Internet]. Singapore: World Scientific Publishing Co.; 2012 [cited 2012 Nov 3]. Chapter 18. Available from: [http://www.worldscientific.com/doi/pdf/10.1142/9789814324496\\_0018](http://www.worldscientific.com/doi/pdf/10.1142/9789814324496_0018)
4. Stockhausen L, Turale S. An explorative study of Australian nursing scholars and contemporary scholarship. J Nurs Scholarsh [Internet]. 2011 Mar [cited 2013 Feb 19];43(1):89-96. Available from: <http://search.proquest.com.ezproxy.lib.monash.edu.au/docview/858241255?accountid=12528>
5. Kanneganti P, Harris JD, Brophy RH, Carey JL, Lattermann C, Flanigan DC. The effect of smoking on ligament and cartilage surgery in the knee: a systematic review. Am J Sports Med [Internet]. 2012 Dec [cited 2013 Feb 19];40(12):2872-8. Available from: <http://ajs.sagepub.com/content/40/12/2872> DOI: 10.1177/0363546512458223
6. Subbarao M. Tough cases in carotid stenting [DVD]. Woodbury (CT): Cine-Med, Inc.; 2003. 1 DVD: sound, color, 4 3/4 in.
7. Stem cells in the brain [television broadcast]. Catalyst. Sydney: ABC; 2009 Jun 25.