

## Avoiding Fluff in Scientific Writing



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“Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts.” W. Strunk Jr. and E.B. White, *Elements of Style*, 3<sup>rd</sup> ed. (Needham Heights, MA, Allyn & Bacon, 1979), p. 23.

Good advice for your figures as well as your text.—*cme*

Today we’ll learn how to identify and eliminate fluff.

## **Four types of fluff are found in tedious scientific writing**

**Unnecessary words, redundancies, and wordy expressions**

**Pointless modifiers**

**Tautologies (circular reasoning)**

**Meaningless generalities**

**Your obligation as a careful science writer is to convey the maximum meaning in the fewest number of words**

## Fluff Type 1: redundant words and wordy phrases

Some fluorophores appear green ~~in color~~, while others appear red ~~in color~~.

Temperature varies with pressure, ~~and vice versa~~.

The results ~~tend to suggest~~...

Given ~~the fact that~~  $\tau_\alpha = \sigma q_\alpha \int n(s) ds$  ...

The samples were immersed in acetone and mechanically agitated ~~in order to~~ remove surface debris.

Train yourself to spot superfluous words that add no meaning to a sentence and eliminate them.

If the results only “tend to suggest,” you probably shouldn’t be writing a paper about it in the first place.

Refer to Ms. P on *in order* (q.v.


<http://people.physics.illinois.edu/Celia/MsP/InOrder.pdf>) *In order* followed by a clause is usually a sign of a wordy sentence.

## Horrible example:

In order to achieve ferromagnetic ordering, it is necessary to dope to concentrations  $x \geq 1\%$ , an order of magnitude larger than the equilibrium solubility, necessitating an off-equilibrium growth technique such as low-temperature molecular beam epitaxy.

36-word sentence! 

Indirect opening (*it is*) 

*Order* used three times, each with a different meaning 

“necessary” and “necessitating” 

## Here's how I'd fix it :

original  
In order to achieve ferromagnetic ordering, it is necessary to dope to concentrations  $x \geq 1\%$ , an order of magnitude larger than the equilibrium solubility, necessitating an off-equilibrium growth technique such as low-temperature molecular beam epitaxy.

edited  
To achieve ferromagnetic ordering, samples must be doped to concentrations  $x \geq 1\%$ , 10 times greater than the equilibrium solubility. Consequently, an off-equilibrium growth technique is required, such as low-temperature molecular beam epitaxy.

Two sentences of <20 words each

*Order* used only once

Neediness eliminated

## Replace Type 1 fluff with simple words

<i>due to the fact that</i>	<b>because</b>
<i>on the order of</i>	<b>about</b>
<i>in the near future</i>	<b>soon</b>
<i>a very limited number of cases that</i>	<b>seldom</b>
<i>it appears to be indicated that</i>	<b>may be</b>
<i>in spite of the fact that</i>	<b>despite</b>
<i>subsequent to</i>	<b>after</b>
<i>at the present time</i>	<b>now</b>
<i>in consequence of this fact</i>	<b>thus</b>
<i>as contrasted to</i>	<b>versus</b>
<i>in combination with</i>	<b>with</b>
<i>ascertain the location of</i>	<b>find</b>

“An expression that is especially debilitating is *the fact that*. **It should be revised out of every sentence in which it occurs.**” W. Strunk Jr. and E.B. White, *Elements of Style*, 3<sup>rd</sup> ed. (Needham Heights, MA, Allyn & Bacon, 1979), p. 24. [emphasis added by cme]

*Scientific Style and Format*, 6<sup>th</sup> ed. (Cambridge, Cambridge University Press, 1994) has three **pages** of examples of common superfluous words that should be avoided in scientific writing. Read and be amazed.

## **Fluff may cause confusion**

**...an electron whose spin is aligned with the two other electrons on either side of it.**

**Are we talking about three electrons here, or five?**

**The self-gravity of the cloud will collapse the ~~cloud core to smaller dimensions.~~**

**In this universe, things don't usually "collapse" to larger dimensions (and they don't get *times smaller*, either, but I digress).**

Superfluous words not only take up precious space (nearly everything you will ever write in physics will be length-limited), they also frequently confuse or irritate the reader.

Removing fluff should make your writing more concise, direct, and easy to understand.

## Beware of introductory fluff

~~It was discovered that~~ some cuprate-perovskite ceramic materials have critical temperatures  $>90$  K.

~~It is interesting to note that~~ the width of the stripe-shaped bubbles ~~practically~~ does not depend on the lateral size of the nanodots, coinciding with the width of the infinite strips generated in the film.

“A phrase such as ‘it is interesting to note that’ adds no information and only delays getting to the point of the sentence.” Style Manual Committee, Council of Biology Editors, *Scientific Style and Format*, 6<sup>th</sup> ed. (Cambridge, Cambridge University Press, 1994), p. 123.

In general, get rid of “It is” and “It was” (and “There is” and “There was”) openers. Make the subject of the sentence the subject, put it first, and use an action verb instead of a weak verb of being. Your readers will rise up and call you “blessed.”



## Fluff Type 2: pointless modifiers

**Careful temperature control is needed to ...**

*Is **careless** control really an alternative?*

*Better yet, give us a quantitative range*

**Permanently remove *basically* and *essentially* from your lexicon**

**The transverse deviations and small kicks are ~~essentially~~ ignored for the subsequent simulations.**

*Are they ignored some of the time but not all of the time? Are some random ones ignored?*

Instead of using pointless modifiers, quantify or give an example.

Your idea of “careful” temperature control ( $\pm 0.05^\circ\text{C}$ ) may not be the same as what a reader thinks. Tell him or her **exactly** what you mean.

“Basically” and “essentially” have become the scientific equivalent of “y’know, like.” They are basically overused and essentially just represent meaningless clutter.

### Fluff Type 3: tautologies

A tautology is using different words to say the same thing, although the repetition does not provide clarity; circular reasoning.

**A circumstellar disk is  
*a disk around a star.***



**A circumstellar disk is a flattened torus, wafer, or elliptical cloud of dust particles, ice, and ionized gases that orbits a star.**

If you are going to define or give an example of something, make sure your clarification actually **adds** something that the reader did not already know. If it doesn't, it's fluff.

## **Fluff Type 4: meaningless generalities**

**“The research will also serve technological purposes, such as fabrication of mesoscopic devices, and contribute to meeting some goals of quantum information to revolutionize the Information Age.”**

**“In order to sustain technological progress, a new generation of engineers has to be trained in the areas of current technological frontiers.”**

**“The new information will benefit researchers in many different fields who are studying many different aspects of RNA or DNA.”**

Writers are most often tempted to put generalities in the abstract or the conclusions section of a paper or proposal to indicate the wide applicability and stunning significance of the work being reported or proposed.

Avoid this temptation. Such broad, overly general, content-less statements make the reader question the author’s impartiality and wit.



No fluff. Never.