

# SWE

## Scientific Writing in English

Christiane Schmidt

course webpage: <http://webstaff.itn.liu.se/~chrsc91/teaching/s21/swe/>

Today and June 24:

Intro

- + Good writing
- + Cutting the clutter
- + How to make a story sticky
- + Punctuation

June 29:

Punctuation ctd.

- + Paragraphs, sentences
- + Common mistakes
- + Parts of paper

June 30 (or later that week?): Homework discussion

Written exam

Part 2: Discuss timing with me!

Text:

- The wording of anything written or printed; the structure formed by the words in their order; the very words, phrases, and sentences as written. (Oxford English Dictionary)
- Narrative text (story-telling) and expository text (no room for fiction and descriptive literary tools)

**Scientific** text?

- Expository text
- Written specifically to explain or explore a (scientific) idea
- Ensure that the information is credible and real
- Follows the problem-solution structure
- More straightforward than other texts
- Provides facts in a way that is educational and purposeful
- Goal: make the essay as clear as possible and edit it in order to remove all information that is not strictly necessary

Working with scientific texts:

- ❖ Read — understand
  - ❖ Listen — understand
  - ❖ Write — make it easy for others to understand, and enjoy!
  - ❖ Present
- It is the author's job to make the reader's job easy.**

(Joshua Schimel, Writing Science, How to write papers that get cited and proposals that get funded, Oxford University Press, 2012)

- ❖ Scientific texts
- ❖ Technical writing
- ❖ Research
- ❖ Teaching
- ❖ ...

## Literature:

- ❖ William Strunk Jr. and E.B. White, *The Elements of Style*.
- ❖ Joshua Schimel, *Writing Science: How to write papers that get cited and proposals that get funded*, Oxford University Press, 2012.
- ❖ William Zinsser, *On Writing Well: The Classic Guide to Writing Nonfiction*, HarperCollins, 1998.
- ❖ Lyn Dupre, *BUGS in Writing: A Guide to Debugging Your Prose*, Addison-Wesley Professional, 1998.
- ❖ Tim Skern, *Writing Scientific English*, Facultas wuv, 2009.
- ❖ R.L. Trask, *The Penguin Guide to Punctuation*, Penguin Books, 1997.
- ❖ Chip Heath & Dan Heath, *Made to Stick: Why Some Ideas Survive and Others Die*, Random House New York, 2010
  
- ❖ Kristin Sainani, Stanford online course “Writing in the Sciences”

Good Writing

What makes good writing??\*

- Communicate an idea clearly and effectively
- Write elegantly and stylishly

takes time, revision  
(and a good editor)

We need:

- Something to say
- Clear thinking

\*from Kristin Sainani, Stanford online course "Writing in the Sciences"

## What makes a good writer??\*

- ❖ Talent?
- ❖ Years of English classes?
- ❖ Inspiration?
- ❖ ...?
- ❖ Having something to say.
- ❖ Logical thinking.
- ❖ A few simple, learnable rules of style.

\*from Kristin Sainani, Stanford online course “Writing in the Sciences”



How do we get there?

Homework 0:  
read something you  
would not have read  
otherwise.

- Read!! and pay attention.
- Talk about your research/work before you try to write about it.
- Stop waiting for inspiration.
- Start writing. Write a first draft.
- Revise.
- Learn how to cut.
- Find a good editor/peer editing group.

Effective storytelling:

1. Content: what makes a story engage and stay with us?
2. Structure: how do you put together that content and make it easy for us to get?
3. Language: how do you write the story in the most compelling way possible?

from Joshua Schimel, *Writing Science: How to write papers that get cited and proposals that get funded*

# Writing Principles

# Writing Principles

- ❖ Active voice is preferred.
- ➔ Do not switch to passive voice without a reason.
- ❖ Use precise words.
  - Avoid jargon, redundancies, and vague words.
- ❖ Use strong verbs, do not turn them into clunky nouns.
- ❖ Cut unnecessary words and phrases.
- ❖ Use paragraphs to structure your work.
- ❖ Avoid repetition.

# Active Voice

# Use the active voice

Passive: you can say only that an event or action took place, without necessarily admitting what or who the causal agent was.\*

- More than 300 aircraft were ordered.

Active voice:

- + American Airlines ordered more than 300 aircraft.

Passive voice is boring even if you name the agent:

More than 300 aircraft were ordered by American Airlines.

Of course, you can still write some sentences in the passive voice.

“Passive voice emphasises the receiver of an activity (the object), rather than the actor (the subject), and there may be occasions when that emphasis is important.”

\*from Lyn Dupré: “BUGS in Writing: A Guide to Debugging Your Prose”, Addison-Wesley

# Use the active voice

- ❖ “You should not mix in one sentence parts that contain the verb form *to X* (to laugh, to cry, to write, and so on), called *infinitives*, and parts in passive voice.”

To get advice, an expert must be consulted.

creates the expectation of an agent

To get advice, you must consult an expert.

Correct, but ugly, in passive mode:

For advice to be gotten, an expert must be consulted.

\*from Lyn Dupré: “BUGS in Writing: A Guide to Debugging Your Prose”, Addison-Wesley

# Cut the Clutter



# Cutting the clutter

From William Zinsser, *On Writing Well, The Classic Guide to Writing Nonfiction*:

Clutter is the disease of American writing. We are a society strangling in unnecessary words, circular constructions, pompous frills and meaningless jargon. Who can understand the clotted language of everyday American commerce: the memo, the corporation report, the business letter, the notice from the bank explaining its latest "simplified" statement? What member of an insurance or medical plan can decipher the brochure explaining his costs and benefits? What father or mother can put together a child's toy from the instructions on the box? Our national tendency is to inflate and thereby sound important. The airline pilot who announces that he is presently anticipating experiencing considerable precipitation wouldn't think of saying it may rain. The sentence is too simple—there must be something wrong with it.

But the secret of good writing is to strip every sentence to its cleanest components. Every word that serves no function, every long word that could be a short word, every adverb that carries the same meaning that's already in the verb, every passive construction that leaves the reader unsure of who is doing what—these are the thousand and one adulterants that weaken the strength of a sentence. And they usually occur in proportion to education and rank.

## Government memo, 1942

Such preparations shall be made as will completely obscure all Federal buildings and non-Federal buildings occupied by the Federal government during an air raid for any period of time from visibility by reason of internal or external illumination.

"Tell them," Roosevelt said, "that in buildings where they have to keep the work going to put something across the windows."

from William Zinsser, *On Writing Well, The Classic Guide to Writing Nonfiction*

# Cutting the clutter

“I have only made this letter rather long because I have not had time to make it shorter.” —Blaise Pascal, 1656

# Cutting the clutter

## Example 1:

“This paper provides a review of the basic tenets of cancer biology study design, using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research.”

In this paper we review cancer biology study design, using examples that illustrate specific challenges and solutions.

from Kristin Sainani, Stanford online course “Writing in the Sciences”

## Example 2:

This paper provides a review of 3D aircraft object recognition methods based on 2D images.

Practice

In this paper we review 3D aircraft object recognition based on 2D images.

# Cutting the clutter

## Example 3:

“As it is well known, increased athletic activity has been related to a profile of lower cardiovascular risk, lower blood pressure levels, and improved muscular and cardio-respiratory performance.”

Increased athletic activity is associated with lower cardiovascular risk, lower blood pressure, and improved fitness.

Increased athletic activity lowers cardiovascular risk and blood pressure, and improves fitness. (stronger level of evidence)

from Kristin Sainani, Stanford online course “Writing in the Sciences”

# Cutting the clutter

You wrote the text, most likely you will find it difficult to delete words that took a long time to come up with in the first place.

Try the sentence without the extra words.

Decide which is better: gives the same idea with more power.

## Example 4:

Yet, only very recently, cases are reported where companies in the bus, railway and airline industry are using advanced OR techniques for solving crew planning problems (almost) optimally.

Recently, OR techniques for solving crew planning problems optimally are used in the bus, railway and airline industry.



# Simplify!

a considerable amount of	many, much
absolutely essential	essential
a majority of	most
a number of	many
an order of magnitude more	ten times
are of the same opinion	agree
completely full	full
considering the fact that	although, because
decline	decrease
due to the fact that	because
each and every	each
end result	result
exact same, exactly the same	identical
exhibit a tendency	tend
having gotten	having got
help and	help to
higher in comparison to	higher than
in close proximity to	near
in spite of the fact that	although

“From research to manuscript”, M. Katz and from Kristin Sainani, Stanford online course “Writing in the Sciences”

# Simplify!

in the final analysis	finally
including but not limited to	including
last but not least	finally
methodology	method, methods
multiple	many
nearly unique	rarely, uncommon
orientate	orient
prove conclusively	prove
referred to as	called
regarded as being	regarded as
seeing that	because
the question of whether	whether
very unique	unique
the reason that/why is because	because

“From research to manuscript”, M. Katz

## Example 5: Dead weight words and phrases

It is well known (eg. [5, 25]) that both the aircraft routing and crew pairing problems are individually NP-hard.

The aircraft routing and the crew pairing problem are NP-hard ([5, 25]).

Example 6: Long words or phrases that could be short

For this reason, the paper restricts itself to hub-and-spoke systems.

Thus, we restrict this paper to hub-and-spoke systems.

## Example 7: Repetitive words or clauses

A robust cell-mediated immune response is necessary, and deficiency in this response predisposes an individual towards active TB.

Deficiency in T-cell-mediated immune response predisposes an individual to active TB.

# Put statements in positive form

She was not often right.  
She was usually wrong.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

# Put statements in positive form

She did not want to arrive late.

She wanted to arrive in time.

He did not believe his homework was incomplete.

He believed his homework was complete.

# Put statements in positive form

not honest	dishonest
not harmful	safe
not important	unimportant
does not have	lacks
did not remember	forgot
did not pay attention to	ignored
did not succeed	failed

from Kristin Sainani, Stanford online course "Writing in the Sciences"



# Cutting the clutter

Eliminate there are/there is

On the topic of generating the schedule itself using mathematical models, there are a few articles that have been published.

A few articles were published on generating the schedule using mathematical models.

# Cutting the clutter

Omit needless prepositions:  
“that” and “on” are often superfluous

On the topic of generating the schedule itself using mathematical models, there are a few articles that have been published.

A few articles were published on generating the schedule using mathematical models.

# Cutting the clutter

Eliminate there are/there is

If at a turn node, there are more arriving flights than departing flights, it means that there is a plane that sits on the ground for a while and then turns to a departing plane at one of the turn nodes below it.

Practice

If more flights arrive than depart at a turn node, a plane sits on the ground for a while and becomes a departing plane at one of the turn nodes below.

We also assume that for every equipment type there is a single station where balance-checks for that equipment type can be done and that this station is also a regular maintenance station.

Practice

We also assume that a single regular maintenance station can accommodate balance-checks for every equipment type.

There is a one-to-one correspondence between Euler tours in the original graph and Hamilton circuits in the line graph.

Practice

Euler tours in the original graph correspond one-to-one to Hamilton circuits in the line graph.

Anti-inflammatory drugs may be protective for the occurrence of Alzheimer's Disease.

Practice

Anti-inflammatory drugs may protect against Alzheimer's Disease.

# Cutting the clutter

Injuries to the brain and spinal cord have long been known to be among the most devastating and expensive of all injuries to treat medically.

Practice

Injuries to the brain and spinal cord are among the most devastating and expensive.

from Kristin Sainani, Stanford online course “Writing in the Sciences”

We will refer to this model as a flight (leg) based spill model.

Practice

We call this a flight (leg) based spill model.



# Cutting the clutter

The airline has to decide the equipment type to use on each leg so that it can fly the schedule, while matching capacity to demand as much as possible and minimizing the total operating cost.

Practice

The airline decides the equipment type for each leg so that it can fly the schedule, while matching capacity to demand as much as possible and minimizing the total operating cost.

The airline decides the equipment type for each leg so that it can fly the schedule and minimizes the total operating cost, while matching capacity to demand as much as possible.

# Cutting the clutter

An IQ test measures an individual's abilities to perform functions that usually fall in the domains of verbal communication, reasoning, and performance on tasks that represent motor and spatial capabilities.

Practice

An IQ test measures an individual's verbal, reasoning, or motor and spatial abilities.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Express co-ordinate ideas in similar form.

## Express co-ordinate ideas in similar form

“This principle, that of parallel construction, requires that expressions of similar content and function should be outwardly similar. The likeness of form enables the reader to recognize more readily the likeness of content and function. [...]

The unskilful writer often violates this principle, from a mistaken belief that he should constantly vary the form of his expressions.”

[Strunk, W., Jr. and White, E.B.: The Elements of Style]

## Express co-ordinate ideas in similar form

Formerly, science was taught by the textbook method, while now the laboratory method is employed.

Formerly, science was taught by the textbook method; now it is taught by the laboratory method.

An article or a preposition applying to all the members of a series must either be used only before the first term or else be repeated before each term.

The French, the Italians, Spanish, and Portuguese

The French, the Italians, the Spanish, and the Portuguese

In spring, summer, or in winter

In spring, summer, or winter (In spring, in summer, or in winter)

from Strunk, W., Jr. and White, E.B.: The Elements of Style