

Scientific writing

科技英文写作

——如何写（读）好一篇英文科技论文

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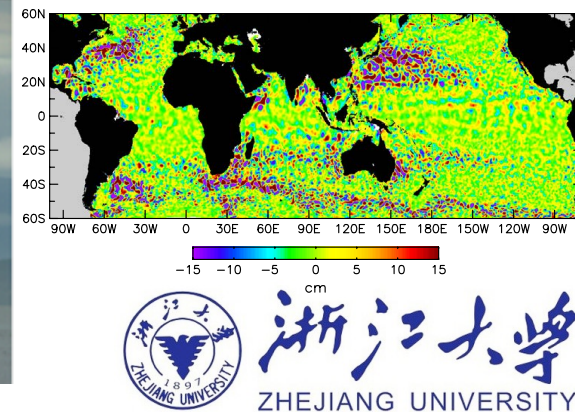
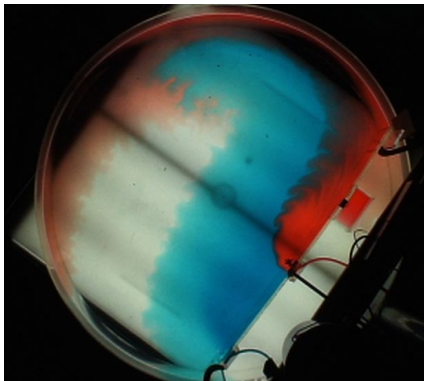
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Short introduction

- [Sichuan University](#) (Bachelor): Environmental Engineering, Drinking Water treatment using membranes
- [University of Washington](#) (Master, Ph.D.): Civil Engineering, Estuary and River Plume Dynamics
- Gap year☺: Travel, Join the CLIVAR P02 cruise (Hawaii – San Diego)
- Join Ocean College, [Zhejiang University](#)
- [University of Georgia](#) (Postdoctoral Research): Satellite Oceanography, Cross-shelf transport and meso-scale eddies.



Scientific writing includes:

- Journals
 - Peer-review journals
 - Reviews
 - Conference proceedings
- Presentations
 - Posters
 - Oral presentations
- Proposals
- CV/resumes
- Applications
- Reports



What are covered in this lecture

- Scientific writing (reading) basics
- How to write better

What are **NOT** covered in this lecture

- How to select a research topic
- How to carry out a research project
- Basic English (grammar)

Schedule

1. Introduction; principles of effective writing
2. How to read literatures; pre-writing steps
3. The format of an original manuscript (first draft)
4. Revision, review, submission, response to review, and the publication process
5. Issues in scientific writing (plagiarism, authorship, reference, etc...)
6. How to present your research (attending conference)
7. Other scientific writing (CV/Resume, application essay)

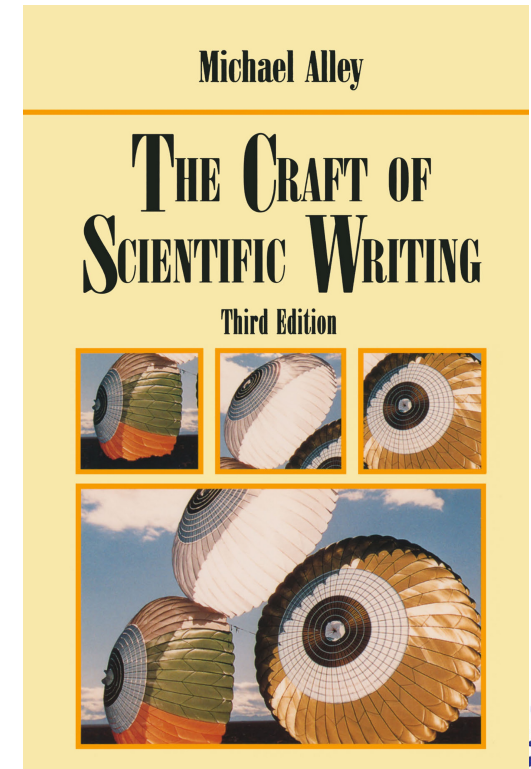
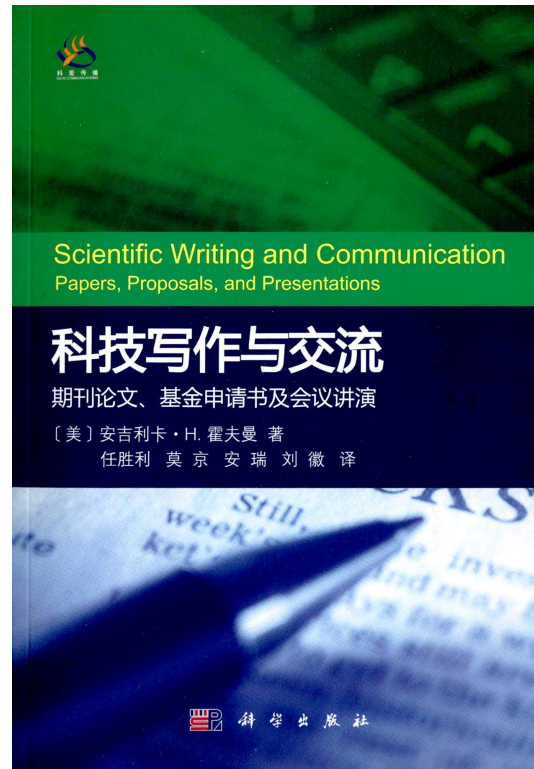
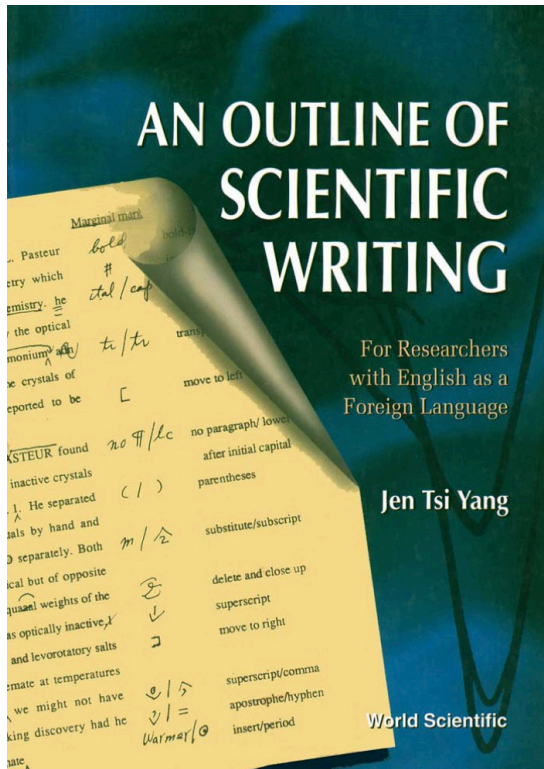
Part of this course attributes to Stanford online course
“writing in the sciences” by Dr. Kristin Sainani



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References

1. Stanford online course “writing in the sciences” by Dr. Kristin Sainani
2. An outline of scientific writing – For researchers with English as a foreign language by Jen Tsi Yang
3. Scientific writing and communication by Angelika H. Hofmann
4. The craft of scientific writing by Michael Alley



Introduction

- What makes good writing?
 - 1. Good writing communicates an idea clearly and effectively.
 - 2. Good writing is elegant and stylish.

Takes having
something to say
and clear thinking.

Takes time,
revision, and a
good editor!



Introduction

- What makes a good writer?
 - Inborn talent?
 - Years of English and humanities classes?
 - An artistic nature?
 - The influence of alcohol and energy drinks?
 - Devine inspiration?

Introduction

- What makes a good writer:
 - Having something to say
 - Logical thinking
 - A few simple, learnable rules of style (the tool you will learn in this class!)

Can I write in Chinese in the first draft and then translate into English?

- **YES!** You can (confirmed by many scientific writing books and professors).
But you need to follow English rules (learn in this class) and spend a decent amount of time in the revision.

Take-home message:

Good writing can be learned!



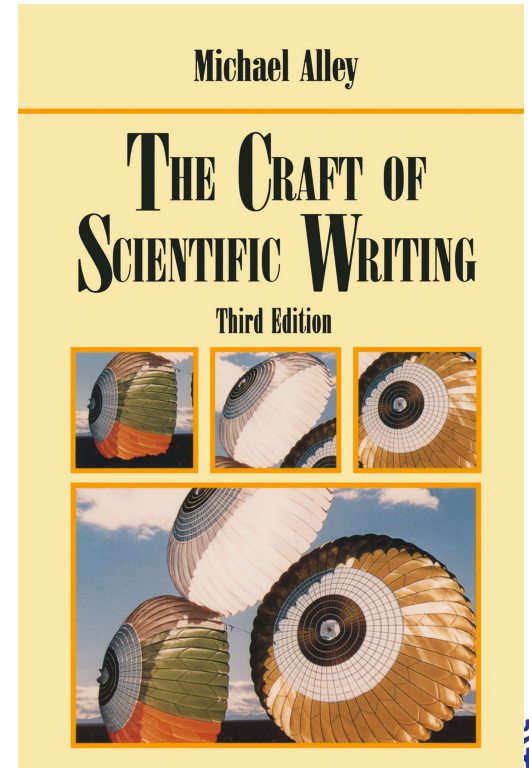
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About Scientific Writing:

- Scientific writing is hard work
- Scientific writing is not science
- Scientific writing is a craft

It is a skill that must be developed through **practice, practice and practice.**

-- Michael Alley



It is a skill that
must be developed
through **practice**,
practice and
practice.

-- Michael Alley



Six Goals of Language in Scientific Writing

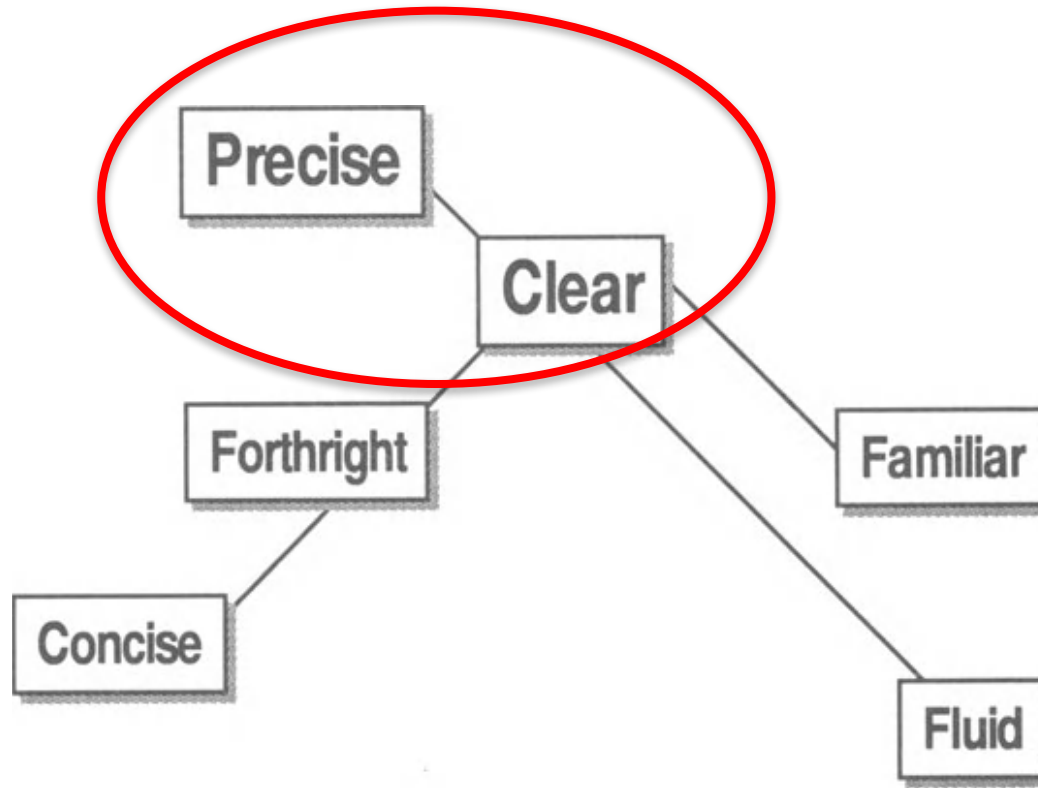


Figure 1-1. Six goals of language in scientific writing. Precision and clarity are the most important.



Themes of this course

- Complex ideas do NOT require complex language.
- Scientific writing should be EASY and even ENJOYABLE to read!

Keep it SHORT but GOOD!

- **Example 1:**

居里夫人女儿和女婿

Irene Joliot-Curie and Frederic Joliot-Curie:

Nobel Prize in Chemistry, 1935

- **One-page Report:**

“Artificial production of a new kind of radio-element”, *Nature*, 1934, 133: 201

It has **620** words and **1** chemical reaction equation

From 香港城市大学 陈关荣



Irene Joliot-Curie (1897-1956)

Frederic Joliot-Curie (1900-1958)



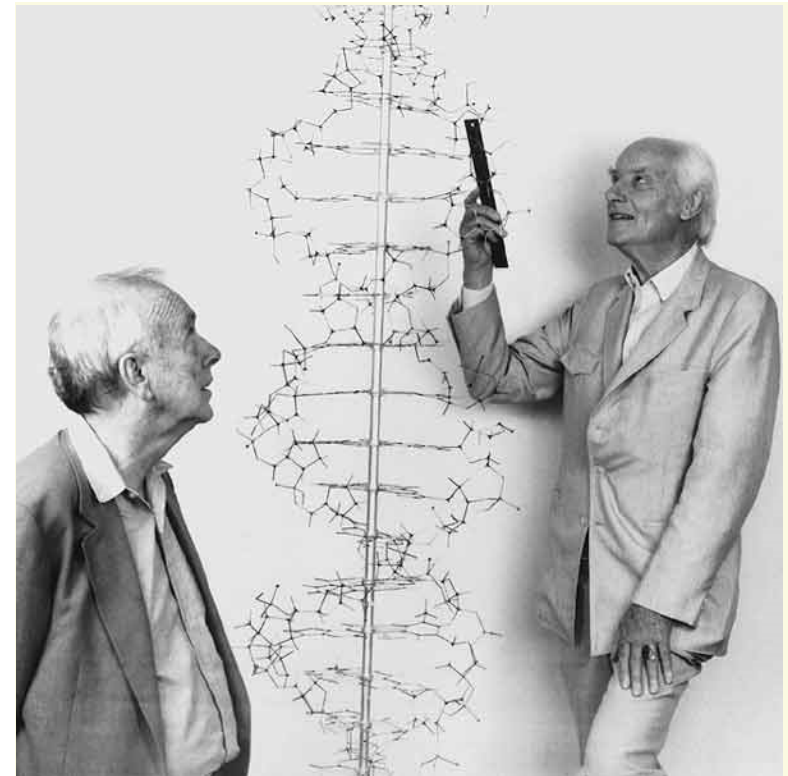
Keep it SHORT but GOOD!

- **Example 2:**

James D. Watson and Francis Crick:
Nobel Prize in Medicine, 1962

- **One-page Report:**

“Molecular structure of nucleic acids: A structure for Deoxyribose Nucleic Acid”, *Nature*, 1964, 171: 4356



James D. Watson (1928-)

Francis Crick (1916-2004)

It has **1100** words and **1** figure !

Keep it SHORT but GOOD!

- **Example 3**

1994 经济学诺贝尔奖 电影 “美丽心灵” (A Beautiful Mind)

关键文章(全文只有 **28** 行!)

Nash, Jr., John F., “Equilibrium points in n -person games,”

PNAS (1950) 36:48-49

EQUILIBRIUM POINTS IN N -PERSON GAMES

BY JOHN F. NASH, JR.*

PRINCETON UNIVERSITY

Communicated by S. Lefschetz, November 16, 1949

One may define a concept of an n -person game in which each player has a finite set of pure strategies and in which a definite set of payments to the n players corresponds to each n -tuple of pure strategies, one strategy being taken for each player. For mixed strategies, which are probability



John Nash

(1928 – 2015)



MIT, Princeton

From 香港城市大学 陈关荣

Principles of effective writing

“My professor friend told me that in his academic world, ‘publish or perish’ is really true. He doesn’t care if nobody reads it or understands it as long as it’s published.”

出版 腐朽

There’s a hint of truth here, is it?

From: Anne Ku. “The joys and pains of writing and editing,” *Le Bon Journal*, 2003

<http://www.bonjournal.com/volume2/issue1writing.pdf>



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Principles of effective writing

1. Cut the clutter (unnecessary words and phrases) 避免使用冗长的词组
2. Use the active voice (subject + verb + object) 运用主动语态
3. Write with verbs: use strong verbs, avoid turning verbs into nouns, and don't bury the main verb! 正确运用动词

注意：

以下例子中被改动的地方并没有语法错误！



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1. Cut the clutter 避免冗长词组

- Example 1 – cut unnecessary (extra) words

“Brain injury incidence shows two peak periods in almost all reports: rates are the highest in young people and the elderly.”

Brain injury incidence peaks in the young and the elderly.

Common clutter

- Dead weight words and phrases
 - As it is well known
 - As it has been shown
 - It can be regarded that
 - It should be emphasized that
- Empty words and phrases
 - basic tenets of
 - methodologic
 - Important
- Repetitive words or phrases studies/examples
 - illustrate/demonstrate
 - challenges/difficulties
 - successful solutions
- Adverbs
 - very, really, quite, basically, generally, etc.

1. Cut the clutter

- Example 2 – long phrase that could be short

The expected prevalence of mental retardation, based on the assumption that intelligence is normally distributed, is about 2.5%.

The expected prevalence of mental retardation, if intelligence is normally distributed, is 2.5%.



Long words and phrases that could be short...

Wordy version

- A majority of
- A number of
- Are of the same opinion
- Less frequently occurring
- All three of the
- Give rise to
- Due to the fact that
- Have an effect on

Crisp version

Most

Many

Agree

Rare

The three

Cause

Because

affect



Long words and phrases that could be short...

Wordy version

- Has the ability to
- In light of the fact that
- In the event that
- In the vicinity of
- Owing the fact that

Crisp version

Can

Because

If

Near

Because



1. Cut the clutter

- Example 3 – Eliminating Redundancies

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

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



Eliminating Redundancies

A redundancy is needless repetition of words within a sentence.

(already) **existing**

(alternative) **choices**

at (the) **present** (time)

(completely) **eliminate**

introduced (a new)

(still) **persists**



1. Cut the clutter

- Example 4 – eliminate negatives

She was not often right.

She was usually wrong.

She did not want to perform the experiment incorrectly.

She wanted to perform the experiment correctly.

They did not believe the drug was harmful.

They believed the drug was safe.

Eliminate negatives

- Not honest
- Not harmful
- Not important
- Does not have
- Did not remember
- Did not pay attention to
- Did not succeed

Dishonest

Safe

Unimportant

Lacks

Forgot

Ignored

Failed



1. Cut the clutter

- Example 5 – eliminate there is/there are

There are many ways in which we can arrange the pulleys.

We can arrange the pulleys in many ways.

The data confirm that there is an association between vegetables and cancer.

The data confirm an association between vegetables and cancer.



2. Use the active voice 运用主动语态

- What is passive voice?

Object-Verb-Subject or just Object-Verb

Classic example: “Mistakes were made.”

Passive verb = a form of the verb “to be” + the past participle of the main verb

Example:

My first visit to Boston will always **be** remembered by me.

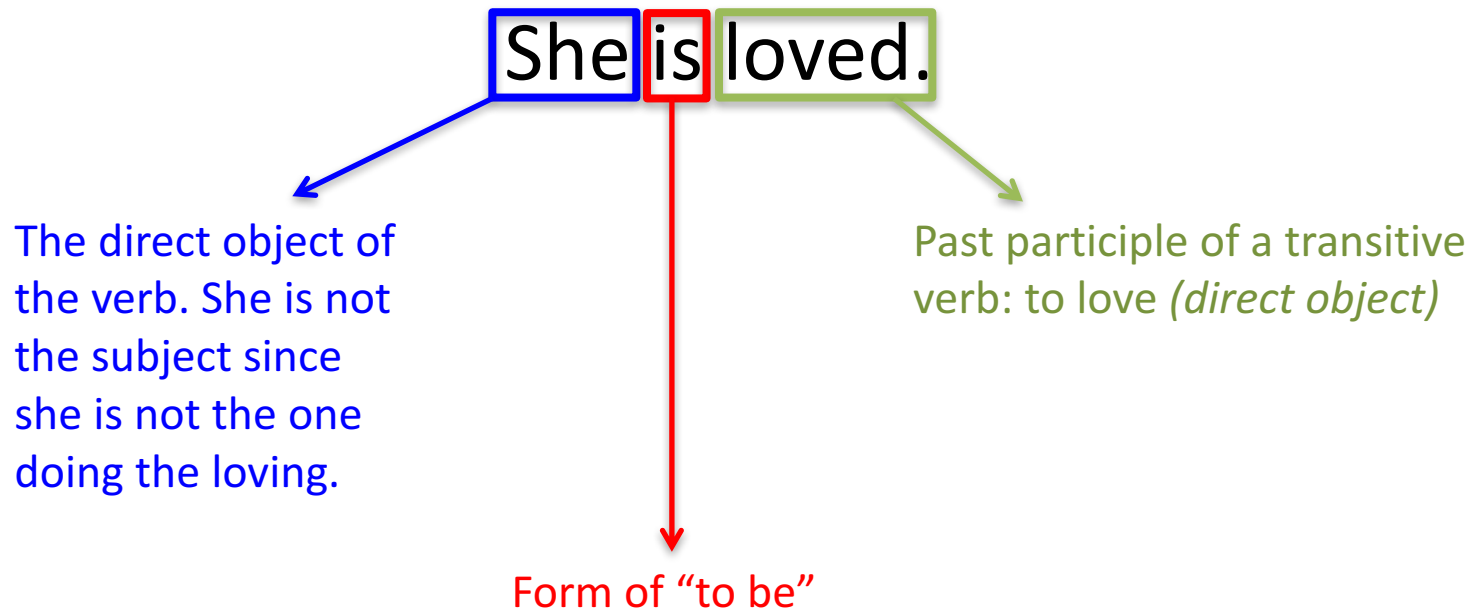
object

verb

subject

Active: I will always remember my first visit to Boston

Example: passive voice



This sentence evokes the question,
“who is loving her?”

2. Use the active voice

Passive:

Increased promoter occupancy and transcriptional activation of p21 and other target genes were observed.

Active:

We observed increased promoter occupancy and transcriptional activation of p21 and other target genes.

Why use active voice?

Because passive voice evokes the question: WHO does what to whom?



Is it really OK to use “I” or “We”?

- YES! It is OK.

1. The active voice is livelier and easier to read
2. It is a myth that avoiding first-person pronouns lends objectivity to the paper.
 - a. You (or your team) ran the experiments and interpreted the data. To imply otherwise is misleading.
 - b. The experiments and analysis did not materialize out of thin air! (e.g., “the data were interpreted to show”).
3. By agreeing to be an author on the paper, you are taking responsibility for its content. Thus, you should also claim responsibility for the assertions in the text by using “we” or “I.”

Is it really OK to use “I” or “We”?

4. Journals want active voice!

The style guidelines for many journals explicitly instruct authors to write in the active voice. For example, Science magazine advises:

“Use active voice when suitable, particularly when necessary for correct syntax (e.g., “To address this possibility, we constructed a λ Zap library ...).” (<http://www.sciencemag.org/site/feature/contribinfo/prep/res/style.xhtml>)

5. Great authors use “we” and “I”!

Watson and Crick’s celebrated 1953 paper in Nature begins:

“We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.).” <http://www.exploratorium.edu/origins/coldspring/printit.html>



2. Use the active voice

- When is it OK to use the passive voice?

➤ The methods section.

- What was done is more important than who did it!
- Readers tend to skim the methods section for key words rather than reading it as prose.
- May be more effort than it's worth to avoid using “we” and “I” in every sentence.

3. Write with verbs! 正确运用动词

- Trick 1 – Use strong verbs

“Loud music came from speakers embedded in the walls, and the entire arena moved as the hungry crowd got to its feet.”

“Loud music **exploded** from speakers embedded in the walls, and the entire arena **shook** as the hungry crowd **leaped** to its feet.”



Avoiding weak verb phrases

In general, the smaller the verb phrase, the stronger the verb phrase.

is beginning

begins

is used to detect

detects

made the decision

decided

made the measurement of

measured



3. Write with verbs!

- Trick 2 – Don't turn verbs into nouns

During DNA damage, recognition of H3K4me3 by ING2 results in recruitment of Sin3/HDAC and repression of cell proliferation genes.

During DNA damage, H3K4me3 **recruits** ING2 and Sin3/HDAC, which together **repress** cell proliferation genes.

Say exactly who does what to whom!



3. Write with verbs!

- Trick 2 – Don't turn verbs into nouns

Obtain estimates of

Has seen an expansion in

Take an assessment of

Offer confirmation of

Make a decision

Shows a peak

Provide a description of



Estimate

Has expanded

Assess

Confirm

Decide

Peaks

Describe



3. Write with verbs!

- Trick 3 – Don't bury the main verb

Keep the subject and main verb (predicate) close together at the start of the sentence.

One study of 930 adults with multiple sclerosis (MS) receiving care in one of two managed care settings or in a fee-for-service setting found that only two-thirds of those needing to contact a neurologist for an MS-related problem in the prior 6 months had done so (Vickrey et al 1999).

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Principles of Effective Writing

“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 the education and rank.”

-- William Zinsser in On Writing Well, 1976

