

# Writing, Scholarship, and Plagiarism

a lecture from Chem 200



image from <https://www.teachingenglish.org.uk/>

Part of 2<sup>nd</sup>-Year Report Advising  
Thursday, Sep 12, 2019

# Today' s Lecture

## 1. Good scientific writing

- a. Know your audience
- b. Teach your audience with an introduction
- c. Get started with published introductions
- d. Scholarly writing is easy
- e. Citations
- f. Quotation
- g. Paraphrasing



<http://www.findhow.com/writing/how-to-write-a-conference-paper.php>

## 2. Plagiarism



<http://www.fda.gov/RegulatoryInformation/default.htm>

# Rule 1. Write to your audience

## “1. Introduction

An interesting development stemming from investigations of string duality is the existence of higher dimensional interacting superconformal fixed points. The simplest such fixed point is the (2,0) field theory in six dimensions. The theory can be discovered on the world-volume of the M-theory 5-branes [3], and in the compactification of type IIB string theory on a singular K3 [2]. This theory, compactified on a 5-torus, is also relevant to Matrix theory [4] compactifications on  $T^4$  [5] and [6].”

Leigh, R. G.; Rozali, M. *Phys. Lett.* **1998**, *B431*, 311.

This introduction didn't connect with me.

# Writing to: First Year Graduate Students

## “0. Introduction.

String theory is an ambitious project. It purports to be an all-encompassing theory of the universe, unifying the forces of Nature, including gravity, in a single quantum mechanical framework. The premise of string theory is that, at the fundamental level, *matter does not consist of point-particles but rather of tiny loops of string*. From this slightly absurd beginning, the laws of physics emerge. General relativity, electromagnetism and Yang-Mills gauge theories all appear in a surprising fashion. However, they come with baggage. String theory gives rise to a host of other ingredients, most strikingly extra spatial dimensions of the universe beyond the three that we have observed. The purpose of this course is to understand these statements in detail.”

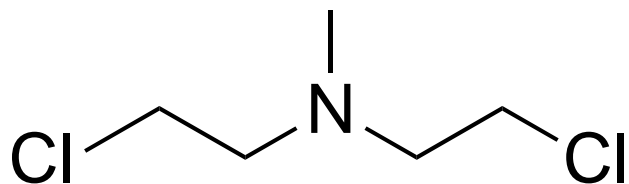
David Tong (University of Cambridge) Lectures on String Theory - <http://www.damtp.cam.ac.uk/user/tong/string.html>

Connect what the audience knows to what you want to tell them.

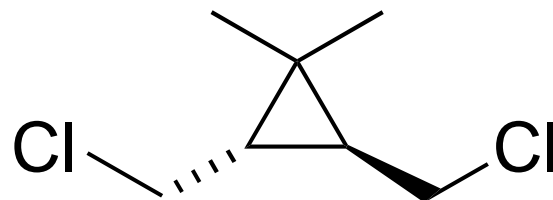
# Use Published Introductions as a Resource

- For most reports, papers, books, and grants, **you need to introduce the reader to your topic.**
- Take a **look at how other authors have recently done it.**
- Start by finding the most recent articles on the topic

**Example:** I need to write an intro for my new proposal...



old DNA alkylator








my proposed DNA alkylator

# Use Published Introductions as a Resource

- For most reports, papers, books, and grants, **you need to introduce the reader to your topic.**
  - Take a **look at how other authors have recently done it.**
  - Start by finding the most recent articles on the topic
- Example**, mechlorethamine or cyclopropane alkylation.

## Web of Science

1. Title: **The Mechanism of Guanine Alkylation by Nitrogen Mustards: A Computational Study**  
Author(s): Polavarapu, Abhigna; Stillabower, Jacob A.; Stubblefield, Skyler G. W.; et al.  
Source: JOURNAL OF ORGANIC CHEMISTRY Volume: 77 Issue: 14 Pages: 5914-5921 DOI: 10.1021/jo300351g Published: JUL 20 2012  
Times Cited: 0 (from Web of Science)  
 [View abstract](#)  
 Fits my topic  
 Fits my audience
2. Title: **Metabolite Profiling of Bendamustine in Urine of Cancer Patients after Administration of [C-14]Bendamustine**  
Author(s): Dubbelman, Anne-Charlotte; Jansen, Robert S.; Rosing, Hilde; et al.  
Source: DRUG METABOLISM AND DISPOSITION Volume: 40 Issue: 7 Pages: 1297-1307 DOI: 10.1124/dmd.112.045229 Published: JUL 2012  
Times Cited: 0 (from Web of Science)  
 [View abstract](#)
3. Title: **Protective Effects of Melatonin and S-Methylisothiourrea on Mechlorethamine Induced Nephrotoxicity**  
Author(s): Kunak, Zeki Ilker; Macit, Enis; Yaren, Hakan; et al.  
Source: JOURNAL OF SURGICAL RESEARCH Volume: 175 Issue: 1 Pages: E17-E23 DOI: 10.1016/j.jss.2011.11.002 Published: JUN 1 2012  
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 [View abstract](#)

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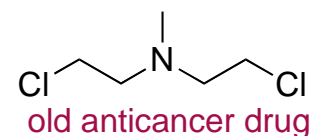
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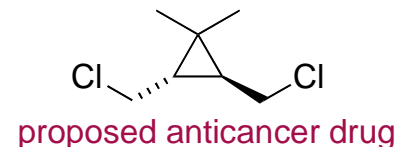
UC-eLinks [View abstract]

### INTRODUCTION

Nitrogen mustards form a class of versatile anticancer drugs used in the treatment of various cancers including Hodgkin's disease, non-Hodgkin's lymphoma, chronic leukemia, and lung, ovarian, and breast cancer.<sup>1-6</sup> Mechlorethamine, *N*-methylbis-(2-chloroethyl)amine (**1**), is the simplest representative of the nitrogen mustard drug family and was the first effective clinical anticancer drug that is still in use today.<sup>7-9</sup> The mode of action of these drugs is relatively well understood with the main cellular target being genomic DNA.<sup>10-15</sup> Nitrogen mustards act



vs.



- **Read** the key references, especially, recent reviews.
- **Compare** this with introductions to mechlorethamine in other publications.
- **Compose a new introduction.**

### (My) Introduction

DNA alkylating agents are one of the three most common classes of anticancer agents in clinical use today.<sup>1</sup> Most DNA alkylating drugs are achiral and possess nitrogen mustard functional groups that alkylate DNA through strained aziridinium intermediates, for example, mechlorethamine (Figure 1), cyclophosphamide, and chlorambucil.<sup>2-4</sup> I propose to develop a new class of chiral drugs that alkylate DNA through cyclopropylcarbinyl cation intermediates.



Write about these coins in my pocket.





# Group, Compare, and Contrast Information



<http://www.youtube.com/watch?v=Ect-kgxBb4M>

One of these things is not like the others.  
One of these things... doesn't belong.  
Can you tell which thing is not like the others  
...before I finish my song?



"One of These Things" written by Raposo, J.; Stone, J.; Hart.  
From *Sesame Street* Episode 1, 1969.

**What distinguishes scholarly writing from Sesame Street?**

# How to Make Writing Easier

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- **A scholar organizes information** and cites journal articles and books where the original information was published.
- **Writing is easy** after you organize the information. Writing is frustrating and difficult if you don't organize the information.
- Organizing the information is most of the work. There are three key devices for organizing information: **group, compare** and **contrast**.

# Organize and then Write

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## Seven Coins In my Pocket

- I. One huge coin
- II. One large coin
- III. Three medium-sized coins
- IV. Two small coins



## Seven Coins In my Pocket

- I. Four silver colored coins
- II. Three copper colored coins

# Organize Further

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## Seven Coins In my Pocket

### I. Four silver colored coins

- A. One foreign coin with a hole
- B. Three U. S. coins

### II. Three copper colored coins

- A. Two U. S. pennies
- B. One Canadian penny

# Complete Your Hierarchical Organization

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## Seven Coins In my Pocket

### I. Four silver colored coins

A. One foreign coin with a hole

B. Three U. S. coins

1. Two dimes

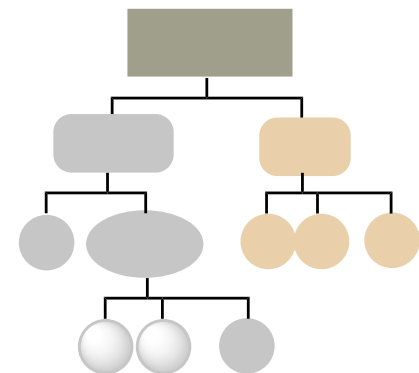
2. One nickel

### II. Three copper colored coins

A. Two U. S. pennies

B. One Canadian penny

## hierarchy





# Translate Your Organization into Writing

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I have seven coins in my pocket.

Four coins are silver colored and three coins are copper colored.

The large silver coin with a hole in the center is Danish. The other three silver coins are United States currency and consist of two small dimes and one larger nickel.

All three of the copper coins are pennies, two from the U.S. and one from Canada.

# Translate Your Organization into Writing

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I have seven coins in my pocket. Four coins are silver colored and three coins are copper colored. The large silver coin with a hole in the center is Danish. The other three silver coins are United States currency and consist of two small dimes and one larger nickel. All three of the copper coins are pennies, two from the U.S. and one from Canada.

# Scholarly Writing: Organize, Analyze, Embellish

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I have seven coins in my pocket, worth about one dollar. Four coins are silver colored and three coins are copper colored. The large silver coin with a hole in the center is Danish. The other three silver coins are United States currency and consist of two small dimes and one larger nickel. The U.S. nickel is made of cupronickel alloy, with copper and nickel in a 75:25 ratio.<sup>1</sup> All three of the copper coins are pennies, two from the U.S. and one from Canada. The U.S. coins are worth twenty seven cents. The 5-kroner Danish coin is worth 85 cents at the current exchange rate.<sup>2</sup>

1. R. Yeoman, K. Bressett, Q. D. Bowers, J. Garrett *The Official Red Book: A Guide Book of U.S. Coins* 2013.

2. OANDA Currency Converter. <http://www.oanda.com/currency/converter/> accessed July 2, 2013.

# Gather Some Data, Then Write About it in a Scholarly Fashion

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Four alphanumeric characters are arranged in quadrants on my wooden easel. Three of the characters are the number 2 from the Arabic numeral system developed in India around A.D. 500.<sup>1</sup> The fourth character in the southwest quadrant is the letter W from the modern English alphabet developed in the 7<sup>th</sup> century.<sup>2</sup> The two characters are related because "W" is a digraph, pronounced "double U" and therefore derives from the multiplicative factor 2.<sup>3</sup>



[1] Bulliet, R.; Crossley, P.; Headrick, D.; Hirsch, S.; Johnson, L. (2010). *The Earth and Its Peoples: A Global History, Volume 1*. Cengage Learning. p. 192. ISBN 1439084742.

[2] MacArthur, T. (1992) *Oxford Companion to the English Language*

[3] Brooks, G. (2015) *Dictionary of the British English Spelling System*, p. 460.

# Citing Your Sources = Scholarship

- **CITE YOUR SOURCES** when you group, compare and contrast information.

“There are four mammalian Janus kinases: TYK1, JAK1, JAK2, and JAK3.<sup>2a,9</sup> JAK2 kinases are the most recently discovered members of this class<sup>10</sup> and two of the three murine isoforms,  $\alpha$  and  $\beta$ , are present in humans.<sup>11</sup>”

“Cyclopropylcarbinyl cations exhibit the same degree of strain as aziridinium ions, 27 kcal/mol vs 26 kcal/mol, respectively,<sup>13</sup> yet cyclopropylcarbinyl cations react with anionic nucleophiles about  $10^5$  faster, than comparably substituted aziridinium ions.<sup>14</sup>”

- **A rich set** of literature references is a sign of **scholarship**
- **A meager set** of literature references is a sign of **superficiality**
- **DON'T PAD your citation list.**
  - Don't cite papers that you haven't looked at
  - Judiciously choose your citations. Favor seminal publications and comprehensive reviews.

“Solar energy is an environmentally friendly alternative to burning of fossil fuels.<sup>1-67</sup> The majority of photovoltaic modules in use today are based on solar cells composed of silicon.”



# Use Quotation Marks when Copying Word-for-Word

- Quote only when the word choice is irreplacable or the focus of analysis. See how Seddon does it?

- If you take key phrases or full sentences from others, use quotation marks.

The Hydrogen Bond and Crystal Engineering<sup>†</sup> *Chem. Soc. Rev.*, **1993**, 22, 397.

Christer B. Aakeröy and Kenneth R. Seddon

Department of Chemistry, David Keir Building, The Queen's University of Belfast, Belfast BT9 5AG, Northern Ireland

## 2.1 What is a Hydrogen Atom?

This is not a rhetorical question, and nor are we the first to raise it. The following is quoted verbatim from a recent paper by Cotton and Luck:<sup>4</sup>

'There is a kind of conventional wisdom that neutron diffraction finds hydrogen atoms better than *X*-ray diffraction does. But is this even a meaningful statement, let alone a true one? It can be argued that it is not meaningful and thus incapable of being true. The simple facts are that neutrons and *X*-rays see two different parts of the hydrogen atom and that these parts do not coincide. It is then a Solomonic question whether either technique is justifiably considered to 'see' the hydrogen atom. The neutron experiment sees, with considerable accuracy (*ca.*  $\pm 0.001$  Å), the location of the hydrogen atom's *nucleus*, the *proton*. In a very favourable case [...], the *X*-ray experiment sees, with less accuracy (*ca.*  $\pm 0.02$  Å), the hydrogen atom's *electron cloud*. Which of these is 'the hydrogen atom'? Both the nucleus and the electron density of an atom are essential parts, and it is therefore impossible to assert rationally that the position of either the one or the other is 'the' position of the atom.'

Only Cotton has the standing, insight, and gall to ask questions like this in a manuscript primarily concerned with the crystal and molecular structure of {diethylbis(1-pyrazolyl)borato}allyldi-carbonylmolybdenum(II)! It is a pity that this manuscript, principally of interest to organometallic chemists, may not attract the universal readership that it deserves. The question

# Paraphrase... with Caution



Definition of PARAPHRASE

**1:** a restatement of a text, passage, or work giving the meaning *in another form*

# Paraphrase with Caution

## Unacceptable and Acceptable Paraphrases

ORIGINAL text, from page 1 of *Lizzie Borden: A Case Book of Family and Crime in the 1890s* by Joyce Williams et al.:

The **rise** of industry, the growth of cities, and the **expansion** of the population were the three **great developments** of late nineteenth century American **history**. As **new, larger, steam-powered factories** became **a feature of the American landscape in the East**, they **transformed** farm hands into **industrial laborers**, and provided jobs for a **rising tide** of immigrants. With industry came **urbanization** - the growth of large cities (like Fall River, **Massachusetts**, where the Borden family lived) which became the centers of production as well as of commerce and trade.

## Here's an **UNACCEPTABLE** paraphrase that is **plagiarism**:

The **increase** of industry, the growth of cities, and the **explosion** of the population were three **large** factors of nineteenth century America. As **steam-driven companies** became **more visible in the eastern part of the country**, they **changed** farm hands into **factory workers** and provided jobs for the **large wave** of immigrants. With industry came **the growth of large cities** like Fall River where the Borden family lived which **turned into** centers of commerce and trade as well as production.

## Two separate reasons this paraphrase is unacceptable:

1. The writer has mainly substituted words or phrases with synonyms, or changed the order of the original sentences.
2. The writer failed to cite a source for any of the ideas or facts.

# This is plagiarism

- Plagiarism is the appropriation of another person's ideas, processes, results or words without giving appropriate credit.

## EDITOR'S PAGE

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### Plagiarism, self-plagiarism and duplicate publication

As defined by the Office of Research Integrity of the US Department of Health and Human Services (1), research misconduct means fabrication, falsification or plagiarism in proposing, performing or reviewing research, or in reporting research results. Perhaps the most common form of misconduct encountered – or at least recognized – is that of plagiarism. Plagiarism is the appropriation of another person's ideas, processes, results or words without giving appropriate credit (1). One usually thinks of plagiarism in science as publishing phrases, sentences or passages (without attribution) that were previously published by someone else. Many times, plagiarized passages are taken from the 'classic' article on the subject or from a standard textbook. Why individuals



Eldon

Smith, E. R.

"Plagiarism, self-plagiarism and duplicate publication."  
*Can. J. Cardiol.* **2007**, 23, 146.

# Plagiarism is Easy to Detect

- Abrupt changes in writing style tip off the reader.

Nature has lots of pretty colors in the molecules and they are used in perfumes and other household products. We synthesize a lot of molecules with colors but the methods aren't very good. The resplendent pastiche of wild sage is unrivalled for brilliance and intensity. Among the wild sages, *L. camara* stands out for its vivid palette arising from a range of anthocyanin glycosides. These are sugars with glucose connected to a benzene. Coffle et al. used a vanadium catalyst to make glycosides in small amounts but didn't get a good yield. We used a new organocatalyst to make phytophorin c using a sulfoximine.



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# Plagiarism is Easy to Detect

- Usually one can identify the source article by typing just a few unique phrases into Google.
- There are many web sites that make it easy to detect plagiarism: e.g., **Turnitin.com**, **Scanmyessay.com**, and **Plagiarismdetect.com**.
- One in three journals has access to **iThenticate**, which has an archive of 37 million scholarly articles and 37 *billion* web pages ([www.ithenticate.com](http://www.ithenticate.com)).

## ACS Publishing Policies

“**Plagiarism.** In publishing only original research, ACS is committed to deterring plagiarism, including self-plagiarism. ACS Publications uses CrossCheck's iThenticate software to screen submitted manuscripts for similarity to published material. Note that your manuscript may be screened during the submission process.”

<http://pubs.acs.org/page/policy/ethics/index.html>

# Consequences of Plagiarism

- **Immediate failure of Second-Year Report requirement.**

Review by the Dean of Physical Sciences: expulsion or option to resubmit, but incident letter goes student file.

- **Immediate failure of Orals / Advancement to Candidacy Exam**

Review by the Dean of Physical Sciences: expulsion or option to resubmit, but incident letter goes student file.

- **Loss of credibility and status**

Senator John Walsh (Montana) Army War College degree revoked

- **Ineligibility for funding**

Professor Leo Paquette (OSU)

- **Loss of job**

German Minister Karl-Theodor Zu Guttenberg 2011 - Resigned all offices

Professor Brian Swart 2012 - Fired

Director of Education (Toronto) - 2013 - Resigned

- **Legal action**

# Faculty Take Responsibility Too

- As faculty members, we plan to accept each of you into our research groups.
- Over the next five years, we will co-author papers with you and may even ask you to help us write proposals
- Ph.D. advisors expect their group members to preserve the integrity of their data and to write in a scholarly manner without plagiarizing.
- If a grad student or postdoc plagiarizes, the advisor will likely also be found guilty.

# Writing

- Know your audience
- Organize information... then write
- Don't confuse composition with handwriting
- Scholarship: using another person's composition and citing them
- Plagiarism: using another person's composition without citing them