学术论文撰写

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学术论文撰写

- 学术论文的撰写

（一）创造自己的论文写作模式

（二）如何撰写论文

（三）学术论文的Outline技术解读

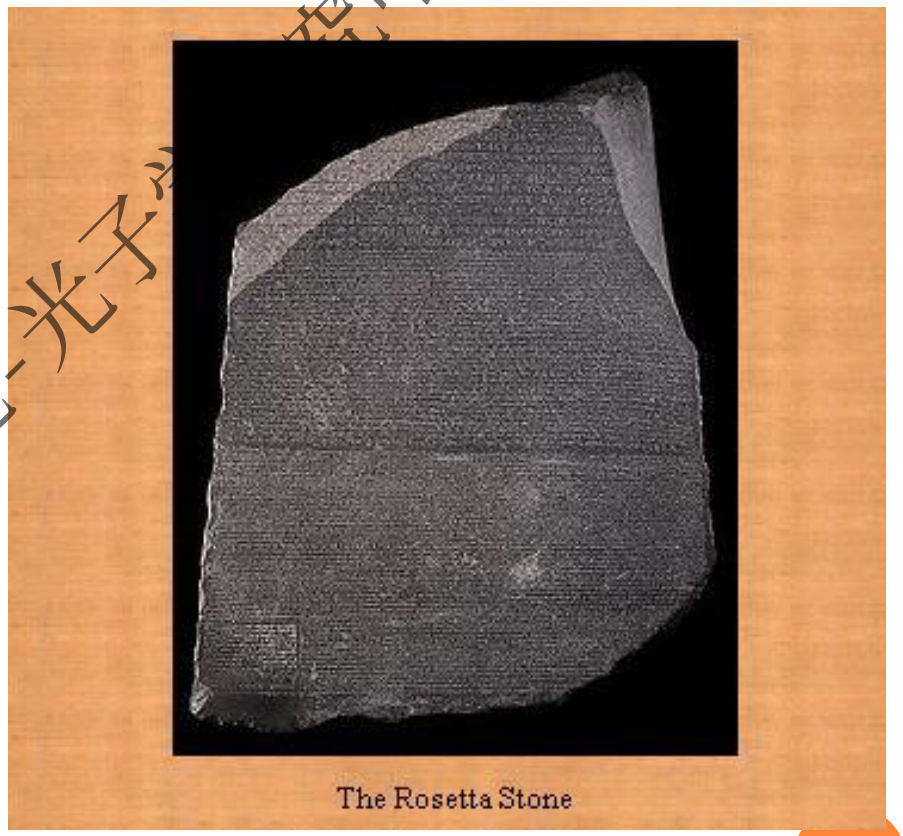
学术论文撰写

（一）创造自己的论文写作模式

- Introduction
- Where can you find a model to help you write?
- How will you know if you have found articles which will help you create a good model?
- Creating your model
- How to Use Your Spreadsheets ?

Introduction

- **What is the Rosetta Stone?**
- The Rosetta Stone is a stone with writing on it in two languages (Egyptian and Greek), using three scripts (hieroglyphic, demotic and Greek).


The Rosetta Stone

Why is it in three different scripts?

- The Rosetta Stone is written in three scripts because when it was written, there were three scripts being used in Egypt.
- The first was hieroglyphic which was the script used for important or religious documents.
- The second was demotic which was the common script of Egypt.
- The third was Greek which was the language of the rulers of Egypt at that time.
- The Rosetta Stone was written in all three scripts so that the priests, government officials and rulers of Egypt could read what it said.

What does the Rosetta Stone say?

- The Rosetta Stone is a text written by a group of priests in Egypt to honour the Egyptian pharaoh. It lists all of the things that the pharaoh has done that are good for the priests and the people of Egypt.
- Many people worked on deciphering hieroglyphs over several hundred years. However, the structure of the script was very difficult to work out.
- After many years of studying the Rosetta Stone and other examples of ancient Egyptian writing, Jean-Francois Champollion deciphered hieroglyphs in 1822

Your Personal Rosetta Stone

- Today the giant stone rests in the British Museum, waiting to inspire all scientists to translate their research results into a language that can be widely read.
- This is important for all of us because the science done in every country deserves reading by as many other scientists as possible.
- Your personal Rosetta Stone for translating your science for others now has English as well as your native language inscribed on it. Native speakers blush in embarrassment but the world language today is **English**.

Rosetta Stone of Science

- English has now become the Rosetta Stone of science, the language used to translate the science of the world into communication for the whole world.
- Most of us learned classical English in school. Many of us learned it extremely well. However, trying to publish in science using the English we were taught in school is like trying to unlock one door with the key to another: the door never opens.
- English today is startlingly different from the English we learned in school, and, to make it worse, English is changing more rapidly today than ever before.

- English today is a rapidly developing language, deeply influenced by Internet communication. As early as in the 1997 edition, the preface to the conservative *Random House Webster's College Dictionary* refers to the English language not as English, nor British English, or American English, but as 'world language'.

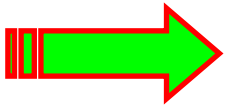
Science Writing Today

- Successful scientific writing today is done in a **simple** and **direct** fashion.
- First, the sequence must be precisely organized – not an easy thing to accomplish because so many things at first seem to need to be said simultaneously.
- Second, every sentence must be worded so that it is clear, with no alternate meanings available to innocent readers who were not in the lab with you, and therefore must rely only on the accuracy of your words.

- **Every scientist in the world who is doing valuable research owes it to the world to publish clear, concise results.**
- **Only when these are published internationally will other scientists doing similar research be able to know what is being done elsewhere.**
- **The fact that we speak and write to each other in English does not mean we should conduct our mental explorations in English, for other languages may have patterns of thought vital for the future development of science.**
- **So let scientists communicate among countries in English but without losing the riches within their native languages.**

学术论文撰写

（一）创造自己的论文写作模式



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- **Models for writing science today cannot be found in grammar textbooks, most of which were published too long ago.**
- **Nor are they taught by English teachers who were educated some years ago by teachers educated before them and using texts written even earlier.**
- **None of these formerly good sources are helpful for writing scientific articles in today's rapidly changing, dynamic English.**
- **Actually, few, if any, of us received English instruction specifically designed for writing science.**

- Those of us who know how to write for science journals taught ourselves, slowly, and usually after several failures.
- In school we were taught how to use correct grammar and to write traditional, formal, English narratives.
- Our teachers taught us how to use allusions, metaphors, creative adjectives, and graceful expressions.
- We labored to produce lengthy, flowing language to delight our English teacher's heart.
- Unfortunately this is not the type of language that delights the hearts of science editors.

- **Editors of science journals today want all ideas in language that is directly to-the-point, straightforward, and in as few words as possible.**
- **They want everything expressed with such clarity the science will be clear to all their readers.**
- **When your work is published, people all over the world will be reading your article.**
- **You not only want the meaning to be clear to them, but you want to represent your country well.**

- **Today's science journals receive many articles reporting good scientific research but written in poor English.**
- **If the English is poor enough, the article is rejected; if the English is good enough, editors will decide whether or not the research is worth publishing.**
- **If the research seems worth publishing despite the poor English, the journal will sometimes have the article edited to make it acceptable, but this is becoming less common.**
- **The most common response of editors is to reject the paper.**

- **Science editors grieve over their lack of time and people to edit the English in their journals, because it is vital to them that their language standards are high.**
- **However, even with their continuous effort to publish only good English, the pressure to publish new research developments as rapidly as possible permits some poor language to appear in even the best science journals.**

- **This is tragic for two reasons:**
- **First, everyone wants the articles in widely-read journals to be understood clearly by readers all over the world, and**
- **Second, no one wants new research to remain unpublished because editors simply did not understand the English in which it was written.**

- **Currently it is possible for good scientists in some countries or institutions to acquire an unwanted reputation for writing poor English.**
- **Don’t let this happen to your country or institution. You are going to teach yourself to write so well that future editors will respond in joy when they see an article written by someone from your country.**

Where can you find a model to help you write?

- The very international journals in which you desire to be published contain the data for your model.
- Although the editors of such journals are seldom willing to edit any of the English sent to them, you can use their expertise if you are clever.
- The recent research articles in their journals have passed their standards and await your analysis.

- All you need to do is to find articles written by native English speakers and published in recent international journals.
- In these articles you will find gold mines of excellent information about contemporary scientific English: In them you can find excellent, up-to-date teachers who can be found nowhere else.
- Each issue in every well-known, international, English-speaking journal contains several research articles written by authors at least one of whom is a native English speaker.

- **Each of these presents excellent information to use in your own writing. They lie before you, waiting for you to turn on your analytical skills.**
- **The friendly, personal model for contemporary scientific writing that can be created using this information would be of help both to scientists who are not native speakers of English and unpublished scientists who are native speakers.**
- **Your goal will be to get help from the language, not the science, in the articles. The first trick will be to insure that you have chosen excellent articles.**
- **The science of every article in a reputable, well-known international journal is sound, but the language may not be.**

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How will you know if you have found articles which will help you create a good model?

- **In order to be worth the time you are going to put in analyzing them, articles you choose must have three basic characteristics:**

1. **Each must be published in well-known international journals. Good examples of journals you might consider include: *Science, Nature, Biochemistry, Journal of the American Chemical Society, International Edition in English, Physical Review, Scientific American*, and other highly-respected international journals specific to your field.**

How will you know if you have found articles which will help you create a good model?

2. **Each must have been published within the last 3–5 years, no longer ago, sorry. Remember scientific language is in a rapid change process.**
3. **Each must have at least one author who is a native speaker of English. This is particularly important. Usually the first author's name listed is the author most responsible for the writing, but not always. If one of the authors is a native speaker of English, probably that person has at least edited the writing. If none of the authors appear to be native speakers of English, the information about the data you draw from the structure of language in the article may easily be misleading.**

- All three of these characteristics are necessary so that the articles you choose will give you good data on the use and style of language.
- Surprisingly enough, you do not need to be concerned with the actual scientific content of the articles.
- Although the closer the article is to the science you do, the more specific language help it may yield about the language for specific procedures and results, this is not a vital characteristic of the articles you choose.
- You are searching for excellent material from which to create a good model.

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CREATING YOUR MODEL

- You are about to learn how to create your own system for analyzing the language used today in successful articles. Luckily, you are the type of person who can do this because you are a scientist, and scientists analyze well.
- First of all, by using a keen eye as you begin to study the language structure of current articles in international science journals, you will discover new things you may not have noticed before. You will realize:

- Science calls for a sudden narrative.
- Successful articles are dramatic stories told in as few words as possible.
- Above all, in the voice of science, clarity is crucial.
- Your first step is to photocopy 1–3 articles all of which have the three characteristics mentioned earlier.
- Next you are going to design spreadsheets, either on paper or in your computer, on which to put the data you collect from the articles.

- **Typically the kinds of information these spreadsheets contain include data on:**
- **Length and variety of sentence structure, including frequency of prepositional phrases.**
- **Use of transitions, direct and implied.**
- **Appropriate choice of verbs.**
- **Verb tenses.**
- **How articles begin and end.**
- **How and when to give credit to other researchers.**

Spreadsheet #1

- This spreadsheet may contain notes on the lengths of sentences in the articles and on the variety of sentence structures. For example, check how frequently sentences start with the subject. Make notes about what words or structures sentences start with when they do not start with the subject. Write down particular structures that catch your eye as effective. Notice how infrequently prepositional phrases are used and when they are used. You may want to eliminate a number of irrelevant ones you find in your manuscript.

Spreadsheet #2

- This spreadsheet may list and explain the transitions you find in your articles. Good use of transitions is vital to a well-written article, but good writers only use transitions appropriately. Make notes on when the transitions are used and notice how the meaning of the transition fits the meaning of the sentence. Check how frequently transitions are used and if the same one is used repeatedly or consecutively.

Spreadsheet #3

- This spreadsheet may contain a list of appropriate varieties of the verbs you find along with notes about the situations in which they were used. Finding correct, varied, and interesting verbs to use in sentences about research procedures is one the most difficult writing problems a scientist encounters. The accuracy of the meaning of your sentences and paragraphs will be driven by the choice you make of verbs. This list will be valuable to you. Use it and keep adding to it.

Spreadsheet #4

- This spreadsheet may be a valuable tabulation of the verb tenses used in today's journals. Keep notes on how commonly the simple present tense occurs and also of any exceptions when the simple present tense is not the tense of choice. You will need this data especially after you finish writing your paper and are ready to edit it. Accomplished writers usually check the consistency of their verb tenses as the last step in polishing their manuscripts for publication. Remember not to pay attention to other language problems at the same time you check for tense consistency because, if you do, it will distract you from doing a thorough job.

Spreadsheet #5

- This spreadsheet may contain helpful notes about the ways the articles you photocopied begin and how they end. Early and last sentences in articles are important. Check how these are written. When you finish writing your paper, turn to this spreadsheet again. You will compose a much better – a simpler and more direct – beginning after you have finished writing your paper than you will at any earlier point. Endings must be sensitively written for it is here that some authors make greater claims than their data support. Avoid doing this.

Spreadsheet #6

- This spreadsheet has valuable information about giving credit to other research and other researchers. Study your articles carefully to see how, where, and when this is done. Your professional reputation in science may depend on the accuracy with which you give credit to others.

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How to Use Your Spreadsheets ?

- The spreadsheets are your model.
- Begin to use them by organizing the information on the spreadsheets in such a way that you can refer to them easily.
- Then as you begin writing you will keep an ongoing sheet of particular words or phrases about which you need more information.
- Perhaps you will make further spreadsheets, which will extend and complete your model for writing a successful scientific paper.

- Keep the spreadsheets. Use them. Modify them by adding new information and discarding data you find you no longer need.
- Anytime you have a question about the written presentation of a certain idea, your spreadsheets should help you.
- If your spreadsheets are not sufficient help, a careful scan of a relevant published article written by a native speaker of English should provide what you need.
- Even writers who do not keep spreadsheets usually have their own personal lists of appealing words and phrases with notes of where they were found and how each was used.

THANKS FOR YOUR ATTENTION !

ANY QUESTION?

学术论文撰写

（二）如何撰写论文

Whitesides Group: Writing a Paper

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怎样撰写科学论文?

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Writing a Paper

- What is a scientific paper?
- The reason for outlines
- How should you construct an outline?
- What should an outline contain?
- Introduction
- Results and Discussion
- Conclusion
- Experimental
- In summary

What is a scientific paper?

What is a scientific paper?
什么是科技论文?

- A paper is an organized description of hypotheses, data and conclusions, intended to instruct the reader. Papers are a central part of research. If your research does not generate papers, it might just as well not have been done. “Interesting and unpublished” is equivalent to “non-existent.”

- **科技论文是集假说、数据和结论为一体的概括性描述，以此向读者论述。论文是研究工作的中心部分。如果你的研究没有写成论文，也就等同于没有做研究。有意义但没有发表，等同于不存在。**

What is a scientific paper?
什么是科技论文?

- Realize that your objective in research is to formulate and test hypotheses, to draw conclusions from these tests, and to teach these conclusions to others. Your objective is not to “collect data.”

- **要意识到研究的目的是为了形成并证实假说，从一些测试中得出结论，并把结论传授给别人。你的研究目的不是简单的收集数据。**

What is a scientific paper?
什么是科技论文?

- A paper is not just an archival device for storing a completed research program, it is also a structure for planning your research in progress. If you clearly understand the purpose and form of a paper, it can be immensely useful to you in organizing and conducting your research.

- **一篇论文并不仅仅是收集已经得到的研究结果，它也有助于形成进一步的研究工作的框架。如果明确了论文的目的，这对于计划开展你的研究工作有很大益处。**

What is a scientific paper?
什么是科技论文?

- A good outline for the paper is also a good plan for the research program. You should write and rewrite these plans/outlines throughout the course of the research. At the beginning, you will have mostly plan;

- **好的文章提要也是研究工作的好计划，在研究的过程中，应该反复修改这些计划或提要。研究工作开始时，应有完善的计划；**

What is a scientific paper?
什么是科技论文?

- at the end, mostly outline. The continuous effort to understand, analyze, summarize, and reformulate hypotheses on paper will be immensely more efficient for you than a process in which you collect data and only start to organize them when their collection is “complete.”

- **工作结束时，应充分的总结。最有效率的做法是及时的理解， 分析，总结， 形成假说； 而不是等到完成时才开始收集和整理数据。**

The reason for outlines

The reason for outlines.
为什么要写提纲?

- I emphasize the central place of an outline in writing papers, preparing seminars, and planning research. I especially believe that for you, and for me, it is most efficient to write papers from outlines.

- **我在这里要强调提纲在论文写作，准备报告以及研究计划中的重要作用。我尤其相信按照提纲进行写作对我们大家都是最有效的方法。**

The reason for outlines.
为什么要写提纲?

- An outline is a written plan of the organization of a paper, including the data on which it rests. You should, in fact, think of an outline as a carefully organized and presented set of data, with attendant objectives, hypotheses and conclusions, rather than an outline of text.

- **提纲是一篇论文的行文计划，应该包括论文所依靠的数据。事实上，提纲不仅仅是列出各段的内容， 而是按照目的， 假说， 结论来精心组织数据。**

The reason for outlines.
为什么要写提纲?

- An outline itself contains little text. If you and I can agree on the details of the outline (that is, on the data and organization), the supporting text can be assembled fairly easily. If we do not agree on the outline, any text is useless. Much of the time in writing a paper goes into the text;

- 提纲本身应该文字简练。如果大家都同意提纲中的细节部分，那么正文组织起来就更容易。在我们就提纲达成一致以前，写正文是没有意义的。 写文章时，大部份时间花在写正文上；

The reason for outlines.
为什么要写提纲?

- most of the thought goes into the organization of the data and into the analysis. It can be relatively efficient to go through several (even many) cycles of an outline before beginning to write text; writing many versions of the full text of a paper is slow.

- **而大部份思考是用在整理和分析数据。在动笔前，详细讨论几遍写作提纲会提高写作效率；写很多遍正文反倒很慢。**

The reason for outlines.
为什么要写提纲?

- All the writing that I do - papers, reports, proposals (and, of course, slides for seminars)- I do from outlines. I urge you to learn how to use them as well.

- **我写的所有文章，包括论文，报告， 建议（当然还有讨论会的胶片）都从提纲开始。我也希望你们能学会使用它。**

How should you construct an outline?

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- The classical approach is to start with a blank piece of paper, and write down, in any order, all important ideas that occur to you concerning the paper.

- **最经典的方法就是找一页空白的纸，以任何顺序，写下与这篇文章有关的所有重要观点。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Ask yourself the obvious questions: “Why did I do this work?” “What does it mean?” “What hypothesis did I mean to test ?” “What ones did I actually test?” “What were the results?” “Did the work yield a new method or compound? What?” “What measurements did I make?” “What compounds? How were they characterized?”

- 自问一些显而易见的问题：为什么我要做这项工作？它意味着什么？我要验证哪些假设？我究竟验证了哪些假设？结果如何？ 这项工作产生了新方法或新物质吗？都是什么？我都做了那些测试？什么化合物？ 它们是如何表征的？

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Sketch possible equations, figures, and schemes. It is essential to try to get the major ideas written down. If you start the research to test one hypothesis, and decide, when you see what you have, that the data really seem to test some other hypothesis better, don't worry.

- **展示相关的方程，图表和示意图。试着写出主要的观点。如果你的研究开始是为证实一个假设，然而当你发现你有的数据仿佛真的可以更好地验证其它的假设时，你也不必担心。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Write them both down, and pick the best combinations of hypotheses, objectives and data. Often the objectives of a paper when it is finished are different from those used to justify starting the work. Much of good science is opportunistic and revisionist.

- **把它们两者都写出来，去选择假设，目的和数据的最佳组合。时常，当一篇文章完成时，它的目的和开始时是不同的。许多好的科学来自机遇和反复修正。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- When you have written down what you can, start with another piece of paper and try to organize the jumble of the first one. Sort all of your ideas into three major heaps (A-C).

- **当你已经写下你能写的，再拿出一页纸，试着草拟一份提纲。将你的观点分成三大类（见A,B,C)**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- A) Introduction

  Why did I do the work? What were the central motivations and hypotheses?

- **A）引言**

  为什么我要做这件工作，主要的目的和假设是什么?

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- B) Results and Discussion

  What were the results? How were compounds made and characterized? What was measured?

- **B）结果和讨论**

  结果是什么？化合物是怎样合成与表征的？测试方法是什么?

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- C) Conclusions

  What does it all mean? What hypotheses were proved or disproved? What did I learn? Why does it make a difference?

- **C）结论**

  所有这一切意味着什么？证实或否定了什么假设？我学到了什么？结果为什么与众不同?

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Next, take each of these sections, and organize it on yet finer scale. Concentrate on organizing the data. Construct figures, tables, and schemes to present the data as clearly and compactly as possible.

- **接下来，把每一部分再仔细组织。尤其是要集中整理数据。要尽可能把数据以清晰、紧凑的图表来展示。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- This process can be slow - I may sketch a figure 5-10 times in different ways, trying to decide how it is most clear (and looks best aesthetically).

- **这个过程也许会慢些。我可能要用5-10次，而且是以不同的方式，来构思一张图，以便决定怎样它才最清楚（而且看上去更加美观）。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Finally, put everything—outline of sections, tables, sketches of figures, equations - in good order.

- **最后，把所有这些—内容的提纲、表格、草图、方程式，排好顺序。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- When you are satisfied that you have included all the data (or that you know what additional data you intend to collect), and have a plausible organization, give the outline to me.

- **当你已经囊括了所有的数据（或者你明确知道你还需要收集哪些额外的数据），有了一个合理的构架，你对这些都感到满意时，将大纲交给我。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Simply indicate where missing data will go, how you think (hypothesize) they will look, and how you will interpret them if your hypothesis is correct. I will take this outline, add my opinions, suggest changes, and return it to you.

- **简要地标明哪些地方还缺数据，你认为（或推测）这些数据大概是什么样。如果你的推测是正确的，你将如何去解释它。拿到你的大纲后，我将把我的观点，建议反馈给你。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- It usually takes 4-5 repeated attempts (often with additional experiments) to agree on an outline. When we have agreed, the data are usually in (or close to) final form (that is, the tables, figures, etc., in the outline will be the tables, figures,…in the paper.)

- **一般，我们需要四或五个来回才能达成一致（中间经常还需要补做一些实验）。在我们的意见一致后，所有的数据通常以最终（或接近最终的）形式确定下来（也就是说，在提纲中的表格，图表等最终将成为文章中的表格，图表）。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- You can then start writing, with some assurance that much of your prose will be used.

- **然后，你就可以开始动笔写，注意你写的这些大多将用于正文。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- The key to efficient use of your and my time is that we start exchanging outlines and proposals as early in a project as possible. Do not, under any circumstances, wait until the collection of data is “complete” before starting to write an outline.

- **合理使用我们的时间的关键是，我们应尽可能早地交换提纲和建议。在任何情况下，都不要等到你已经收集“全”了数据之后才开始动笔写提纲。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- No project is ever complete, and it saves enormous effort and much time to propose a plausible paper and outline as soon as you see the basic structure of a project.

- **研究是永无止境的。当你看到你的结果初具雏形时，就要立即开始准备构思文章和提纲，这将节省你很多的精力和时间。**

How should you construct an outline?
你应该如何起构建你的论文研究提纲?

- Even if we decide to do significant additional work before seriously organizing a paper, the effort of writing an outline will have helped to guide the research.

- **即便在认真组织成文前，我们已经决定补做重要的其他实验，试着写一个提纲也一定对研究有指导意义。**

What should an outline contain?

What should an outline contain?
提纲需要包括哪些内容?

- Title:
- Authors:
- Abstract: Do not write an abstract. That can be done when the paper is complete.

- **标题：**
- **作者：**
- **摘要：不要着急写摘要，可以等文章写完后再写。**

Introduction

Introduction
引言

- The first paragraph or two should be written out completely. Pay particular attention to the opening sentence. Ideally, it should state concisely the objective of the work, and indicate why this objective is important.

- **文章的第1或2段应该完全用来写引言。要特别注意写好开头一句话。最好是简洁地陈述工作的目的，并指明该工作为什么重要。**

Introduction
引言

- In general, the Introduction should have these elements:
  The objectives of the work.
  The justification for these objectives: Why is the work important?
  Background: Who else has done what? How? What have we done previously?
  Guidance to the reader. What should the reader watch for in the paper? What are the interesting high points? What strategy did we use?

- **一般而言，引言应该包含以下几个要素：**
  工作目的。
  对工作目的的评价：该工作为什么很重要?
  工作背景：谁做了什么工作？做得怎么样？以前我们做了哪些工作?
  导读：读者应该注意该文章的哪些方面？有意义的要点有哪些？我们用到了哪些策略?

Introduction
引言

- Summary conclusion. What should the reader expect as conclusion? In advanced versions of the outline, you should also include all the sections that will go in the Experimental section (at this point, just as paragraph subheadings).

- **总结结论。读者期望什么样的结论呢？在提纲的前几个版本中，你应该包括实验部分中涉及到的所有内容。（在这一点上，就像是段落的副标题）。**

Results and Discussion

Results and Discussion
结果和讨论

- The results and discussion are usually combined. This section should be organized according to major topics. The separate parts should have subheadings in boldface to make this organization clear, and to help the reader scan through the final text to find the parts that interest him or her.

- **通常，结论和讨论是合在一起的。这一部分应根据主题来进行组织。分段应有黑体字的副标题，目的是使文章更有条理，能帮助读者清楚地通览全文，并找到他们感兴趣的内容。**

Results and Discussion
结果和讨论

- The following list includes examples of the phrases that might plausibly serve as section headings:
- Synthesis of Alkane Thiols
- Characterization of Monolayers
- Absolute Configuration of the Vicinal Diol Unit

- **下面列举一些适合作副标题的短语:**
- **烷基硫醇的合成**
- **单层膜的表征**
- **邻二醇单元的绝对构像**

Results and Discussion
结果和讨论

- Hysteresis Correlates with Roughness of the Surface
- Dependence of the Rate Constant on Temperature
- The Rate of Self-Exchange Decreases with the Polarity of the Solvent

- **滞后现象与表面粗糙度的关系**
- **温度对速率常数的影响**
- **自交换速率随溶剂极化度而降低**

Results and Discussion
结果和讨论

- Try to make these section headings as specific and information-rich as possible. For example, the phrase “The Rate of Self-Exchange Decreases with The Polarity of The Solvent” is obviously longer than “Measurement of Rates,” but much more useful to the reader. In general, try to cover the major common points:

- **尽可能使副标题具体并且内容丰富。例如，“The Rate of Self-Exchange Decreases with The Polarity of The Solvent”这个短语明显比“Measurement of Rates”长，但是对读者更有帮助。一般来说，尽量概括该段落的共同点。**

Results and Discussion
结果和讨论

- Synthesis of starting materials
- Characterization of products
- Methods of characterization
- Methods of measurement
- Results (rate constants, contact angles, whatever)

- **初始材料的合成**
- **产物的表征**
- **表征方法**
- **测量方法**
- **结果（速率常数，接触角，其它）**

Results and Discussion
结果和讨论

- In the outline, do not write any significant amount of text, but get all the data in their proper place: any text should simply indicate what will go in that section.
- Section Headings
- Figures (with captions)
- Schemes (with captions and footnotes)
- Equations
- Tables (correctly formatted)

- **在提纲中，不要罗列大量的正文内容，而是要给出数据应放的合适位置：任何正文应该简明地指出那段中包括了什么数据。**
- **副标题**
- **图表（附说明）**
- **示意图（附说明和注解）**
- **方程**
- **表格（正确格式化的）**

Results and Discussion
结果和讨论

- Remember to think of a paper as a collection of experimental results, summarized as clearly and economically as possible in figures, tables, equations, and schemes. The text in the paper serves just to explain the data, and is secondary. The more information that can be compressed into tables, equations, etc., the shorter and more readable the paper will be.

- **记住把文章看作实验结果的集合，并尽可能清晰和简洁地总结在图表，表格，方程和示意图中。论文中的正文是为解释数据服务的，因而它是次要的。可以被压缩进表格，方程等的信息越多，文章越短，越易读。**

Conclusion

Conclusion
结论

- In the outline, summarize the conclusions of the paper as a list of short phrases or sentences. Do not repeat what is in the Results section, unless special emphasis is needed. The Conclusions section should be just that, and not a summary. It should add a new, higher level of analysis, and should indicate explicitly the significance of the work.

- **在提纲里，总结论文中的结论应是由一些简短的短语或句子组成。除非是为了特殊的强调，一般不要重复在结果部分已经有的结论。结论部分应该是像上面说的那样，而不仅仅只是一个总结。它应该增加新的，更高层次的分析，并且应该明确地指出这项工作的意义。**

Experimental

Experimental
实验部分

- Include, in the correct order to correspond to the order in the Results section, all of the paragraph subheadings of the Experimental section.

- **包括所有实验部分的副标题，顺序与结果部分要相对应。**

In summary

In summary:
总结：

- Start writing possible outlines for papers early in a project. Do not wait until the “end”. The end may never come.
- Organize the outline and the paper around easily assimilated data - tables, equations, figures, schemes, rather than around text.

- **在一个项目开始时，就应该着手去写可能的论文提纲，而不要等到论文结束的时候。研究可能永远没有结尾可言。**
- **整理提纲和论文要围绕易于接受的数据—表格，方程式，图表，示意图，而不是围绕正文。**

In summary:

总结：

- Organize in order of importance, not in chronological order. An important detail in writing paper concerns the weight to be given to topics. Neophytes often organize a paper in terms of chronology: that is, they recount their experimental program, starting with their cherished initial failures and leading up to a climactic successful finale.

- **不是按照时间顺序，而应按重要性来整理。论文写作的一个重要细节是要考虑各部分的权重。新手常常按照时间顺序来写论文：他们常常从珍爱的开始时的失败写起，直到最后的成功来叙述实验过程。**

In summary:
总结：

- This approach is completely wrong. Start with the most important results, and put the secondary results later, if at all. The reader usually does not care how you arrived at your big results, only what they are. Shorter papers are easier to read than longer ones.

- **这种方法是完全错误的。应该从最重要的结果写起，然后是较重要的结果。读者们通常不关心你是怎么得到的结果，而只关心结果是什么。短文章比长文章更易读。**

THANKS FOR YOUR ATTENTION !

ANY QUESTION?

学术论文撰写

（三）学术论文的Outline技术解读

- 学术论文撰写是研究工作的核心
- Outline技术是改进研究工作和撰写学术论文的有效方法
- 将任务化整为零三项实用小技术

  （1）划分段落技术；

  （2）每日一段方法；

  （3）十篇参考法则。

学术论文撰写是研究工作的核心

- 论文撰写表面上看好像是研究工作的总结，实际上则是研究工作的核心，是围绕核心问题开展研究的组织、计划和实施的重要模式和抓手。论文撰写的过程就是对问题进行深入系统思考的过程，也是不断发现新问题、使研究不断深化的过程。因此，**论文的撰写是研究者思考的深化和知识深刻理解并内化的重要手段**。
- 那些将撰写论文与问题研究的过程相互割裂的想法和做法不仅是片面的，而且是有害的。因为论文的立意、围绕问题进行专题文献的查阅、研究提纲的推敲、实验的设计等各个环节就是深入开展研究的过程，就是研究工作本身。正如美国科学院士George M. Whitesides所说的：“**论文是研究工作的中心部分。如果你的研究没有写成论文，也就等同于没有做研究。有意义但没有发表，等同于不存在。**”

学术论文撰写是研究工作的核心

- 高效的科学研究方法就是将拟开展的研究工作分解成若干个相对简单的问题，然后围绕问题反复深化与提炼出用于撰写论文的题目，这样，论文的撰写本身与研究的开展是合二而一的，是研究工作不可分割的一部分，不但没有成为所谓研究的负担，反而是撬动研究工作最好的工具和手段。是真正开展研究的正确门径。
- 通常而言，一个科研课题是要解决一个方面的重要问题，需要将其分解成一系列更小的问题来分别加以解决，所谓分而析之，就是把一个复杂的问题进行分解（如何分解问题也是科研能力的一个方面），转化成一系列相对简单的问题。这就是所谓的科学方法。而每一个简单的问题的解决就是通过一篇论文的组织、分析、研究、思考并撰写的过程而得以完成的。这样，通过一系列论文组织与撰写的过程，解决了每个相对简单的问题，这些问题的解决办法与解决方案就是通过所完成了的一系列论文表达出来的。也就完成了这项科研课题。

学术论文撰写是研究工作的核心

- 每位研究生的硕士或博士学位论文实际上就是一个科研课题（作为培养与训练学生科学研究能力而挑选出来的课题，硕士论文的课题一般较博士论文的课题要相对简单些），通过深入系统地解决这个科研课题内较为单一相对简单的一系列学术问题，就完成了这个有一定难度、相对复杂些的课题。而这一系列学术问题的解决，就是借助于围绕每一个单一问题学术论文的组织、研究、分析、撰写、（经过同行评审、质疑、修改、完善后）和最终的发表来得以表达的。学生通过这一系列的训练，来掌握科学研究的基本方法，最后，通过对该课题的综合，也就是硕士或博士学位论文的组织与撰写，来完成对如何解决复杂问题的综合训练。

OUTLINE技术是改进研究工作和撰写学术论文的有效方法

- Outline技术的核心是解决如何不断完善研究工作计划与不断扩展与丰富学术论文提纲的问题，是引导思维始终关注于：问题→作为试探的假设与解决方案→方法与方案的反复修改与不断完善→结果的证明和验证→获得正确的、有意义的结果→问题得到解决。
- 在上述过程完成后，就不断扩展了和丰富了的学术论文提纲，再进一步补充一些说明性文字，并反复进行润色与修改，就形成了一篇完整的学术论文。一篇科技论文比较难写的部分是引言、结论和摘要这三个部分，因为创新的学术思想的产生动机、价值与意义需要在这几个部分体现出来，而论文中所采用的具体的理论方法、实验结果及各种情况的讨论的叙述和阐明，通常学生大都能够较为容易的撰写出来。

学术论文的OUTLINE

- **Title**（文题，由拟解决的具体问题抽象概括出来）
- **Abstract**（摘要，论文全部完成后写摘要）
- **Introduction**（引言部分大致分成四个层次来撰写）：

（1）回答为什么开展此项工作？（如何开头：概述并说明拟开展问题讨论的领域或方向或问题越来越引起人们的重视，表明其**重要性**；为此，人们开展了一系列深入系统的研究。）

（2）有关此项工作国内外都有哪些人解决了哪些问题？（则其要，**概述那些人都解决了哪些问题并清晰注明**）

（3）本文要解决什么问题？（转折并提出**本文将要阐明的问题**。尽管如此，但XXX问题一直没有得到解决或没有得到关注。）

（4）简述如何解决，主要目的、意义是什么？（阐述：这个问题解决后，有什么现实的、可能的、潜在的**价值、作用、意义**。）

学术论文的OUTLINE

- **Working principle**

  Figures and descriptions

- **Theoretical model**

  Equations

  Simulation results

  Tables

  Figures

- **Experiments**

  Purpose of the experiment;

  Description of the experimental setup;

  Figures of Experimental setup

  Experimental results

- **Discussions**

学术论文的OUTLINE

- **Conclusions**

  结论部分的撰写一般大致包括三层内容：

  简要陈述本文主要完成了那些工作，获得了哪些主要的结果；

  进一步说明本文的结果的价值所在：解决了什么问题？能够进一步导致什么结果？

  意义所在：为。。。提供了可能？具有哪些潜在的影响或应用价值或前景？

- **Acknowledgements**
- **References**

定期与导师进行交流、讨论是确保OUTLINE不断充实与完善的关键

- 对于多数学生而言，完成了简单的Outline框架，并不等于完成了研究或完成了论文本身。需要不断进一步细化、深化Outline，需要定期的将阶段性研究结果、一些初步的实验验证结果、一些新的思考、一些公式推导不断补充到Outline中。**定期与导师进行交流、讨论是确保Outline不断充实与完善的关键**。**不要等到最后再去找导师讨论，事实上，这种带有具体研究任务与目标的讨论是你从导师那里获得宝贵的研究过程指导的最佳方式。**你会发现每次都会获得若干新的启发并使你的Outline不断的得到进一步的丰富和完善。一件研究工作以及围绕着这件研究工作拟撰写的一篇论文的Outline的完成，**前后需要与导师反复交流讨论4-5次，有时甚至更多次，越是积极的与导师交流、及早的完善与修改你的Outline，对于尽快的完成论文越有利**。

研究过程与OUTLINE的两个阶段

研究过程

（Action）行动　　表达（Express）

（Motivation）动机　　文题（Title）

（Research Plan）计划　　提纲（Outline-phase 1）

（Working）执行　　提纲（Outline-phase 2）

（Report）总结　　论文（Manuscript）

研究过程与OUTLINE的两个阶段

研究过程

提纲（Outline-phase 1）

提纲在这个阶段主要是按问题的逻辑需要进行构建。这个阶段提纲给你整体上和方向上的把握，帮助你明晰内容的框架及其主要脉络。（与导师交流讨论2-3次）

提纲（Outline-phase 2）

提纲在此阶段主要是具体化过程，要将逻辑指令转换成具体的实证和思想表达；将本课题的文献进行归纳整理，用mini overview的形式列出来；将理论依据和具体的公式推导出来；将实验装置图示通过具体的实验过程后给出明确的具像化；将实验结果给出具体的图示或结论；将可能的潜在应用明确化。（与导师交流讨论4-5次）

将任务化整为零三项实用小技术

（1）划分段落技术

- 在初步完成了Outline中的大部分内容时，对于如何开始学术论文的撰写，有些学生往往还会感觉无从下手，这可以进一步采用将整篇论文划分成10-15段，用10-15个方框表示，每个框中标明要大致写什么内容。

（2）每日一段方法

- 采用每天至少写一段的办法，就将心理上看似无从下手的艰巨任务化整为零，成为易于实现的工作了。

（3）十篇参考法则

- 对于初学者，在具体的写作过程中，还要找到若干篇你的核心参考文献，每当写到相关部分内容时，一旦无从下手之时就参考一下别人是怎样写的。例如：如何开头？查看10篇有关文献，学习一下看他们是怎样开头的。

好文章是虚心学习和反复修改的结果

（A）样板学习法

- 所谓样板学习法，是指对于初学者而言，一个十分具体的模仿榜样具有十分具体的示范作用。因此，初学论文写作者应虚心选择一篇你心目中或你课题十分接近的论文作为模仿样板。不妨在初步完成了Outline中的大部分内容时，采用亦步亦趋的模仿方式来尝试完成蹒跚学步的第一篇论文的初稿。这犹如蹒跚学步的孩童，难免要有很多对于依赖他人帮扶的痕迹。

（B）反复修改法

- 我们的第一篇初稿尽管惨不忍睹，但是有了这样一个批判稿要比没有已经有了实质的进步。我们记住：好文章都是反复修改的结果。因此在这个初稿的基础上，还要经过4-5次，甚至无数次反复的修改，才能使得你的论文犹如凤凰涅槃一般，脱去稚嫩的外衣，变成可投稿的雏形了。

研究生《学术修养》研讨课程
课堂提问

- 问题：

_____

_____

- 学号：　　姓名：

THANKS FOR YOUR ATTENTION !

ANY QUESTION?