CAASTRO Student Writing Workshop Summary and Cheat Sheet

1 Structure

1.1 Different Tasks

There are three main tasks when writing a manuscript:

1. Outline *(70% of your time)*
2. First Draft *(10% of your time)*
3. Revision *(20% of your time)*

One approach is as follows:

1.1.1 Outline

This is where you collect all of the information you will need to generate the text in your first draft. This includes facts from other literature, descriptions of your data, early versions of your figures, and discussion points. You might collect facts and references first, and later organise these into sections and subsections.

1.1.2 First Draft

Just write! The First Draft stage is where you work on turning your outline directly into sentences. The first draft doesn't need to be refined since you will come back to edit it later. If you have constructed a comprehensive outline, you should be able to complete the First Draft stage without consulting any other documents!

1.1.3 Revision

Finally, during the revision stage, you come back and edit your first draft. Clean up the clutter and refine your message (see Grammar & Style).

1.2 Order of the Outline

To make sure you only include necessary information, try constructing your Outline in the following order:

1. Results *(define the scope)*
2. Data and methods *(set up the results)*
3. Introduction *(provide the context)*
4. Discussion and conclusion *(interpret the results)*
5. Abstract *(sum up)*

1.2.1 Figures

Figures form the bulk of your results and will largely dictate the structure of your paper. Try to make them self-explanatory by using clear captions and legends. Be wary of colour-blindness! When you read papers, keep an eye out for effective figures and work out how you can improve your own.

1.2.2 Results

Aim for clarity! The text in this section should be entirely complimentary to your figures. Consider the most effective way to present your results: figure, table, or diagram?

1.2.3 Data and methods

This section should contain any information that would be required to replicate your work. Give a clear overview of where your data came from and how they were analysed.

1.2.4 Introduction

This should be geared towards a general audience as much as possible, and should be entirely shaped by what you'll discuss in the rest of the paper.

Highlight gaps in the literature, but leave any extended examination to the discussion. Be specific about your aim or hypothesis and how you'll achieve it. Note that you should already know the answer to this, having mapped out the results and methods sections.

1.2.5 Discussion and conclusion

Interpret your results and cover:

- your findings and how they relate to your aim
- how your results compare to the literature
- the strengths and limitations of your study
- the big-picture take-home messages and any future work

Make sure to focus on what your results actually prove, rather than what you hoped they would prove!

1.2.6 Abstract

Keep it concise! People usually scan this and decide if they want to read it, so try and get to the point of your work in the first or second sentence. The abstract should contain your main finding (not necessarily all of your findings). Try to emphasise what is novel about your work. Again, keep an eye out for abstracts that make you excited to read a paper and emulate those traits in your own abstracts!

2 Grammar & Style

Grammar and style is about communicating clearly and concisely with the reader. The text in your paper should aid the reader's understanding rather than getting in the way!

2.1 Key parts of language

- verb: describes an action
- noun: names a thing
- adjective: modifies a noun
- adverb: modifies a verb or adjective

2.2 Active voice

It is often easier to understand a sentence constructed in the active voice than in the passive voice:

- A new referee reviewed the manuscript. *(active)*
- The manuscript was reviewed by a new referee. *(passive)*

In the active voice the subject (referee) applies the verb (review) to the object (manuscript), whereas the order is reversed in the passive voice. When using the active voice, you must explicitly declare the subject, which is not a requirement of the passive voice. "The manuscript was reviewed." makes sense but does not provide any information about who did the reviewing!

2.3 Cutting clutter

Clutter is everything that might distract the reader from the point youâĂŹre trying to make.

2.3.1 Replacing phrases with single words

- a majority of $\longrightarrow$ most
- less frequently occurring $\longrightarrow$ rare
- give rise to $\longrightarrow$ cause
- due to the fact that $\longrightarrow$ because

2.3.2 Removing negative phrases

- does not have ⟶ lacks
- not important ⟶ unimportant
- not harmful ⟶ safe
- did not pay attention to ⟶ ignored
- not clear ⟶ unclear
- did not succeed ⟶ failed

2.3.3 Writing with verbs

- undergoes expansion ⟶ expands
- provides emphasis ⟶ emphasises
- offers confirmation ⟶ confirms
- provides a review ⟶ reviews
- makes a decision ⟶ decides
- gives a description ⟶ describes

2.4 That vs. which

"that" is restrictive (it defines the subject) where "which" is non-restrictive (extra information about the subject). If you can remove the information from the sentence without losing the intended meaning, you should use which (and offset the information with commas):

- The painting that was hanging in the foyer was stolen.
  (there is only one painting in the foyer, it was stolen)
- The painting, which was hanging in the foyer, was stolen.
  (there are possibly other paintings in the foyer, but only one was stolen)

2.5 Punctuation

Punctuation marks are used to separate clauses (a group of words with a subject and a verb). They are listed in order of their power to separate clauses (strongest to weakest).

- period *(separates independent clauses)*
- semicolon *(connects short, related clauses)*
- parentheses *(inserts an explanation or afterthought)*
- colon *(comes after a clause and introduces a list or explanation)*
- dash *(inserts a definition or description; more casual than parentheses)*
- comma *(indicates a pause between clauses)*

2.6 Paragraphs

A collection of sentences that contains a single main idea, which is ideally expressed within the first few sentences. The flow should be logical; options include chronological or from general to specific.

3 Peer Review

Peer review and publication is an important part of scientific writing.

3.1 Before submission

3.1.1 Authorship

- First author *(did most of the work; wrote the paper)*
- Co-author *(contributed to the work or broader project)*
- Acknowledgements *(helped shape the paper or provided insight)*

3.1.2 Picking a journal

There are numerous journals for astrophysics:

- Nature
- Science
- The Astrophysical Journal (ApJ)
- Astronomy and Astrophysics (A&A)
- Monthly Notices of the Royal Astronomical Society (MNRAS)
- Physical Review D (PRD)
- Publications of the Astronomical Society of Australia (PASA)

Each has its own audience. Read articles from different journals to get a feel for where it would be most appropriate to publish your work. For example, PASA has a focus on Australian-led papers, particularly astronomical or cosmological survey papers. Each journal will have its own LaTeX templates and guidelines about formatting.

3.1.3 Types of papers

There are several different types of papers:

- First exploration
  (New phenomenon or problem – arXiv: 0709.4301)
- Mid-way contribution
  (Moves the field forward – arXiv:1501.05516)
- Definitive answer
  (Legacy left by final measurements – arXiv:1212.5225)
- Review
  (Discusses all existing literature for a topic – arXiv:1001.2965)
- Letter
  (Short presentation of result for quick publication – arXiv:0810.0710)

3.2 Submission

You'll likely need to provide:

- LaTeX source files (including figures)
- compiled pdf or ps for the editor and reviewer
- information that you want the editor to know (such as potential reviewers who might have a conflict of interest)

Make sure you double check:

- any final spelling mistakes
- any mismatched references (figures and tables)
- any incomplete citations

Check for these before uploading, as well as in the compiled pdf that the journal provides during the submission process – this is what the reviewer will receive!

3.3 After submission

3.3.1 The referee

The editor responsible for your submission will assign a referee. The referee's job is to help improve your scientific contribution – not to rewrite your work!
The referee may wonder:

- what does your paper contribute to the field?
- have you made any major methodical mistakes?
- are your results believable?
- are your ideas clearly presented?
- have you made fair comparisons to the literature?

3.3.2 The outcome

There are a few possible outcomes after submitting to a journal:

- accepted with no changes (rare)
- accepted pending minor revisions
- moderate/major revision with resubmission (most common)
- rejected with no resubmission possible

Moderate or major revision can sound harsh, but you are just being encouraged to improve your work. The rejected outcome is often because the paper is not a good fit for the journal.

Make sure to take some time away from the referee's comments so you can address them fairly! When resubmitting with a response to the referee:

- start by thanking the referee for their feedback
- state the referee's comment and how you addressed it
- if you don't want to change something explain why
- be polite – being defensive won't help you!

3.4 The arXiv

It is entirely your (and your co-authors') choice about when to submit to the arXiv. There are pros and cons for both submitting before or after the journal accepts your paper. Seek advice from other academics and use your best judgement!

Science Writing Course

A significant amount of the content for this workshop was influenced by material from the Stanford Online Course: "Writing in the Sciences". The course can be found at:

lagunita.stanford.edu/courses/Medicine/SciWrite-SP/SelfPaced/about