

Advanced Writing for Astronomy

- <https://gherczeg.github.io/teaching/>
- Lectures on Tuesdays, Discussion/edits on Fridays
 - many slides and topics based on a similar course taught by Lynne Hillenbrand:
<https://sites.astro.caltech.edu/~lah/ay31/>

Syllabus

- Goal of this course: improve your editing
- Two tracks, depending on your time
 - You will not improve your writing/editing by listening to me lecture
 - You will (hopefully!) improve as an editor by completing the assignments
- If you improve as an editor, you will improve as a scientist
 - Better able to see strength, weaknesses in logic
 - Logical gaps lead to papers!

Common Sayings

- “Clarity of thought begets clarity of expression.”
- “If you haven’t written it, you haven’t done it.”
- “If you write it, but no one reads it, then you still haven’t done it.”
- “Write for the reader, not just to the reader.”

Writing Considerations

- Occasion: why and in what format to write?
- Purpose: to inform and/or to persuade?
- Audience:
 - who are they?
 - what do they know how they will use the document?
 - how much time do they have to digest the document?
- Special Circumstances
 - context, situation
 - culture issues
 - relevant history

Academic Writing

“Success is seen as largely measured by recognition and, in turn, the process of acquiring recognition as dependent on the capacity to write papers that are valued by one’s colleagues.”

[Ken Hyland; Writing in the Academy]

Structure of oral presentations

- Clear statement of the problem
- Summary of the state of the art, including assumptions and limitations
- Scientific approach
- Importance/Uniqueness of problem and approach
- Key results
- Conclusions
 - restatement of problem in light of the results
 - identification of new contribution
 - generalization / future

Structure of written presentations

- Written communication is fundamentally different from oral communication
- Writing is a Way of Thinking
- Technical writing enables self-interrogation
 - Editing: critically evaluate your own logic
- Popular writing: translates abstract to intuitive concepts

Because many scientists dread it, writing often is left to the last minute and thus is not optimally executed

Academic Writing

“Simply, academics who excel in publishing their writing are often appointed to key positions, gain access to economic resources, and occupy major gate-keeping roles. Not only do they achieve social power in their disciplines, but tend to form an elite as they exercise influence in setting standards, directing strategies, and determining what is considered good work or important topics. They may also gain greater influence as spokespeople for their colleagues, and more likely to become members of government committees and granting bodies that decide the fate of funding applications and research contracts.”

[Ken Hyland; Writing in the Academy]

Purpose: to convey and explain information

- Logical approaches
 - Chronological / narrative
 - Process / step-by-step
 - Problem and solution
 - Compare and contrast
 - Cause and effect
 - Definition and classification
- Every paper includes these each of these logical steps
- Astronomy papers have a specific flow that readers expect
 - Flow makes following arguments easier

Remember, readers are busy and will be lazy.

Problems with Scientific Writing

Most frequent problems:

- dense
- boring
- obscure
- arrogant
- difficult to read
- often grammatically sloppy
- **logic is unclear (maybe even to the author!)**

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Goal: communicate by describing as simply as possible your methods and results

How to learn to write?

It's hard! Practice makes perfect, or at least better

Mostly by emulation (copying) approaches that others take.
Sometimes courses like this one.

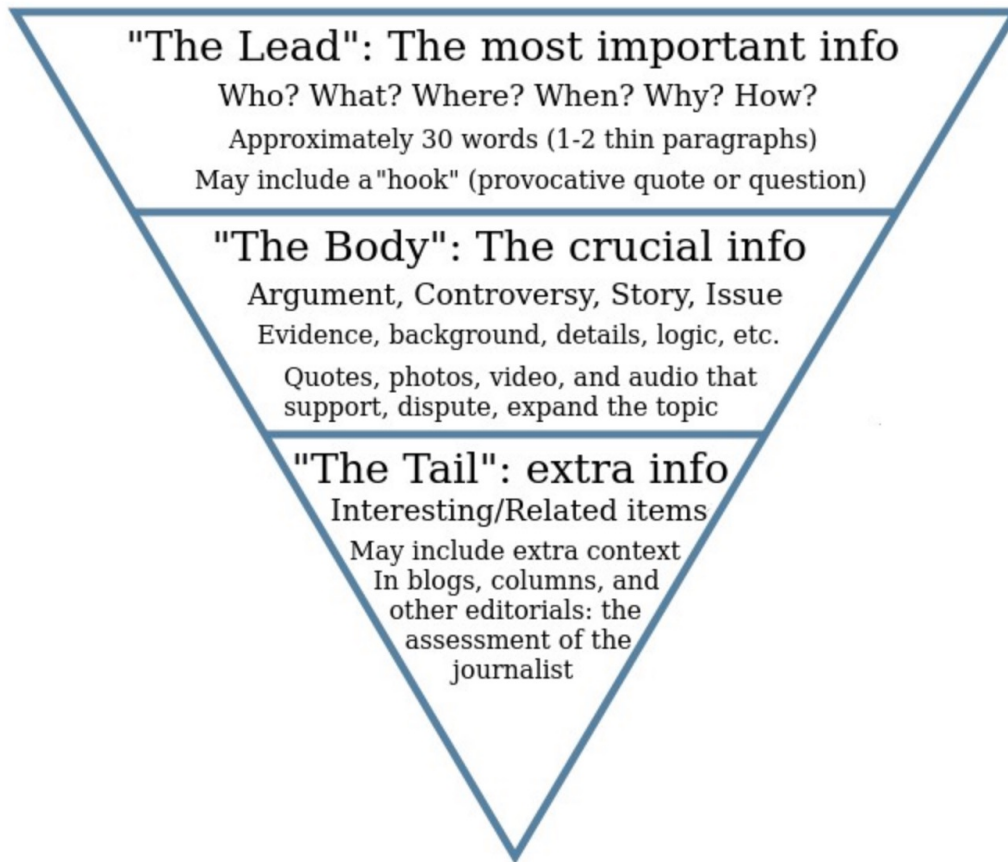
- First step: have a clear focus.
 - Focus, focus, focus!
- Second step: recognize that writing is mostly an art, not an exact science.
- Third step: acknowledge that some rules and guidelines apply, and that there is a recommended process.

Practice as a writer and as an editor!

General rules

- There are no rules. I will teach you some things that others will disagree with.
 - Example: avoid almost all acronyms!
(My rule, your advisor may differ; that's ok, your advisor is correct)
 - Exceptions: Telescopes/Instruments, ISM, AGN, FRB (but not many more!)
- **Logical flow is most important**
 - We will also cover grammar, but focus of course is on logic
- Approach: outlining
 - This approach differs from my own writing method
 - I often “outline” in plot form. Plots tell the story, text explains the plots
- **EDITING: critical to good writing**
 - When first writing, “throw up on the page”
 - Don't try to become a good writer, try to become a good editor.
- Tell a story of discovery (but not in chronological order)
 - Show, don't tell

Logic: funnel flow structure



- Inverse pyramid:
start big and get smaller
 - This applies both to the structure of a section and to each paragraph in the structure
- DO NOT: build up to a surprising conclusion!
 - This is not Avengers; conclusions come first

First assignment: Introductions

- Often the last section written in a paper (except conclusions)
- For us, introductions provide a good place for discussion
 - Similar logic across papers
 - Broad enough for non-experts to understand

Resources

https://owl.purdue.edu/owl/general_writing/

<https://www.astro.caltech.edu/~lah/ay31/>

<https://cgi.duke.edu/web/sciwriting/>

Alley, The Craft of Scientific Writing

Porush, Short Guide to Writing About Science, 1994

Lindsay, Scientific Writing = Thinking in Words, 2011

Hofmann, Scientific Writing and Communication, 2009