Jumpstart Your Paper

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Get the juices flowing

- Writing is tough...
- ...so lower the barrier to entry.
- Try:
  - Speaking about your project (e.g., elevator pitches).
  - Writing on a whiteboard or piece of paper (something obviously not in final form).
  - Writing stream-of-consciousness for 500 words, then throw out that text and start writing decent text.
- Expect that the 1st (and 2nd and 3rd) drafts will be terrible...
- ...but the final draft will be much, much better.

Start a tex Document Early

- You don’t need to have any results to start your LaTeX document.
- But you should definitely start one once you have even preliminary figures

Write the Abstract First

- Start by writing a very rough draft of the Abstract (don't worry you will re-write the whole thing several times).
- A good guide is:
  - **Context** - How does your work fit into the broader astrophysics literature.
  - **Aims** - What are you trying to do?
  - **Methods** - How are you going to do it?
  - **Results** - What did you find?
  - **Conclusions** - What do your results suggest?
- You can start by writing it out like a lab report (or like Astronomy & Astrophysics), but eventually you can remove the prompts and make it flow like a paragraph.

Structure Around Key Figures

- You should be able to tell story through figures.
- Start with the main result(s) figure(s) and work backwards.
- Which supporting figures do you need to demonstrate that your method or data selection is behaving as desired?
- Add very rough or even hand-drawn figures as placeholders.
  - If you don't have results yet, draw the plots how you expect or hope for them to turn out.
- Write captions as you add the figures.

Build Out Hierarchically

Create a detailed outline in a hierarchical approach:

1. Section
    1.1. Sub-section
        1.1.1. Paragraph main idea
            1.1.1.1. Sentence main idea

Build Out Hierarchically

Create a detailed outline in a hierarchical approach:

1. Introduction
2. Data
3. Method
4. Results
5. Discussion
6. Conclusion

Build Out Hierarchically

Create a detailed outline in a hierarchical approach:

1. Introduction
2. Data
    2.1. XMM-Newton Source Catalog
    2.2. SDSS Catalog
3. Method
4. Results
5. Discussion
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Build Out Hierarchically

Create a detailed outline in a hierarchical approach:

1. Introduction
2. Data
    2.1. XMM-Newton Source Catalog
    2.2. SDSS Catalog
        2.2.1. SDSS Main Galaxy Sample Overview
        2.2.2. Photometric Cuts
        2.2.3. Sky Footprint
        2.2.4. Targeting Strategy
3. Method
4. Results
5. Discussion
6. Conclusion

Build Out Hierarchically

Create a detailed outline in a hierarchical approach:

1. Introduction
2. Data
    - 2.1. XMM-Newton Source Catalog
    - 2.2. SDSS Catalog
        - 2.2.1. SDSS Main Galaxy Sample Overview
            - 2.2.1.1. How many galaxies?
            - 2.2.1.2. What redshift range?
        - 2.2.2. Photometric Cuts
        - 2.2.3. Sky Footprint
        - 2.2.4. Targeting Strategy
3. Method
4. Results
5. Discussion
6. Conclusion

Write Sentences

- Once you have a detailed outline, writing the sentences will be much easier because you have already done the work of planning the narrative.

Edit. Edit. Edit.

- The biggest difference from writing essays in high school English class is that your paper is only halfway done when you have enough words.
- Understand that you will edit each paragraph many, many times.
- You should do several edits yourself and with your advisor before sending to co-authors, who will suggest further edits.
- The editing process is even more intense for proposals because the binding constraint there is the MAXIMUM page limit.
    - Usually you can cut ~20% of the length without losing content. After that you really need to make difficult choices, but facing hard choices about what to keep and what to cut is important for truly understanding your proposed project idea.

Summary

- Get the writing juices flowing.
- Start a tex document.
- Abstract first.
- Then figures.
- Construct an outline from the top-level down.
- Edit. Edit. Edit.

The Bezanson approach (similar, but subtly different)

Step 1: Iterate between figures (cartoon) and abstract.

- DO NOT MAKE YOUR FIGURES BEAUTIFUL NOW. YOU DO NOT KNOW WHAT WILL SURVIVE THE EDITING PROCESS

Step 2: Write a rough outline (section headings)

Step 3: start writing your conclusions

Step 4: when you're feeling braindead or unmotivated - force yourself to write the boring parts (Data and Methods, describing plots)

Step 5: Keep writing and editing

Step 6 (or whatever the last step): Write your introduction

Some random thoughts (1) Papers *can* follow a formula

- A possible formula for a strong introduction:
  - Given status / knowledge
  - Difficulty / problem
  - We need to solve this! (What is the solution)
  - What does the solution require
  - Why is this recently possible?
  - We present . . .

Some random thoughts (1) Papers *can* follow a formula

- Discussing figures in the text
  - What is literally shown on the figure (what are the quantities, symbols, etc)
  - What trends should the reader notice?
  - What conclusions should the reader draw/what does this mean??

An abbreviated version of this should be in the figure caption as well!!!

Some random thoughts (2): TOOLS

- Pitt provides a pro overleaf account: https://www.overleaf.com/edu/pitt
    - This allows two-way synching with Dropbox! (useful for plot upload and ADSTEX - see below)
- Former Pitt Postdoc, new Prof at Utah, and general awesome Yao-Yuan Mao wrote an amazing tool to help generating and updating your .bib file: https://github.com/yymao/adstex (pip or conda install!)
- Seaborn for plots. . . I rarely directly use, but for ideas and color palettes it is amazing
- latexdiff

Some random thoughts (3)

Know yourself and your productivity/brainpower:

10% – set up tools, format a table, . . .

50% – write figure descriptions and captions, beautify figures

90% – work on your abstract and discussion/conclusion sections

Some random thoughts (4)

90% of the things that you spend your time on will likely correspond to 10% of the actual paper text. Remember how most people read papers and cater to that. You're telling a story!

(Use appendices wisely and extensively)

Some random thoughts (5)

Set expectations about getting feedback from an advisor - and make that interaction easier.