Reading a scientific paper

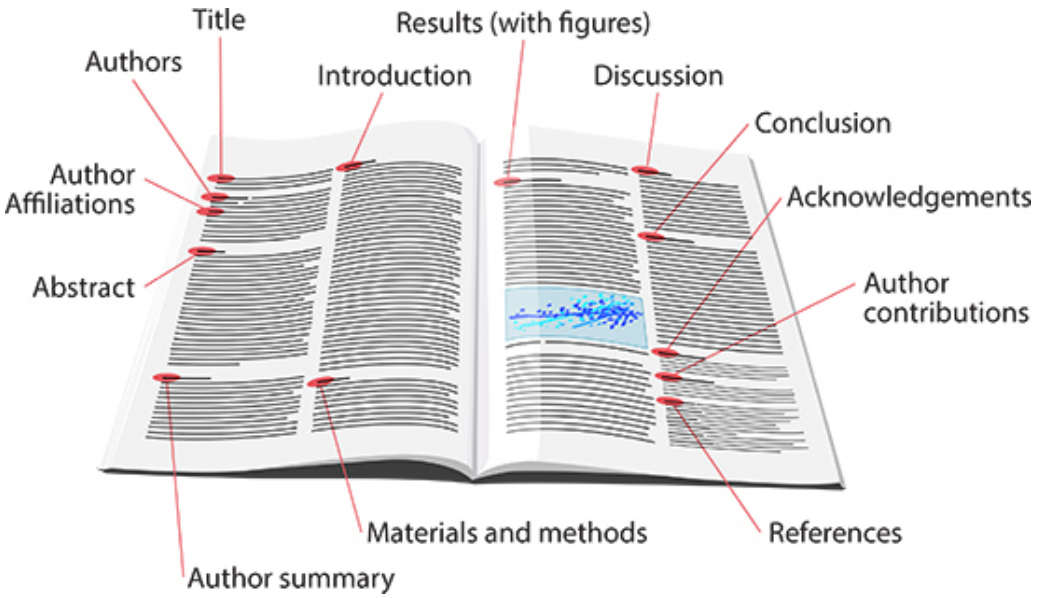
Eddie Schwieterman ---- 10/9/2014

This is a Guide – NOT a recipe!

- Everyone absorbs information a little differently
- You will not understand everything the first time
- Try things out and see what works for you

Paper Structure

- Abstract
- Introduction
- Methods
- Results
- Discussion
- Conclusion
- References



Questions to Ask

- **What** is the topic of the paper? What "big question" is being addressed? (*Abstract/Introduction*)
- **Why** is this specific topic important? (*Introduction*)
- **How** did the researchers investigate this question? (*Methods*)
- **What** did they find? (*Results*)
- **What** are the sources of uncertainty or error (*Discussio*n)
- **What** are the implications or consequences? (*Discussion and/or Conclusion*)

The Most Important Questions

- **What** is the topic of the paper? What "big question" is being addressed? (*Abstract/ Introduction*)
- **What** did they find? (*Results*)
- **What** are the implications or consequences? (*Discussion and/or Conclusion*)

The Abstract

- A summary of the paper
- Includes a description of the problem, the experiment (or observation), and the conclusions or **results**
- Used as a means of deciding whether the paper is worth reading in more detail
- Information dense, but should be readable to a large audience

Introduction

- Background information: description of the problem (motivation) and previous work
- Summarizes steps taken in paper
- ***What*** *is the topic of the paper? What "big question" is being addressed?*
- ***Why*** *is this specific topic important?*

Methods

- Describes experiments or observations in detail
- Steps taken to transform data into a useable form
- Lots of technical details: these can be sometimes hard to understand
  - For measurements/observations mostly about minimizing and/or estimating **uncertainty** and **error,** though this might not be mentioned until the discussion
- ***How*** *did the researchers investigate this question?*

Results

- Presents findings of observation or experiment
- Critical information displayed in **figures** or sometimes in **tables**
- Usually *analysis* saved for discussion, but sometimes here
- **Pay attention** to the figures
- **What** did they find?

Discussion

- Authors' interpretation of results
- Authors' interpretation of the *implications* of the results (how is this different?)
- Caveats or reservations concerning **error** or **uncertainty**
- **What** are the implications or consequences?

Conclusions

- Usually summarizes work
- Presents results and implications succinctly
- **What** did they find?
- **What** are the implications or consequences?

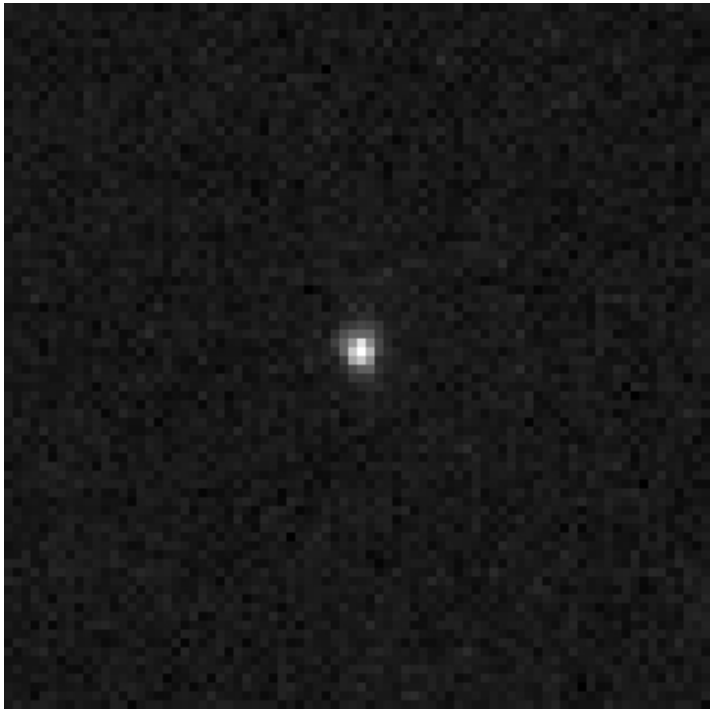
Recommended Reading Sequence

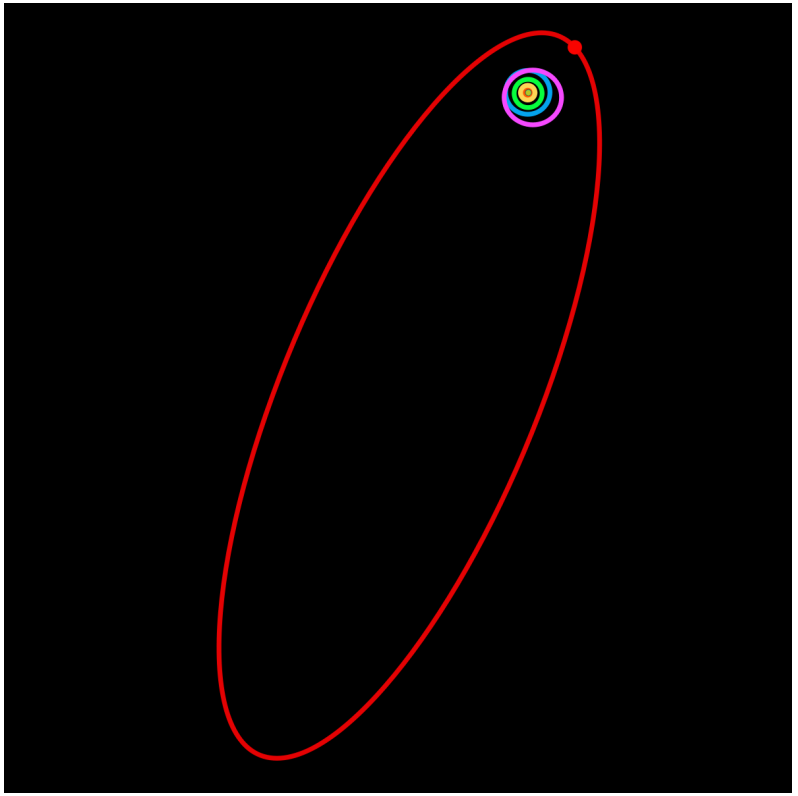
1. Read the abstract once or twice. Summarize what the topic of the paper is in your own words.
2. Read the abstract again. Then read the conclusions. Summarize the findings in your own words.
3. Start with the introduction and read the paper all the way through once. Underline words, phrases, and concepts you don't understand.
4. Look up the words, etc. from above. Read the paper again.
5. Rinse. Wash. Repeat.

On reading older papers

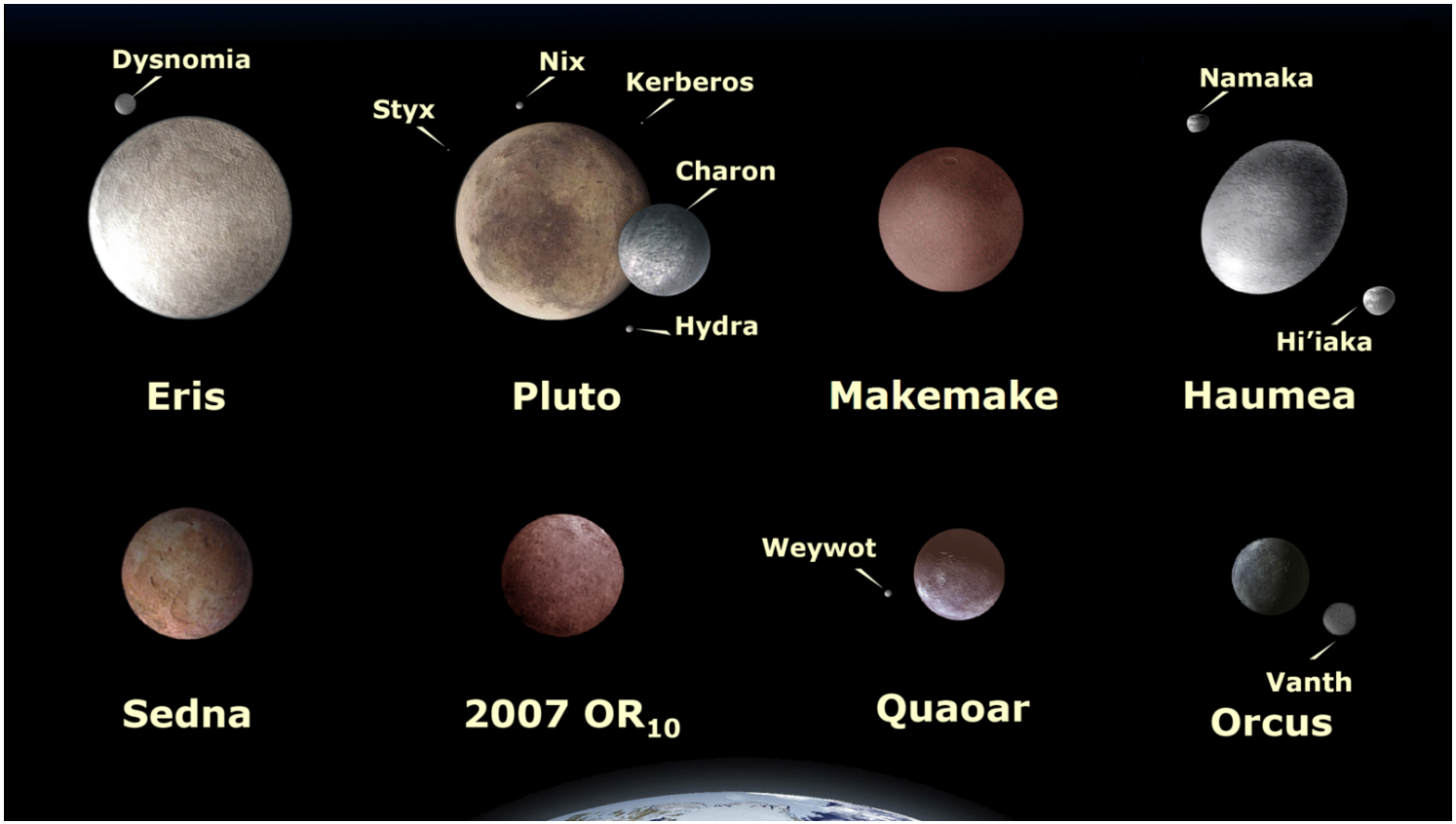
- Some of the assumptions and conclusions will be out of date
- This does not mean the paper is not worthwhile to read both for scientific and educational purposes
- **Everyone has to start somewhere**

Sedna





Sedna in Context



Assignment – Writing 3

- Read ““**Discovery of a Candidate Inner Oort Cloud Planetoid**”
- Answer guided questions
- Work with your fellow classmates
- Ask me questions in class, at office hour, or over email
- I **expect** you to have questions

Remaining Class Time

- Work on coding assignments OR
- Start reading paper