Tips For Reading Scientific Papers

**Remember** when reading a paper be critical but also pay attention to exciting findings, novel insights, and creative ideas. It’s easy to criticize, but hard to praise!

**General:** Keep in mind the whole time you read the paper.

- What is the central question/hypothesis the author is proposing?

- What critical data/experiment would **you** do to evaluate this hypothesis?

  - You should form an opinion **before** reading what they in fact did!

- What assumptions are made both when proposing the hypotheses and when evaluating them in light of the data collected.

- What data do they collect to assess their hypothesis?

- What is their conclusion given the data?

- Do you agree with their interpretation or are there other compelling alternatives given the data?

**Specific:** As you read each section, focus on some of these specifics.

**Introduction:**

- What is the main question they are interested in pursuing?

- What background research/pattern/theoretical prediction motivates this question?

- Why is this question interesting in light of the background they discuss?

- Do they offer one hypothesis or more than one?

  If more than one hypothesis is offered, is each exclusive, meaning that it proposes a distinctly alternative explanation that is incompatible with the others, or could some of these hypotheses operate simultaneously?

- What assumptions are made when proposing the hypotheses?

**Methods:**

- What assumptions are made about the effectiveness of their experiments or the accuracy of their data?
- Do their proposed methods critically test their hypotheses?

- Are any of their methods confounded?

- Did the authors use a creative method to evaluate their hypothesis?

- Are their methods simple and elegant or complicated and convoluted?

- Did they come up with a new technique to better evaluate a problem others have struggled with?

**Results:**

- What does the data say about the hypotheses?

- Is there only one interpretation of the data?

- Are there any big surprises / unexpected results?

**Discussion:**

- Does the author say that they support or reject the hypothesis?

- Do you agree with the author's interpretation of the data?

- What novel insights are gained from the results?

- What do the results imply more generally for the field of interest? For other fields?