Thoughts on for reading a scientific paper (Modified from K.G. Gooch’s Guide)

Read carefully, it’s not a novel. It could take a long time to get through one short paper.

Consider the following questions while reading:

1) Start with the introduction
   a) Don’t panic - try to get the big picture context and even if there is difficult vocabulary
   b) look up words you don’t know
   c) think about questions such as:
      i) Why is the general area important?
      ii) What is the scientific hypothesis? Or what is the authors’ specific goal?
      iii) What is already known related to the hypothesis and how do we know this?

2) I personally skip the Materials and Methods and come back to it as needed while reading the results because otherwise I have no idea isolated method is for

3) The results
   a) focus on their observations and data
   b) for each part/figure/table
      i) try to understand what they did and why
      ii) what do their results mean to the rest of the paper
   c) after going through all the pieces, think again about what they did and why
      i) how do the results fit together?
      ii) what story do they tell?
      iii) how do they fit into the big picture goal laid out in the beginning?
      iv) Did they show what they set out to?

4) The discussion
   a) This is where they should try to put their results in perspective
      i) Does it make sense?

5) Overall
   a) If they had a hypothesis, what testable predictions did it make?
      i) Did they evaluate this? How?
      ii) How can their results be interpreted in light of the hypothesis?
   b) If the work was more application driven, did they accomplish their goal?
   c) What experiments/work do they propose for the future? What would you like to see?
   d) What are the practical implications of the results?
   e) Also, is there anything in the paper that you didn’t understand? Is this likely do to your lack of comprehension, poor presentation by the authors, or poor logic by the authors?

The ability of researchers, scientists and engineers, to effectively and clearly communicate ranges from incomprehensible to beautifully eloquent. Consider this while you read. Then make a commitment to always clearly tell your story and present your information when presenting material to others.