Writing Advice by Prof. Sarah Douglas

Over the years, I have edited numerous student proposals and papers. I have collected the following advice that I commonly give my students. Please try to follow this advice as best as you can; it will make your writing much easier to read!

1. *Determine the purpose and audience for your paper*. All papers have a purpose and a style. For conferences and journals, you must follow the required styles, usually in a *LaTex* format. Decide who your audience is and write for them. There are no writers without readers.

2. *Use a scientific writing style*. What are your research questions? Focus on your results and contributions: what have you learned that is new? Your methods tie the questions to the results. Use evidence to support your argument. The flow of ideas must be logical and yet interesting enough to tell a story and keep your reader engaged.

   Be precise in your language and in quantities. If something is better, say exactly why. If it is quantifiably better, give the numbers that tell how much better it is. Define terms if necessary and give examples to make ideas more concrete.

   Use the active, present tense and the third person. Even if you are the only person involved in the project, discuss your results in the first person plural. For example, you should say "We conduct three experiments ..."; not "Experiments were conducted ...".

3. *Create a clear organization*. You should follow a standard organization for a proposal or a paper. Fill in this outline with any additional subsections you may need.

4. *Use a topic sentence for each paragraph. Pay attention to transitions!* Before writing complete paragraphs, write the topic sentence for each paragraph in each subsection. When writing the topic sentence, use a transition from the topic of the previous paragraph. Likewise, the first sentence of each section or subsection should make a transition from the previous section or subsection. A reader should be able to understand your entire document just from reading the first sentence of every paragraph.

   After you have completed your outline, fill in each paragraph with supporting statements. Every single sentence should contribute to clarifying or elaborating on your thesis sentence.

   If you follow this procedure, you should have created a proposal or paper with a top-down organizational style, rather than a bottom-up organization. If you find that you tend to write "logically" by concluding with the most important thought, invert your paragraph so that the most important thought is at the top.

5. *Use appropriate conventions for mathematical expressions, proofs, algorithms, figures and tables*. Remember to connect these multi-media representations to your written narrative and don't expect your reader to figure them out. Clearly define elements such as

variables, etc. Use the conventions (culture) of the community that you see as your audience. Be consistent in use of symbols and terms that refer to concepts.

For each figure or table, include a short, descriptive caption that places the figure in the context of the paper. This should normally be a very short phrase. Then, you must reference the figure in the text of your paper and describe what is shown in the figure. Discuss the details of your results. You should say "Figure 1 shows that ...", not "We see that ..." or "Notice that ...".

You must use accurate and complete labels for all axes in a graph, with units clearly indicated on each axis. Include a legend if needed. Be sure to use consistent scales on the x and y axes when comparing results across a set of graphs. For example, if you are showing the results of three different programs, one may have data in the range (0,30), another from (10,40), and the last from (30, 70). If you have a graph for each configuration, then they should all use a scale from 0 to 70, rather than using a separate scale for each graph.

Be sure your graphs are readable. If you combine multiple experiments on the same graph, you need to be able to distinguish them from each other. If several experiments can't be distinguished, then place them on separate graphs.

6. *Check your grammar and spelling*. Before turning in a paper, check the grammar and spelling. You can use *ispell* to check the spelling of a LaTeX paper. Eliminate run-on sentences. Pay attention to punctuation, especially where commas are needed.

7. *Remember, writing is a process*. Expect to write several drafts and many many papers in graduate school. Recruit fellow students to read drafts and give you written feedback. Don't be afraid of criticism. It doesn't help if your reader refrains from telling you negative things to be nice. Negative things strengthen and improve your paper. The anonymous referees of your conference paper will not hesitate telling you where you failed to communicate. Although you might not believe it now, practice truly improves your writing and makes it easier.