Recitation 11: Project writeup

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1 Outline

• Project to do's
• Making good figures
• Organizing computational biology projects

2 Project to do's

• DO: Your job as a writer is twofold: 1) Explain and document what you have done 2) Convince the reader that your work is interesting, important, worth reading and carefully considering, building upon, and extending.

• DO: Explain your project clearly enough so that a classmate can understand the motivation for your project, what you have done, and what you have found. Assume that the reader knows less than you do; you need to explain to him what you have done and why it is important.

• DO: Write a careful, concise, and clear abstract.

• Clearly explain:
  1. How your project relates to previous work (background)
  2. Why your project is important (background)
  3. What you have done (methods)
  4. What you found and the significance of your findings (results and discussion)
  5. What further directions would be interesting to pursue, if time permitted (future work)

• DO: include division of labor, comparison with proposal, commentary on project experience, commentary on peer review process.

• DO: Prepare clear figures to explain your methods and results. A figure should be self-contained – it should be possible to understand a figure only by looking at the figure and reading the accompanying legend.

• DO: Organize your paper around about 4-5 clear figures.

• DO: Organize your final paper like a journal article.

• DO: Proofread, revise.
2.1 Sections of your final paper

- Abstract: Very short (300-500 words), but the most important couple of paragraphs in your paper. You need to clearly communicate to the reader why your paper is worth reading. The abstract should include:
  1. A clear and succinct description of the context and goals of your project.
  2. Your approach and results. Summarize what you did, and what you found.
  3. Summarize your conclusions: What are the implications of your findings and why are your results important?

- Background: The goal here to provide the background that the reader will need in order to understand your work, situate your work in the context of previous studies, and explain what is original and novel about your approach. You want to provide just enough background so it is clear what has previously been done in this area, why your project is important, and how it extends, improves, and builds upon previous efforts. The background section should be written so that it would be understandable to a classmate.

- Methods: Explain what you have done. For a real journal article, you should include enough information so that a diligent reader could re-create your results. Here, you should explain clearly enough so that a classmate could understand the main steps that you have taken.

- Results and discussion: Clearly explain your findings and their significance.

- Future goals: Since you only had a very limited amount of time to work on your project, there are likely to be many additional directions that you would be interested in exploring, if time permitted. What research directions would be interesting extensions of your project?

3 Making figures

- Useful website for picking nice color combinations for figures: http://colorbrewer2.org/
- R: http://www.r-project.org/
- Excel, Powerpoint, Inkscape, Adobe Illustrator

4 Writing clear and compelling prose

- The Science of Scientific Writing [http://www.unc.edu/~haipeng/teaching/sci.pdf] Contains examples on how to re-phrase scientific prose for clarity and ease of reading. (Thanks to Avanti Shrikumar for the link.)
- Elements of Style by Strunk and White: http://www.keck.ucsf.edu/~craig/The_Elements_of_Style.html
- "All through The Elements of Style one finds evidences of the author’s deep sympathy for the reader. Will felt that the reader was in serious trouble most of the time, floundering in a swamp, and that it was the duty of anyone attempting to write English to drain this swamp quickly and get the reader up on dry ground, or at least to throw a rope. In revising the text, I have tried to hold steadily in mind this belief of his, this concern for the bewildered reader." E. B. White, preface to Elements of Style
5 Organizing projects


- "Someone unfamiliar with your project should be able to look at your computer files and understand in detail what you did and why."

- "Everything you do, you will probably have to do over again." Not necessarily true in a class project, but likely in a real research project.

- Keeping well-organized directories and records of what you did.