

## **UNDERGRADUATE HONORS IN BIOPHYSICS**

### *Guidelines for preparing the Honors Research Paper*

The honors paper must describe independent research carried out by student as part of biophysics research requirement (250.531/521/522). Library research is not acceptable for this purpose. The length should be ~20 pages double-spaced, plus figures and literature citations. The format should follow the layout of a research paper; a guide for each section is given below:

#### **Abstract** (250 words, no longer)

A typical abstract typically contains one sentence describing the problem, one sentence describing its significance, one sentence describing the approach, and two-three sentences stating the results and conclusions.

#### **Introduction** (~4-6 pages)

Provide background information necessary to understand the study undertaken. Be sure to state why the problem you addressed is important as well as how your research relates to previous work. Assume that your reader is another undergraduate biophysics major with some scientific training but who does not work in the same lab. Your goal is to provide sufficient information for such a reader to understand and appreciate your project, but nothing extraneous.

#### **Materials and Methods** (~2-3 pages)

Describe your experimental protocols, and state where you obtained reagents. There should be enough detail to allow an independent researcher to reproduce your experiments. Since the methods section describes the experiments you have already done, it should be written in the past tense.

#### **Results** (~4-10 pages)

Provide a narrative that describes the outcome of the experiments performed. Figures documenting the results should be accompanied by legends that enable the reader to understand what is in the figure. It is preferable if the figures are imbedded in the text, but they can also be placed together at the end of the paper. The space taken by figures is not counted in the page limitation of the paper. The results section should be written in the past tense.

#### **Discussion** (~4 pages)

Discuss what was learned, the reliability of the results, any limitations to the interpretation, significance of your conclusions, future directions.

#### **Literature references**

These must follow the format of a standard journal in the field, such as *Biophysical Journal*, *Protein Science*, *Nature Structural Biology*, *Nucleic Acids Research*, etc. Take care to include references to the primary literature, not just review articles or textbooks. Your paper should represent a scholarly effort. In general, any time you report a specific scientific finding or restate a specific idea or thesis, the author of the experiments or the idea should be cited. The citation of a timely review article can support general statements that refer to a collection of phenomena. Your research advisor can direct you to the best literature sources in the area of your research project. The citations should be placed in a list at the end of the paper (endnotes rather than footnotes). Citations can either be numbered in order of appeared in the main text, or marked by Author, year in the main text and listed alphabetically in the reference section.