

Lu Fan's NSERC report – Summer 2009
“Mathematical Models in Biology”

For my summer project I worked on an interdisciplinary topic that combined first year mathematics with biological applications.

One of the major results of this project is the completion of the preliminary draft for a book by my supervisor, Dr. Leah Keshet. That book will be used by first year mathematics students learning how calculus can be applied in the Life Sciences.

I made many contributions to this project.

First, I had to learn a number of new skills. These included how to use UNIX, how to create and edit Latex documents, how to make, save, and edit figures, and how to use other software (e.g. spreadsheet, etc) in my work.

My first steps consisted in interviewing instructors who had taught such a course before, to accumulate suggestions and ideas for what can work well, and what was problematic. I also took time to carefully read and try out previous material, including course notes, problem sets, and laboratory assignments, to help eliminate errors.

I set up and joined an interview between my supervisor and my former high-school teacher, to discuss learning difficulties, and how the BC curriculum changes will affect the background of students coming into UBC.

Much of my work was centered around revisions of Latex files. However, aside from the technical aspects of revising material, I also got several chances to make new contributions and to research new topics on my own. These included: (1) Examples of age-dependent mortality (application of integration), (2) genetics (combining what I learned in Biology with material in the probability unit, and advising my supervisor of how this material is taught in biology) (3) Designing a new lab on the branching of tree structures (based on geometric series) (4) Designing a new lab based on Newton's Law of Cooling. In the last two cases, I wrote the material on my own (with some suggestions from my supervisor), made up instructions for the students, and produced a fully worked-out solution using actual data for a cooling object. I also created a number of worked examples of calculations.

As part of the summer work, I also got an opportunity to participate as a helper in a conference on Mathematical Biology co-organized by my supervisor, to meet a number of professors, graduate students, and other USRA students in mathematical biology, and to find out more about this field of study.

This summer job had been a valuable experience for me. It activated my interest in mathematical biology. I have decided to take more math courses in my upcoming years at UBC.