Senior Writing Experience in the Math Department: Information Session

Are you a junior trying to plan your Senior Writing requirement for your math major? Are you a sophomore or a first-year student curious to know more about senior writing experience in the department? Come join us for an information session where we discuss different options for Senior Writing Experience in the math department.

Panelists **Colin Langton, Mickey Shea**, and **Laura Vinton** will tell you about their own senior writing experience this year. Professors Friedman, Hatley, Mariano, Plofker, and Tønnesen-Friedman will tell you more about specific topics available for senior theses next year.

Pieces from Thesis

Xinchen Huang *wrote his senior thesis this past fall term under the direction of Professor Jue Wang.*

This past fall term, I did a one-term thesis about the application of statistics in the medical field with Professor Wang. My thesis project focused on estimating the survival rate of liver cancer patients by their demographic and cancer characteristics. The project provided me with valuable opportunities to implement the mathematical and statistical ideas I learned in the math courses to address problems in medicine, my field of interest.

Before the beginning of the term, to get a glimpse of and prepare for the research, I studied the basic idea and coding mechanism of the language R, a commonly used computer science language in the field of statistical research, as suggested by Professor Wang. Then, at the beginning of the term, I read several papers related to the survival analysis in other branches of medicine, to learn how survival analysis, in general, is done. Then Professor Wang and I worked together during the first half of the term to select and pull out the desired data from *Surveillance, Epidemiology, and End Results* (SEER), a database with data about 43817 patients together with 12 different traits, such as age and cancer stage. Then, for the second half of the term, I used Excel to categorize and arrange the data for later use in R. Then, by coding in R, I used Kaplan-Meier Model and Cox proportional Hazard Ratio to estimate the survival rate of patients. To ensure that the model predicts the survival rate correctly, I applied Receiver Operating Characteristics (ROC) curve and Area Under the Curve (AUC) to perform the model validation test and prove that the model is successful in predicting the survival rate.

This thesis experience was valuable for me since I always seek ways to put mathematical theory into practice. Professor Wang provided me with this opportunity to deal with a medical problem studied by people in industry, which was enlightening for me in helping me choose my future career. In the project, one thing I encountered unexpectedly was the extensive amount of time I spent on the database. Due to my lack of experience in statistics, I was stuck in the process of extracting data from the database, and it took me nearly half of the term to work on it. Thanks to my preparation in the summer, I saved substantial amounts of time during the research otherwise I would not have been able to complete my work due to the huge amount of time I spent with the database. My suggestion is to take the advantage of break time, trying to do as much background research and preparation as possible so that during the actual thesis process, you can leave time for the unexpected obstacles you will likely face.

Math Club Elects Officers

At this past week's meeting, the Math Club elected its new slate of offices. Please congratulate Co-Presidents **Will Grimwood** and **Uri Tomer**, Treasurer **Ollie Taylor**, and PR Chair **Livi Gwinnett.** To get onto the club's mailing list, contact any officer. We look forward to a fantastic year of math-themed and math-filled events!

Next meeting: Thursday, March 3 at 5pm in the Math Common Room, Bailey 204