

STA 450/650: Theory and methods for the analysis of social networks

Duke University, Spring 2018

Instructor: Alexander Volfovsky, Assistant Professor, Dept of Statistical Science, alexander.volfovsky@duke.edu
Course Time: T/Th: 3:05 pm - 4:20 pm

Relational data has come to dominate the landscape of information across many fields — social scientists are interested in how friendships are formed, biologists are interested in gene-gene interaction networks, epidemiologists study disease transmission, economists study trade between companies or countries and the list goes on and on. The statistical study of such data has also seen a surge over the last few decades and this course will try to track this development and build a practical toolkit for analyzing such data.

We will study deterministic and probabilistic specifications of networks and graphs: structural blockmodels, the Erdos-Renyi model, the exponential random graph model, the stochastic blockmodel, generalizations to latent space models and to more complex relational data models. We will develop the mathematical background for these models and learn how to implement them in R. There is no book, lectures will be supplemented with discussions of relevant papers.

Prerequisites You are expected to have all pre-reqs to be in the course. A familiarity with linear algebra and analysis is strongly encouraged as is knowledge of material from STA360/601. Students are expected to be very familiar with R and are **encouraged** to have learned LaTeX by the end of the course.

Grading policy: Grading will consist of theory homeworks, computer implementation and data analysis. The course will have a final project.

Academic Honesty: Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity. Cheating on exams and quizzes, plagiarism on homework assignments, projects, and code, lying about an illness or absence and other forms of academic dishonesty are a breach of trust with classmates and faculty, violate the Duke Community Standard, and will not be tolerated. Such incidences will result in a 0 grade for all parties involved as well as being reported to the University Judicial Board. Additionally, there may be penalties to your final class grade. Please review Duke's Standards of Conduct. For more information on the Duke honor code (known as Duke Community Standard), please go to <http://integrity.duke.edu/faq/faq1.html>.

Students with Disabilities: Students who require special accommodations in class or during exams should follow the procedures outlined by the Disability Management Program <http://access.duke.edu/students>. Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Student Disability Access Office at (919) 668-1267 as soon as possible to better ensure that such accommodations can be made.

Privacy Policies: Student records are confidential.