Statistics Bootcamp
September 16-20, 2019
Instructors: Amy Johnson, Rebecca Gleit, and Nick Sherefkin
Location: Encina Hall West, Room 101

GOALS

1. Increase students' understanding of and confidence with basic statistical concepts.
2. Build students' programming intuition and data management skills.
3. Encourage collaboration and camaraderie among the graduate student cohort.

OVERVIEW

Monday: mindset, descriptive & inferential statistics, summary statistics, and Stata workshop
Tuesday: graphing, exponents/logarithms, sampling distributions, and statistical significance
Wednesday: probability basics, file structure, and data workflow
Thursday: variable types, functions, lines of best fit, prediction equations
Friday: matrix algebra basics, reading calculus

AGENDA

Monday 9/18 10am-3pm: Amy & Rebecca

Learning Objectives (Students will be able to...)	**Brief Agenda**
...understand the concept of growth mindset and how it applies to math. ...explain the difference between descriptive and inferential statistics. ...calculate mean, median, mode, and standard deviation. …understand how data are stored in Stata ...use logical if-statements to subset data ...use a .do file to write reproducible code ...begin to use functions to manipulate data (e.g. variable creation)	Introductions Mindset quiz and video about growth mindset Descriptive vs inferential statistics Summary statistics Mean, median, mode, standard deviation Introduction to Stata workshop

Tuesday 9/17 10am-3pm: Rebecca & Nick

Learning Objectives (Students will be able to...)	Brief Agenda
...present data as graphs and tables. ...transform data into useful units. …conduct basic exponent and logarithm computations ...explain the difference between a population distribution, sample distribution, and a sampling distribution. ...explain the logic of statistical significance and repeated sampling.	Representing data by hand Practice generating tables/graphs in Stata Exponents and logarithms: Properties, basic calculations, and why they can come in handy with statistics Distribution activity Statistical significance and repeated sampling Discuss recent challenges to null hypothesis significance testing

Wednesday 9/20 10am-3pm: Nick & Amy

Learning Objectives (Students will be able to...)	Brief Agenda
...use probability notation to communicate foundational of probability concepts: counting rules, operations on sets, expected value, conditional probability, independence. ...setup a friendly file structure to manage data and programming workflow.	Union/intersection notation with Venn diagrams to link to Monday's Stata workshop Translating probability notation to English and English to probability notation Folder disaster cleanup

Thursday 9/19 10am-3pm: Amy & Nick

Learning Objectives (Students will be able to...)	Brief Agenda
...categorize variables according to their type. ...understand the difference between a	Types of variables Relations vs functions

function and a relation. ...explain the meaning of the slope of a line. ...draw a line of best fit and justify its location. ...describe the relationship between two variables in words, graph form, and equation form. ...understand the purpose of prediction equations and how to use them.	Equation of a line Line of best fit (real example) Overview of prediction equations Stata practice with graphing and simple regression

Friday 9/20 1pm-5pm: Rebecca & Amy

Learning Objectives (Students will be able to...)	**Brief Agenda**
...understand what a matrix and a vector are, and how to multiple vectors with matrices ...be able to represent a prediction equation in matrix notation ...read the notation of, understand, and interpret basic calculus relevant to a statistics context (e.g. limits, derivatives, integrals)	Vectors, matrices, vector with matrix multiplication Calculus: concepts and interpretation, notation, some basic calculations, and how this relates to statistics ● Limits ● Derivatives (and finding maximum or minimum of a function) ● Integrals Interpreting bootcamp topics through the lens of calculus If time: Translating mathematical notation/ phrases into plain English (and Stata?)