2017 SUMMER STATISTICAL INSTITUTE

May 22nd—June 9, 2017

BUILD YOUR TOOLKIT AT STATS CAMP

Learning statistical terminology and computing tools

- Strategies for reproducible research
- Suitable for research in academic, corporate, and government settings

Sessions:

- Statistical Software: R
  May 22nd—May 26th
- Statistical Software: Stata
  May 30th—June 2nd
- Structural Equation Models
  June 5th—June 9th

Sessions individually priced: $50-70 per day

Please see CRMDA.KU.edu/statscamp for more information

CRMDA.KU.edu • Watson Library, Room 470 • 785-864-3353
Day 1—Installation & Getting to Know R
Instructor: Dr. Paul Johnson, CRMDA Director and Professor, Political Science
- Installation
- R documentation, interacting with the R help system, packages
- User interfaces: Comparing Windows R, Emacs, Notepad++, Macintosh
- Line aRt: Illustrating functions, create publication quality line art and graphic displays

Day 2—Establishing a Replicable Research Process
Instructor: Dr. Paul Johnson, CRMDA Director and Professor, Political Science
- Data impact and Recode data: Wrestling with numerical, text, and factor variables
- Graphical exploration and presentation scatterplots, barplots, boxplots, etc.
- Exporting tables for presentations in documents: cross tabulations regression, and other tables

Day 3—Statistical Analysis the R Way
Instructor: Dr. Paul Johnson, CRMDA Director and Professor, Political Science
- Regression & ANOVA
- Structural Equation Modeling
- Moderation and Mediation

Day 4—R Toolkit for Interacting with Data
Instructor: Dr. Paul Johnson, CRMDA Director and Professor, Political Science
- Matrix Algebra with R
- Iteration concepts in R: for, lapply
- Subsetting data, processing subsets and merging results
- Creating R functions to customize analysis

Day 5—Monte Carlo Programming and Power Analysis
Instructors: Dr. Paul Johnson and Dr. Ben Kite
- Monte Carlo simulation in R
- Power analysis: definition and implications
- Using Monte Carlo simulation to estimate power
Day 6—An Introduction to Stata for Statistical Analysis
Instructor: Dr. Jacob Fowles, CRMDA and School of Public Affairs & Administration

- The Stata interface: point & click, menus, command line, and the do-file editor
- Finding help, including web sources
- Editing data within Stata, the project, data, and variable views
- Managing collaborative projects
- Reproducibility and documentation options within Stata

Day 7—Reliable and Reproducible Workflows Using Stata
Instructor: Dr. Jacob Fowles, CRMDA and School of Public Affairs & Administration

- Common syntax and structure for writing code
- Alternatives for editing do-files
- Workflow concepts, customized do-file template that facilitates project organization
- Importing, organizing, recoding, and labeling variables
- Generating descriptive plots and tables

Day 8—Automating Common Tasks in Stata
Instructor: Dr. Jacob Fowles, CRMDA and School of Public Affairs & Administration

- Installing and using prepared Stata packages
- Estimating quantitative models and capturing estimation output
- Stata macros
- Produce “pretty” output (summary statistics, regressions results, etc.), using the estout suite of command and putexcel commands

Day 9—Data Visualization in Stata
Instructor: Dr. Jacob Fowles, CRMDA and School of Public Affairs & Administration

- Programs for creating plots, charts, and graphs
- Customizing graphics using Stata’s suite of graphing commands
- Stata’s “margins” and “marginsplot” command for visualizing regression results
**KU SUMMER STATISTICAL INSTITUTE:**

**WEEK 3: SEM     JUNE 5TH-9TH, 2017**

Day 10—Introduction to Structural Equation Modeling  
Instructor: Dr. Edgar Merkle, University of Missouri, Department of Psychological Sciences  
- Factor Analysis Overview  
- Confirmatory Factor Analysis By Example  
- Visualizing SEM with Path diagrams  
- Diagnostics for Estimated Models

Day 11—Using Mplus and R  
Instructor: TBA  
- Introducing the CRMDA SEM Code Repository  
- Mplus  
- Using R for basic SEM: the lavaan package

Day 12—Interaction Effects in SEM  
Instructor: Dr. Holger Brandt, University of Kansas, Department of Psychology  
- Lavaan overview and Product Indicators  
- The R package nlsem  
- Latent moderate structural equations (LMS)  
- Graphical illustrations

Day 13—Extensions to semiparametric approaches  
Instructor: Dr. Holger Brandt, University of Kansas, Department of Psychology  
- Structural equation mixture modeling (SEMM)  
- SEMM with the R packages nlsem and plotSEMM  
- Robust alternatives for non-normality

Day 14—Bayesian alternatives and multilevel SEM  
Instructors: Dr. Holger Brandt, University of Kansas, Department of Psychology  
- (Short) introduction to Bayesian modeling  
- Introduction to stan (a Bayesian analysis framework) and rstan (a R package for usage of stan)  
- Interaction models with regression and the multilevel framework in stan  
- Multilevel SEM with interaction effects in stan