Statistics Bridge Introduction to R: Syllabus/schedule

August 5, 2019

Unless otherwise noted, modules are about 75 minutes long: 45 minutes for presentation, 20 minutes for breakout and 10 minutes for discussion of solutions.

- Monday – Intro to R
  - Module 0: Introduction, what is R, starting R, why R? why not R?
  - Module 1: Basics of R, with Rstudio (Chris)
    * R as a calculator
    * helpful shortcuts: tab-complete, up arrow, Ctrl-{up arrow}
    * vectors and indexing and subset assignment
    * some basic functions; help()
    * vectorized calculations, comparisons
    * basic R objects: vectors, matrices, dataframes, lists
    * basic graphics
    * breakout problems
  - Module 2: Managing R and your analyses
    * managing R objects, the R workspace
    * using packages (installing, loading, namespaces)
    * the working directory and basic file reading/writing
    * Git, Github and version control
    * getting R help online
    * breakout problems
- Tuesday – Working with data

  - Module 3: Working with data
    * dataframes/matrices
    * attributes, missing values and factors
    * subsetting
    * strings
    * dates and times
    * simulation, sample()
    * more on reading data
    * breakout problems

- Wednesday - Programming
  - Module 4: Calculations
    * vectorized calculations and efficiency
    * apply, lapply
    * tabulation, stratified analyses, aggregation, merging data
    * breakout problems
  - Module 5: Programming in R
    * loops, if-else
    * writing your own functions, function arguments, functions as objects
    * basic scoping and environments
    * breakout problems

- Thursday – The tidyverse and analyses
  - Module 6: Data manipulation using the tidyverse
    * stratified analyses: groupwise operations and split-apply-combine using dplyr
    * reshaping and tidying data
    * breakout problems/homework
  - Module 7: Data analysis
    * regression, GLMs
    * smoothing
    * optimization
    * breakout problems

- Friday - Graphics and wrap-up
  - Module 8: Graphics
    * exporting graphics (vector/raster formats)
    * lattice graphics
    * ggplot2
    * breakout problems