

An Introduction to Data Handling and Analysis using R

INSTRUCTORS:

Chris Sutherland is an assistant professor in the Department of Environmental Conservation at UMass Amherst. He teaches quantitative ecology at both the undergraduate and graduate level. Chris is primarily interested in the development and application of spatially realistic statistical models to answer biologically interesting, real-world questions related to space use, dispersal and connectivity.

Joe Drake is a PhD student at UMass and his research is focused quantifying structural, functional and genetic connectivity in spatially structured populations. He is also invested in science communication and outreach. He has worked with the United States Forest Service and National Park Service.

Blake Massey is a PhD candidate at UMass researching Bald Eagle movement patterns through spatially-explicit, individual-based modeling. He also works for the US Fish and Wildlife Service as a GIS technician and is developing a regional database for the federally-listed northern bog turtle.

COURSE OUTLINE:

This 1-day workshop is has been developed for people who have never used **R** before, or have only limited experience using **R**. The workshop will be split into two section: *Data Carpentry* and *Basic Analyses*, and will be split between brief mini-lectures, guided tutorial and independent exercises.

Data Carpentry (morning session) - In this part of the workshop, we will focus on some of the basic concepts, skills and tools required to operate successfully in the **R** environment. The main objective here is to develop a familiarity with the **R** syntax, the variety of data object types, and some plotting and data processing functions. In this session we will develop the idea of a repeatable workflow which will highlight the values of **R**, and of programming more broadly.

Data Analysis (afternoon session) – Having developed a workflow for importing data, exploring data, and preparing data for analysis, we will focus on formatting data specifically for analysis using *linear models*. We will briefly discuss linear models before demonstrating how to do statistical analysis in **R**.

BEFORE YOU ARRIVE:

We ask that participants bring along a laptop with both **R** and **RStudio** installed. **R** can be downloaded here: <https://cran.r-project.org/> and **RStudio** can be downloaded here: <https://www.rstudio.com/>. This video shows how to download both: https://www.youtube.com/watch?v=cX532N_XLI8. Also, before arriving, participant should read “A protocol for data exploration to avoid common statistical problems” by Zuur et al. (2009) which can be found here: <http://onlinelibrary.wiley.com/doi/10.1111/j.2041-210X.2009.00001.x/full>. There will be opportunities throughout the workshop for participant to practice concepts on their own data, and therefore we recommend bring a copy of your data to use during in-class exercises.