

# OpenSource OpenScience

## 2014 Summer Workshop: July 10 - 12

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### Day 1 - July 10th

**9:00 am**

**Session 1 - Introduction to the R environment (Rebecca Clark)**

[Session 1 Handouts and Files](#)

1. Overview
2. Interface Basics)
  1. a. Simple calculations
  2. b. Variables and assignments
  3. c. Functions
3. Loading Data
  1. a. Directories, paths, and finding files
  2. b. .csv and .txt
  3. c. Headers
  4. d. Formats (vectors and data frames)
  5. e. Group activity ("fixing" an input file for R)
4. Manipulating data
  1. a. Subsetting
  2. b. Indexing
  3. c. Handling missing values

**- Lunch Break -**

**1:00 pm**

**Session 2 - Introduction to the R environment continued (Michelle Lawing)**

[Session 2 Handouts and Files](#)

1. Organization of projects
  1. a. File hierarchy
  2. b. Reference cards
  3. c. R style guide
  4. d. Well-documented scripts
2. Base plotting
3. Some simple statistics
  1. a. Regression example with some plotting
  2. b. ANOVA example with sums of squares explanation
4. Packages and CRAN
5. Where to go for help
6. R Studio
7. Wrap-up

# Day 2 - July 11th

**9:00 am**

**Session 3 - R for Scientific Programming (Tom Olszewski)**

[Session 3 Handouts and Files](#)

1. Introduction to programming
  1. a. Control structures
  2. b. Vector notation
  3. c. How to write instructions as a script
2. Random walk example
3. Randomization with Monte Carlo and bootstrapping

**- Lunch Break -**

**1:00 pm**

**Session 4 - \*nix commands in bash and R (Claudio Casola)**

[Session 4 Handouts and Files](#)

1. \*nix commands
2. Regular expressions
3. Invoking R from command line

**3:00 pm**

**Session 5 - Publication Quality Graphics (Rebecca Clark)**

[Session 5 Handouts and Files](#)

1. Base graphics details
2. Plotting with lattice
3. Plotting with ggplot2

# Day 3 - July 12th

9:00 am

Session 6 - Open Source GIS (Mike Treglia)

[Session 6 Handouts and Files](#)

1. Introduction to GIS
  1. a. Capabilities
  2. b. Data types and formats
  3. c. Projections
  4. d. Common software
2. Working with QGIS
  1. a. Introduction to QGIS
  2. b. Loading and Viewing Spatial Data
  3. c. Dealing with Projections
  4. d. Some Basic Vector Operations
  5. e. Some Basic Raster Operations
  6. f. Using Vector and Raster Datasets Together
  7. g. Making a Map
3. Q&A to cover any other elements of interest

## Additional Websites

- <http://cran.r-project.org>
- <http://www.statmethods.net>
- <http://stackoverflow.com/questions/tagged/r>