

GIS in R

Syllabus, Winter 2015
Room 2-22 Ocean Sciences Bldg.

Bring your laptop to class!

Class schedule: Monday, Thursday, 13:00-15:00

Office hours: Tuesday, Friday, 14:30-16:30

All class material is available on my GitHub account:
<https://github.com/MarieAugerMethe/GISinR> and will be updated throughout the class.
The material is also available on the OTN GitLab page
(<https://utility.oceantrack.org/gitlab/otn-statistical-modelling-group/gisinr/tree/master>).

Grades: Pass/Fail need 70% to pass

Pre-class assignment – 5%

4 Tutorials – 40%

3 Assignments – 30%

Final assignment – 25%

Class 1 (Feb 2):

- Lecture:
 - What is GIS
 - Coordinate reference system
 - Points data
 - Where you can get info/help
- Tutorial:
 - My basic R set up: RStudio project + R scripts + Version control
 - Intro to package sp
 - Importing GPS point data (import .csv file)
 - SpatialPoints
 - SpatialPointsDataFrame
 - Intro to map packages
 - Intro to RGDAL & PROJ4

Class 2 (Feb 5):

- Lecture:
 - Vector data manipulation

- Vector data visualization
- Tools for vector data analysis
- Tutorial:
 - More on SP objects
 - SpatialLines from points (e.g., movement track)
 - SpatialPolygons
 - Manipulating vector data
 - Overlay
 - Buffer
 - Crop
 - Plotting
 - Tools for arrow, scale bar, coordinates
 - Importing and saving other format (rgeos?)
 - Shapefiles and google earth files

Class 3 (Feb 9):

- Lecture:
 - Raster data
 - Remote sensing
 - Where to get good data?
 - Reprojecting raster data – potential problem
- Tutorial:
 - Package raster
 - Stacks
 - How to avoid memory problems
 - How to display rasters (rasterViz?)
 - Good data packages:
 - Marmap package for bathymetry
 - Landsat for landsat data

Class 4 (Feb 12):

- Lecture:
 - Examples of analyses
- Tutorial:
 - Packages for analyses
 - Movement
 - specialise package – adehabitatLT, adehabitatHR
 - rangeMapper – see cran list (at bottom eco spatial models)
 - gstat
 - for-loop (equivalent of models in ArcGIS)

Resources:

- Websites:
 - CRAN Task View: Analysis of Spatial Data
Brief description of all of the main packages available for spatial data.
<http://cran.r-project.org/web/views/Spatial.html>
 - Cheat sheet available on Barry Rowlingson website:
<http://www.maths.lancs.ac.uk/~rowlings/Teaching/UseR2012/cheatsheet.html>
- Mailing lists/message boards
 - R-Sig-Geo mailing list
Mailing list for questions/answers for R spatial.
Info is found here:
<https://stat.ethz.ch/mailman/listinfo/R-SIG-Geo/>
Searchable archive is found here:
<http://r-sig-geo.2731867.n2.nabble.com/>
 - Stackoverflow
Message board to post questions on coding.
<http://stackoverflow.com/>
You can use tags to focus your search. Tags of interest are: R, geospatial, sp, raster.
Do not post statistical questions. For stats questions use Cross Validated (<http://stats.stackexchange.com/>)
- Book:
 - Applied Spatial Data Analysis with R, 2nd Edition
Roger S. Bivand, Edzer Pebesma and V. Gómez-Rubio
Available through Dal library
- Online tutorials:
 - Francisco Rodriguez-Sanchez tutorial:
<https://github.com/Pakillo/R-GIS-tutorial>