

R without fear: an R course in evolutionary ecology

Teacher: Jordi Moya-Laraño (Functional and Evolutionary Ecology, Estación Experimental de Zonas Áridas – CSIC)

Calendar: November 21st-25th 2016

Duration: 36 hours

Schedule: 9h-12h30 and 14h-17h30, Monday-Thursday; 9h-13h and 14h-18h Friday

General Plan:

- Introduction to the R working environment
- Variable types in R
- Statistical populations and samples through working examples
- Measurements of central tendency and variability
- Precision, accuracy and bias
- Hypothesis testing: Falsability, Type-I and II errors and statistical power
- Correlation and simple regression
- P-value vs. effect magnitude
- Linear Models: residuals, assumptions and interpretation.
- Explained vs. unexplained variance of a model (the coefficient of determination).
- Building functions in R
- Introduction to graphics in R
- The concept of partial effect: partial regression and correlation
- General Linear Models (GLM)
- Curve fitting in linear models and General Additive Models (GAMs)
- The problem of spatial autocorrelation in ecology and evolution
- Multicollinearity: when is there a problem?
- Additive vs. multiplicative effects: checking and plotting interactions
- Introduction to General and Generalized Linear Mixed Models (GLMM)
- Fixed vs. Random effects and implications for analysis: main R functions
- Introduction to Bayesian statistics: the function MCMCglmm
- Practical examples in evolutionary ecology:
 - The study of natural selection
 - Applications of linear models for quantitative genetics
- Student's case studies.

This course can have a recognition of 6 ECTS for FCUL PhD students enrolling in it as part of their first doctoral year. For FCUL PhD students only requiring 5 ECTS recognized in their specific PhD

programmes the last 6 hours of the course are not mandatory and the certificate will be on 'Topics in R without fear'.

Location: room 4.2.07 (FCUL)

Nº (min, max) students: 10 – 24

Minimum formation: bachelor degree in Biology or related areas

Directed to: PhD or MSc students in Biology, Evolution, Ecology or related areas, and postdocs and other professionals working in related topics

Fee: free for 1st year PhD students in the Doctoral program in Biology (FCUL), Biodiversity, Genetics and Evolution (BIODIV UL; UP) and Biology and Ecology of Global Changes (BEAG UL, UA) when the course counts credits for their formation, in which case the delivery of a final report done after the course is mandatory; 25 € for PhD students from institutions of the PEERS network (cE3c, CFE); 125 € for FCUL Master students and unemployed; 180 € for BTI, BI and other PhD students; 250 € for Professional and postdocs.

When the maximum number of students is reached 12 vacancies will be available for non-paying 1st year PhD students mentioned above, being, by order of preference: 1) cE3c students; 2) BIODIV students (not from cE3c); 3) FCUL students (not from cE3c); 4) BEAG students (not from FCUL).

Deadline for applications: October 20th, 2016

Candidates should send a short CV and a motivation letter to Jordi Moya-Laraño at the following email address: jordi@eeza.csic.es