



## APPLIED METHODS IN COMMUNITY ECOLOGY AND FUNCTIONAL ECOLOGY

**Lecturers:** Paulo A. V. Borges (Assistant Professor in the University of Azores, researcher in IBBC- Azorean Biodiversity Group, cE3c) & François Rigal (Assistant Professor in the University of Pau and Pays de l'Adour, collaborator in the Azorean Biodiversity Group, cE3c)

**Note:** This course is intended to be presential, but if needed (e.g. due to COVID-19 security measures by the time of the course) it may be adapted to be given remotely

**Calendar:** June 20<sup>th</sup> to 24<sup>th</sup> June 2022

**Duration:** 36 hours

**Schedule:** 9h-13h and 14h30-17h30 Monday to Thursday; 9h-13h and 14h30-18h30 Friday

**Objectives:** This is a mostly practical course offering an overview on different community ecology and macroecological methods and software. These will include all steps of a research project, from the optimal sampling of communities to process inference from large-scale patterns of taxon, phylogenetic and functional diversity. Specific topics will be: (1) alpha, beta and gamma diversity; (2) estimating diversity from incomplete sampling; (3) partitioning taxonomic beta diversity; (4) community-assembly rules, (5) functional and phylogenetic diversity, (6) null models, (7) rarity and species abundance distribution. Finally, students will be asked to present own data and case studies.

### General Plan:

1. Partitioning diversity into independent alpha, beta and gamma components - basic concepts and software (Species Diversity, Richness IV and R).

2. Partitioning beta diversity - multiplicative vs. additive measures of beta diversity and replacement vs richness differences components. Applications in PARTITION and R.
3. Estimating diversity from incomplete sampling - algorithms and applications with EstimateS and R.
4. Conceptual bases of community assembly theory.
5. Conceptual bases of functional and phylogenetic approaches in community ecology.
6. Computing functional and phylogenetic diversity (overview of the different indices and different R packages available and introduction to null models)
7. Rarity and Species Abundance Distribution Models (SADs) with new applications in R.
8. 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. These students need to deliver two reports after the course. For students only requiring 5 ECTS recognized in their specific PhD programmes the last 3.5 hours of the course are not mandatory, they need to deliver only the main report and the certificate will be on '**Topics in Applied methods in Community Ecology and Functional Ecology**'. Such report(s) are also advised for other students requesting creditation of the course in their institutions.

**Location:** Departamento de Biologia Animal (FCUL) or Universidade dos Açores (Angra do Heroísmo) depending of the edition. In 2017 the course will be held in Lisbon.

**Nº (min, max) students:** 10 – 20

**Minimum formation:** "Licenciatura" (bachelor) in Biology, Geography or related areas; (very) basic knowledge of R is required.

**Directed to:** PhD or MSc students in Ecology, Geography or related areas, and postdocs working in related topics

**Fee:** Free for 1st year PhD students in Doctoral programmes at FCUL (e.g. Biologia), Biodiversity, Genetics and Evolution (BIODIV UL; UP), Biology and Ecology of Global Changes (BEAG UL, UA) and Sustainability Science (UL, several institutions), when the course counts credits for their formation, in which case the delivery of a final report done after the course is mandatory; the course is also free for more advanced PhD students of the BIODIV programme (ULisboa or UPorto); 50 € for more advanced PhD students of cE3c; 80 € for PhD students of the PEERS network (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, 10 vacancies will be available for non-paying 1st year PhD students mentioned above, being, by order of preference students from: 1) cE3c; 2) BIODIV (not from cE3c); 3) FCUL (not from cE3c); 4) Sustainability Science (not from cE3c or FCUL); 5) BEAG (not from cE3c or FCUL).

**Deadline for applications:** May 6<sup>th</sup>, 2022

Candidates should send a short CV and motivation letter explaining why they are interested in the course, including a brief description of their research projects. Send all information and requests to Paulo A. V. Borges ([paulo.av.borges@uac.pt](mailto:paulo.av.borges@uac.pt)). The cv and letter should be named as *1st-lastNAME-CV.pdf* and *1st-lastNAME-ML.pdf* (that is personalize the name of each file with your first and last name).

**In the email please add the following information:**

Full Name:

E-mail:

Phone:

Professional activity: Professional/Postdoc, BTI, BI (or other non-post-doc research grant), PhD student (with/without scholarship), Lic. (Bachelor)/Master student

PhD student of the 1st year of a Doctoral programme at FCUL, BIODIV (FCUL/FCUP), BEAG (FCUL or UA) or University of Azores?

If yes to the above question, PhD student doing the Course to count credits for 1st year?:

PhD student of cE3c or CEF (Centro de Ecologia Funcional)?:

Name of the PhD programme: