

## Practical Course on Phylogeography Faculdade de Ciências da Universidade de Lisboa

### Organizers:

Computational Biology & Population Genomics Group (<http://cobig2.fc.ul.pt>)

Centre for Ecology, Evolution and Environmental Changes

**Teacher:** Octávio Paulo (DBA Professor, cE3c researcher)

**Calendar:** July 3<sup>rd</sup>-7<sup>th</sup> 2017

**Duration:** 36 hours

**Schedule:** 13h-20h, Monday-Thursday; 13h-21h Friday

### Objectives:

Phylogeography is one of the recent scientific areas emergent from the dissemination of highthroughput technologies of sequencing starting in the 90's of the XXth century, with the consequent development of intra-specific genetic variance analysis and its geographic distribution. The analysis of phylogeographic data allows to study the processes of population differentiation and the underlying evolutionary and demographic history. Applications of this body of knowledge go from conservation genetics to the study of the evolution of species and populations. This course is aimed at students and professionals that intend to get started on phylogeographic analysis as well as researchers already with some experience that want to deepen or update their knowledge in the field. The course involves theoretical classes as well as hands-on practical sessions using software. Participants are encouraged to bring their own sequence data for analysis.

### Objectivos:

A Filogeografia é uma das áreas científicas recentes resultante da disseminação da tecnológica de sequenciação que ocorreu nos anos 90 e do consequente desenvolvimento da análise da variação genética intra-específica e da sua distribuição geográfica. A análise de dados filogeográficos permite dar informação sobre os processos de diferenciação das populações e sobre a história evolutiva e demográfica das mesmas. As suas aplicações vão hoje desde a genética de conservação até ao estudo da evolução das espécies e populações animais.

O presente curso é destinado a estudantes ou profissionais que pretendam iniciar-se na análise filogeográfica e também a investigadores já com alguma experiência mas que queiram aprofundar e actualizar os seus conhecimentos. O curso consistirá em aulas teóricas alternadas com aulas práticas de utilização de software. Encorajam-se os participantes que tenham dados de sequências a trazê-los para análise.

### Resume

Introduction the Phylogeography, basic concepts and problems. Databases for population studies and types of data sets for analysis etc. Short description of statistical methods and principles necessary for understanding the analytical methods used in Phylogeography. Trees and networks. Population structure and analyze of molecular variance. Introduction of themes related to the coalescence theory, genetic demography and landscape genetics.

Detection and selection and demographic change with molecular data. Regional analysis of diversity and of the factors that determined or modified that diversity. Genetic effect of contact between populations.

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 Phylogeography'.

### **Programa**

**Dia 1** – Segunda-feira

13h00 – 20h00 - Introdução à filogeografia; princípios básicos e conceitos; Sequencher, BioEdit e Mega

**Dia 2** – Terça-feira

13h00 – 20h00 – Métodos de árvores e de redes, Concatenator, Network e TCS

**Dia 3** – Quarta-feira

13h00 – 20h00 – Estrutura populacional e AMOVA; Arlequin

**Dia 4** – Quinta-feira

13h00 – 20h00 – Demografia e Seleção; DnaSP

**Dia 5** – Sexta-feira

13h00 – 21h00 – Métodos vários em filogeografia; Análise de casos de estudo propostos pelos estudantes

**Location:** Departamento de Biologia Animal, FCUL

**Nº (min, max) students:** 15-20 students

**Minimum formation:** student of 'Licenciatura' (bachelor) in Biology

**Fee:** free for 1<sup>st</sup> year PhD students in the Doctoral programme in Biology (FCUL), Biodiversity, Genetics and Evolution (UL; UP) and Biology and Ecology of Global Changes (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; 300 euros for Professionals and postdocs, 250 euros for BTI, BI and PhD students and 180 euros for master and bachelor students in FCUL as well as unemployed

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: 1) cE3c students; 2) BIODIV students (not from cE3c); 3) FCUL students (not from cE3c); 4) BEAG students (not from FCUL).

**Deadline for applications:** June 9<sup>th</sup>2017

To apply send an e-mail to [octavio.paulo@fc.ul.pt](mailto:octavio.paulo@fc.ul.pt) with the following information:

Name:

E-mail:

Phone:

Professional activity: Professional/Postdoc

BTI, BI, PhD student (with/ without scholarship) Lic./Master student

Academic formation:

Institution:

Student of the 1st year of Doctoral programme Biodiv (FCUL/FCUP), Biologia (FCUL) or BEAG (FCUL or UA)?

