# Use of technology in field biology

**Organization**: Maria Dias e Inês Rosário (cE3c/FCUL)

**Lecturers**: Maria Dias, Inês Rosário, José Pedro Granadeiro, Ana Leal, Rui Rebelo, Miguel Rosalino, David Santos

**Calendar:** 5th-9th June 2023

**Duration:** 36h (contact hours)

**Schedule:** Day 1 (FCUL): one morning or afternoon (2h); Days 2-5 (HRA): 8h-18h (with 1.5 h break)

**Objectives:**

Collecting data in the field is nowadays greatly facilitated by the advance of technology such as the development of devices that can automatically record and store environmental information, or miniaturized GPSs that can follow the movements of animals. In this course we will provide advanced hands-on training on some of the most used technological tools in field biology: **movement tracking devices** (e.g. GPS loggers, geolocators), **environmental data loggers** (e.g. to record temperature or water depth), **acoustic devices** (e.g. Audiomoths), **camera traps**, **identification apps** and **drones**. At the end of the course the participants will 1) understand the usefulness of each tool in the context of field biology; 2) know the basic principles of the use of these tools in fieldwork; 3) be able to download the data to a computer. Data analysis will not be addressed in this course, although a list of available software to deal with data handling and analysis for each tool will be provided.

**General plan**:

The course will have a strong component of fieldwork and will be held both at FCUL and in cE3c/FCUL field station, Herdade da Ribeira Abaixo (HRA), located in Grândola.

The course will last 5 days. On the first day (at FCUL) we will give an overall introduction and a brief presentation of each tool. Days 2 to 5 will be in the field (HRA) and will focus on the practical component of the use of each tool, both in terms of fieldwork and data handling.

The following subjects will be addressed:

- Background on the use of technology in field biology;
- Main tools currently available to support data collection in Ecology;
- Main areas of application of each tool in Ecology;
- Main advantages and disadvantages of technological tools in comparison with traditional methods of data collection;
- Main currently constrains of each tool (including logistic challenges and financial costs);
- Data storage and handling: available software/R packages; challenges in data storage;
- Legal requirements (e.g. use of sound and image recorders);
- Potential of these tools in science communication;
- Technology failure and troubleshooting.

Participants have to be present at 85% of the contact hours (this means that they can miss one half-day), and actively participate in all activities.

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 technology in field biology'. Such report(s) are also advised for other students requesting creditation of the course in their institutions.**

**Specific needs (e.g. computers, lab)**: laptops; remaining material will be provided.

**Nº (min, max) students**: 8-15

**Minimal formation of students**: some experience in fieldwork is desirable; basic knowledge on Excel

**Directed to:** MSc or PhD students in Biology, Environmental Sciences, Ecology, Agricultural and Forestry or related areas, postdocs and professionals working in related topics

**Provisional plan**:

Day 1 (FCUL) – 2h (morning or afternoon, TBD)

Introduction

Brief presentations of each tool

Plans for fieldwork

Days 2-5 (HRA) 34h (ca. 8.5h per day)

Days 2 -4 will be organized in modules. Each module will consist of a practical session where the trainees will have the opportunity to use the tools in a real-case example, collect data, learn how to transfer the data to the computer and, when applicable, visualize the data with a dedicated software. End of day 4 and day 5 the participants will have the opportunity to do a practical work using one of the tools (in groups).

Participants should arrive the night before of the start and leave by the end of day 5/early morning the following day.

Day 2:

8-10: Module 1: Tracking devices: deployment

10-12: Module 2: Data loggers: placement in the field

Lunch break

14-16: Module 3: Camera traps: placement in the field

16-18: Module 4: Acoustic devices: placement in the field


Day 3:

8-10: Module 5: ID apps

10-12: Module 6: Drones: operating

14-16: Module 7: Drones: data download

16-18: Module 8: Tracking devices: data visualization*

Day 4:

6-8: Module 8: Collection of devices (data loggers, acoustic devices and camera traps)

8-9: Module 9: Data loggers: data visualization*

Coffee break

10-11: Module 10: Camara traps: data visualization*

11-12: Module 11: Acoustic devices: data visualization*

Lunch break

14-16: Group work: Device deployment


Day 5:

8-14: Group work: Device collection and data download

14-16: Final session


**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, 8 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 5$^{th}$ 2023**

**How to apply**

Candidates should fill in the following FORMULARY:

(closed)

This formulary is strictly confidential, as explained in the introduction, and the data are required because the cE3c Advanced Courses are also offered as part of the PRR programme of FCUL.

When filling the formulary mind to:

1) FILL ALL THE MANDATORY FIELDS
2) UPLOAD CV AND MOTIVATION LETTER, both mandatory; use the names as instructed there
3) If you want to resume later SAVE the formulary, otherwise you will need to fill everything again
4) At the end SUBMIT the formulary before exiting

For any doubts please contact the cE3c coordinator of the cE3c courses Margarida Matos, email [mmmatos@fc.ul.pt](mailto:mmmatos@fc.ul.pt)