

FREE

FIELD COURSE, 17-29<sup>TH</sup> DE ABRIL 2023

# ECOLOGICAL RESEARCH IN MEDITERRANEAN ECOSYSTEMS

## From Theory to Practice

**Theory** (17-21<sup>st</sup> April, online) | **Practice** (24-29<sup>th</sup> April, in person)



### OBJECTIVES

#### **Introduce**

students to key concepts in ecological research

#### **Offer**

a general overview of Mediterranean fauna and flora

#### **Provide**

experience in field ecology and wildlife sampling techniques

#### **Foster**

communication (oral and written) and team working skills









# OVERVIEW

The education paradigm has been changing in the last years, mostly as a result of a growing awareness of the benefits of field-based education. More than ever, providing field work experiences to students are key to fostering the next generation of wildlife researchers, enhancing their awareness towards current environmental issues, but also providing a first-hand view of the “real world”, which is vital for understanding and delineating realistic and well-founded research questions. The advanced course on “Ecological Research in Mediterranean Ecosystems - From Theory to Practice” aims to provide the necessary scientific background to design and implement ecological studies. This field course has a strong practical component offering participants a hands-on experience in field sampling techniques focused on terrestrial Mediterranean ecosystems. Brief theoretical introductions on sampling design, habitat characterization, and biodiversity surveys will be followed by practical sessions in an outdoor Mediterranean landscape, the Faia Brava reserve (northeastern Portugal). Participants will learn the steps to survey and monitor different taxonomic/functional groups, habitats and ecosystem compartments as well as the logistics and the challenges they may face in field ecology and data collection. The course programme comprises a solid theoretical background and practical training for students and young researchers working on Mediterranean ecosystems.

## OUTCOMES

- Theoretical knowledge on Mediterranean ecology, biodiversity assessment and ecosystem processes;
- Skills on study design, implementation, and evaluation;
- Practical skills on field methods in terrestrial ecology;
- Communication and collaboration skills within a group to effectively achieve relevant research aims;
- Science communication skills: written and oral presentation;
- Production of research proposals aligned with current sustainable development goals.

## SUSTAINABLE DEVELOPMENT GOALS - UNITED NATIONS

SDG4	SDG13	SDG15	SDG17
Quality Education	Climate action	Life on Land	Partnership for the Goals
			

# ORGANIZATION AND INSTRUCTORS

ECOLOGICAL  
RESEARCH IN  
MEDITERRANEAN  
ECOSYSTEMS  
From Theory to Practice



### JOÃO CARVALHO

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am an ecologist focused on the dynamics of ecosystems and wildlife populations. Over my research career, I have expanded my interests to invasive species, wildlife infectious diseases, citizen science and human perceptions of natural assets. My research and teaching activities are a blend of applied ecology, geographical information systems and statistics.

See <https://www.cienciavitae.pt/pt/F317-62C3-2689> for further information.



### EDUARDO FERREIRA

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am an ecologist focused on biodiversity and wildlife management and conservation, both on natural and humanized landscapes. Throughout my career I have been mostly applying molecular ecology and population genetics tools to management and conservation, with a major focus on mammals and herpetofauna. See <https://www.cienciavitae.pt/portal/581B-7ED8-3A0F> for further information.



### JORGE HENRIQUES

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am an ecologist interested in evolutionary and community ecology, exploring the drivers of intraspecific variation, species interactions and ecosystem functions, and how these are interconnected in space and time. Currently, I am focused on studying the interactions between natural soil communities and landscape features, using a combination of molecular and ecological tools.

See <https://www.cienciavitae.pt/en/C81E-4273-A33A> for further information.



### PEDRO BEÇA

Department of Communication and Art and Digital Media and Interaction Research Centre, University of Aveiro

As professor and member of DigiMedia, my areas of interest include the use of mobile devices and participatory culture, and the development of web and mobile applications, especially in the design, implementation and validation stages.

See <https://orcid.org/0000-0001-7332-4901> for further information.

# INSTRUCTORS



### ANTONIO JOSÉ CARPIO

Research Institute of Hunting Resources, University of Castilla-La Mancha

I am a wildlife biologist and an applied ecologist particularly interested in the monitoring, management and conservation of wildlife. I have working in several ecosystems and spatial contexts, from Iberia to Latin America.

See <https://orcid.org/0000-0002-6989-970X> for further information.



### CARLOS FONSECA

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro. ForestWISE - Collaborative Laboratory for Integrated Forest and Fire Management

I am wildlife biologist focused on the management and conservation of the wildlife, forestry ecosystems and sustainability of rural areas. Due to my last responsibilities as Chief Technology Officer of the ForestWISE - Collaborative Laboratory for Integrated Forest & Fire Management, I have been working daily in the interface between academia, industries and public bodies promoting the integrated forest and fire management that is crucial for the sustainability and valorisation of the ecosystems and people. See <https://www.cienciavitae.pt/8610-54AB-874A> for further information.



#### EMMANUEL SERRANO

Wildlife Ecology & Health Group and Servei d'Ecopatologia de Fauna Salvatge, Department of Medicina i Cirurgia Animals, Facultat de Veterinària, Universitat Autònoma de Barcelona

I am a wildlife ecologist particularly committed to understanding the impact of infectious diseases and environmental variation on wildlife populations. Understanding the role of ungulates as ecosystem engineers is in my research agenda.

See <https://www.researchgate.net/profile/Emmanuel-Serrano-4> for further information.



#### FRANCISCO SÁNCHEZ TORTOSA

Department of Zoology, University of Cordoba

I am a professor interested in animal diversity under different environmental contexts, from agriculture to forest areas. My research is focused on identifying the landscape features that fosters the conservation of biodiversity in altered areas of Iberian Peninsula and Latin America.

See <https://orcid.org/0000-0003-0034-886X> for further information.



#### HÉLDER CAIXINHA

Department of Communication and Art and Digital Media and Interaction Research Centre, University of Aveiro

I am a professor who teaches undergraduate and graduate courses on photography, audiovisual production, and front-end web development. My main research interests are related with new storytelling approaches for documentary, visual storytelling, audiovisual documentary production, transmedia/crossmedia strategies for audiovisual content and technology-enhanced cultural heritage preservation.

See <https://www.cienciavita.pt/pt/1319-EAF6-9468> for further information.



#### INÊS BOM

Associação Transumância e Natureza

I am a biologist with a particular interest in environmental education and management of protected areas. I am currently responsible for implementing environmental education initiatives, while developing actions related to the management and conservation of wildlife in the Faia Brava reserve.

See <https://www.faiabrava.pt/pt/> for further information.



#### JOANA FERNANDES

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am a PhD student currently focused on the ecology of Mediterranean reptiles. I am particularly interested in understanding the impact of human activities on wildlife populations. I have also expanded my interests to wildlife conservation and management, and wildlife genetics.

See <https://www.cienciavita.pt/en/9E1B-F3BF-A7CF> for further information.



#### KATARZYNA TAJCHMAN

University of Life Sciences in Lublin

I am a professor focused in hunting management, animal protection, and farmed deer breeding. My scientific interests include the genetic diversity of game animals, the impact of road traffic on wild animal populations, the management of wild game populations, the welfare of farm deer, and the use of free-living animal tissues to monitor environmental pollution.

See <https://orcid.org/0000-0003-4725-9020> for further information.



#### LUÍS MIGUEL ROSALINO

Department of Biology and Centre for Ecology, Evolution and Environmental Change, Faculty of Sciences, University of Lisbon

I am a wildlife biologist focused on understanding human impacts on wildlife individuals, populations, and on landscape patterns and processes. I am also interested in developing strategies for conserving wild mammals, especially mammalian carnivores. My research's main goal is to understand how we can promote biodiversity conservation and economically sustainable production.

See <https://orcid.org/0000-0003-4186-7332> for further information.



#### MÓNICA ARESTA

Department of Communication and Art, University of Aveiro

I am a professor and a researcher in the field of Human centered design and multimedia. Over the past five years I have been working on environmental and sustainable education through game design activities - that is, how we can promote the environmental awareness through digital games design.

See <https://orcid.org/0000-0002-7629-934X> for further information.



#### RAMON PEREA

Technical University of Madrid

I am a professor particularly interested in the biotic interactions (plant-animal and plant-plant interactions) in the Mediterranean and tropical environments. Some of my main research topics include forest ecology, oak ecology and evolution, wild ungulates, herbivory, seed dispersal, plant facilitation, regeneration of woody plants, and conservation and management of Mediterranean and tropical systems. See <http://www2.montes.upm.es/Dptos/dsrn/RPerea/> for further information.



#### RITA TINOCO TORRES

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am a biologist and researcher that uses spatial ecology to understand how species respond to global changes and describe their dynamics at ecosystem level. I am particularly interested in the biology of reintroductions and how they can be used as tools for restoring ecosystem functions and processes. In recent years, I am trying to understand the role of wild ungulates as models for unravelling the main challenges of infectious diseases.

See <https://www.cienciavita.pt/portal/FC1B-85CF-958D> for further information.



#### RUI CARVALHO

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I have been working in standardised arthropod assessment and monitoring as a tool to a better understanding of ecosystems functioning, for the last 15 years. Focusing primarily on spiders, I have covered different areas, from biodiversity inventory, behavioral studies to the creation of science communication contents. Recently, I developed an integrated methodology to assess the impact of pedestrian trails on the integrity of protected ecosystems.

See <https://www.researchgate.net/profile/Rui-Carvalho-11> for further information.



#### RUI MORGADO

Department of Biology and Centre for Environmental and Marine Studies, University of Aveiro

I am a biologist and postdoc at the University of Aveiro. My research is mainly focused on soil ecology and ecotoxicology, soil biodiversity and functioning soil ecosystem services, multiple stressors research, climate changes, mixture toxicity, and toxicokinetic-toxicodynamic modelling.

See <https://www.cienciavita.pt/portal/3616-6DF6-2BEC> for further information.



# PROGRAMME

## 17-21<sup>ST</sup> APRIL 2023

THEORETICAL (ONLINE) Portugal local time, GMT +01:00

### DAY 1 (Monday, 17<sup>th</sup> April)

**10:00h – 12:00h** Opening session. Introduction to course programme and course instructors. The importance and challenges of field Ecology in an era of data Science.

**14:00h – 15:30h** Mediterranean ecosystems – a story of Humans and Nature. Patterns, processes, and determinants of Mediterranean biodiversity.

**16:00h – 17:30h** A general overview on monitoring animal populations and their habitats.

### DAY 2 (Tuesday, 18<sup>th</sup> April)

**10:00h – 12:00h** Scientific method and experimental design in field Ecology.

**14:00h – 15:30h** Towards an understanding of soil processes and functions. Soil sampling and measurement techniques.

**16:00h – 17:30h** Drivers of Mediterranean flora and vegetation. Vegetation sampling and measurement techniques.

**18:00h-19:00h** Mediterranean forest: The Portuguese state of the art.

### DAY 3 (Wednesday, 19<sup>th</sup> April)

**10:00h – 12:00h** Ecology and identification of Mediterranean herpetofauna. Recording, capturing and monitoring amphibian and reptile populations and communities.

**14:00h – 16:00h** Ecology and clues for the identification of Mediterranean invertebrates. Recording, capturing and monitoring invertebrate populations and communities.

**16:30h – 17:30h** Faia Brava – history, conservation, and management of a nature reserve.

### DAY 4 (Thursday, 20<sup>th</sup> April)

**10:00h – 12:00h** Ecology and identification of Mediterranean carnivores and small mammals. Recording, capturing and monitoring carnivore and small mammal populations and communities.

**14:00h – 16:00h** Ecology and identification of Mediterranean ungulates. Recording, capturing, and monitoring ungulate populations and communities.

**17:00h – 19:00h** Problems and capabilities of conducting research on wild and farm cervids.

### DAY 5 (Friday, 21<sup>st</sup> April)

**10:00h – 12:00h** Tips, tricks, and tools to achieve and communicate ecological research.

**14:00h – 16:00h** Production of audio-visual contents through entertaining means. Gamers4Nature.

## 24-29<sup>TH</sup> APRIL 2023

PRACTICAL (IN PERSON) Figueira de Castelo Rodrigo, Portugal local time, GMT +01:00

### DAY 1 (Monday, 24<sup>th</sup> April)

**09:00h – 15:30h** Departure, lunch, and accommodation. (Aveiro – Figueira de Castelo Rodrigo)

**17:30h – 18:30h** The wild side of science – tips and guidelines for ecologists and field practitioners. Initial planning and preparation.

**18:30h – 19h30** Meet your group/Group assignments.

### DAY 2 (Tuesday, 25<sup>th</sup> April)

**09:00h – 12:00h** Soil ecology in practice – field interpretation and soil sampling. Introduction to the pre-processing of soil samples.

**14:00h – 16:00h** Soil ecological indicators. Measuring underground biodiversity. Sample integrity from field to lab.

**16:30h – 19:00h** Group work and collection of audio-visual material.

### DAY 3 (Wednesday, 26<sup>th</sup> April)

**09:00h – 12:00h** Sampling wild carnivores and small mammals in the field. Methods to estimate carnivore occupancy and habitat use. Methods to estimate the density, abundance and body condition of small mammals.

**14:00h – 17:00h** Sampling wild ungulates in the field. Methods to estimate ungulate density, abundance, behaviour and habitat use. From direct observations to remote monitoring.

**17:30h – 19:30h** Group work and collection of audio-visual material.

### DAY 4 (Thursday, 27<sup>th</sup> April)

**09:00h – 12:00h** Recording, capturing, and handling herpetofauna. Monitoring amphibian and reptile populations through invasive and non-invasive methods.

**14:00h – 15:00h** Group work and collection of audio-visual material.

**15:30h – 18:00h** Mediterranean invertebrates – groups of interest and collection methods. Specimen handling, preservation, and identification.

**20:30h – 23:30h** Visit to the Côa Valley rock engravings (Group 1).

### DAY 5 (Friday, 28<sup>th</sup> April)

**09:00h – 12:00h** Initial steps in vegetation and habitat sampling.

**14:00h – 16:30h** Objectives, protocols and techniques for studying diversity, vegetation properties and habitat structure.

**17:00h – 18:30h** Group work and collection of audio-visual material.

**20:30h – 23:30h** Visit to the Côa Valley rock engravings (Group 2).

### DAY 6 (Saturday, 29<sup>th</sup> April)

**09:00h – 12:00h** Departure (Figueira de Castelo Rodrigo – Aveiro).

**14:00h – 17:00h** Wrap-up session, presentations and conclusions (Department of Biology, University of Aveiro).

## DBIO-CESAM/DeCA/ATN Field course – Spring edition

**LOCATION:** Aveiro and Figueira de Castelo Rodrigo in person, Portugal

**DATE:** 17-21<sup>st</sup> April 2023 (online), 24-29<sup>th</sup> April 2023 (field, Figueira de Castelo Rodrigo)

**ORGANIZATION:** Universidade de Aveiro, Associação Transumância e Natureza

**PARTNERS:** Universitat Autònoma de Barcelona, Universidad Politécnica de Madrid, Universidad de Córdoba, University of Life Sciences in Lublin

**SUPPORT:** Figueira de Castelo Rodrigo Municipality

**TARGET AUDIENCE:** The field course targets BSc, MSc or PhD students, aiming to deepen knowledge on the design and implementation of ecological studies, and monitoring wildlife populations and habitats.

**REQUIREMENTS:** Students enrolled in a BSc, MSc or PhD in Biology or related areas.

**LANGUAGE** English

### REGISTRATION

To apply, please send an email to João Carvalho (jlcarvalho@ua.pt) with your Curriculum Vitae and motivation letter.

APPLICATION DEADLINE: **March, 17<sup>th</sup>**

