



Exploring the Hidden World of Microbes: Unravelling Microbial Communities in Complex Multi-dimensional Systems

Place of work: TecLabs – Ulisboa

Supervisors: Monica Nunes (msnunes@fc.ul.pt); Ricardo Dias (rpdias@fc.ul.pt)

The study of microbial communities in complex environmental samples has become an increasingly important field in microbiology and environmental science. These communities play critical roles in maintaining ecosystem functions and have significant impacts on human health and disease. However, characterizing these communities is challenging due to their vast diversity and complexity.

One of the most important steps in these studies is proper sample collection, concentration, and processing, to accurately characterize the microbial communities.

This study will focus on exploring the different techniques available for characterizing microbial communities in complex environmental samples. Different methods for collecting and preserving environmental samples, techniques for extracting and purifying microbial DNA, and various molecular methods for profiling microbial communities, including amplicon sequencing and metagenomics, will be explored. Bioinformatics tools and pipelines used for analysing and interpreting large-scale microbial community data, including different software packages for quality control, taxonomy assignment, and statistical analysis will also be addressed.

These techniques will be applied to analyse complex environmental samples, such as water, and air samples, and to characterize the diversity of microbial communities in different ecosystems. The project can be tailored to the student's specific interests and may involve collaborations with other researchers or institutions in the field if needed.

The development of this study will provide a systematic framework for understanding the functional relationships between microbial communities in complex environmental systems, advancing our knowledge of how these communities interact and contribute to ecosystem functioning.



ULisboa Master Programmes of interest:

- Master Programme in Microbiology
(Coordinator Prof. Jorge Leitão - jorgeleitao@tecnico.ulisboa.pt)
- Master Programme in Molecular Biology and Genetics
(Coordinator Prof. Francisco Dionísio - fadionisio@fc.ul.pt)
- Master Programme in Applied Microbiology
(Coordinator Prof. Mónica Cunha - mscunha@ciencias.ulisboa.pt)

Information: Students selected for this project, after thesis registration, are eligible to apply to the BioISI Junior Programme (supporting 8 students with a 6-month Scholarship (BII), being the selection criterium the academic merit of the candidates.