



## Frontiers in Plant Sciences: Microbiomics II: Metabarcoding - from bioinformatics to statistics (ETHZ 751-5127-01L)

**Lecturer:** Hartmann Martin, Institute of Agricultural Sciences, ETH Zurich

**Location:** ETH Centre,

**Dates:** 10. – 13.06.2025

**Credit Points:** 1 ECTS

### Course Description

This computer block course provides a thorough introduction to the application of next-generation sequencing techniques for analyzing diversity of microbial communities with a main focus on the metabarcoding technique. The topics covered by the course range from bioinformatic processing of sequencing data to the most important approaches in multivariate statistics. Using a combination of theoretical lectures and hands-on computer exercises, the participants will learn the computational steps from processing raw sequencing reads down to the final statistical evaluations.

### Learning Objectives

After the course, the participants will be able to

- 1) understand the concept, potential and limitation of microbial NGS applications
- 2) know how to process raw metabarcoding data to obtain meaningful information
- 3) use multivariate statistical methods evaluate and visualize microbial community data
- 4) make informed decisions on best practices for their own data

### Prior Knowledge

The participants should have some background in microbial ecology and understand the basics of next-generation sequencing techniques as a tool to study microbes in the environment. Participants that are not familiar with these topics are encouraged to take the course unit «Microbiomics I» as preparatory class (mandatory for master students). No programming or scripting expertise is required, but some basic experience with using command line applications is of advantage since not all the basics can be thoroughly covered in that short amount of time. However, some basic introduction to UNIX-based command line applications will be provided on the first day. Bioinformatics analyses will be done in UNIX-based environments using a selection of tools. All statistical analyses will be run in R using RStudio.

**Number of Participants:** 16

**Note:** ETH students (Master and PhD students) have to register via MyStudies only, to ensure valid registration !

**Individual Performance and Assessment:** In order to obtain the ECTS points, participants are required to actively participate during the four course days.