

Seminar!

A primer for...



Bioinformatics for Microbiomes

Microbial diversity analysis with amplicon sequencing

by

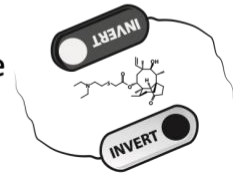
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Department of Biochemistry and Biotechnology

A probe for the microbiome analysis module of the

[HosMic MSc programme!!!](#)

Course contact person: Prof K. Kormas (kkormas@uth.gr)



The seminar will be carried out at the Department of Biochemistry and Biotechnology

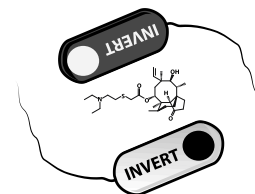
Schedule

Monday 25 Oct. 08:00 – 12:30 at “Fotis Kafatos” (“ΦΩΤΗΣ ΚΑΦΑΤΟΣ”) teaching room (1st floor). **In-person presence capacity of 25 participants.**

MS-Teams [link](#).

Basic concepts

- The vastness of microbiome
- Microbiome analysis approaches (past, present, future)
 - Culture-based
 - Culture-independent
- Microbial diversity analysis with next generation sequencing approaches of phylogenetic marker genes
 - Sampling and material prep
 - Choice of phylogenetic marker gene
 - PCR, primer choice, errors and how to deal with them



- Generations of sequencing
 - Past, present, and future of phylogenetic marker gene sequencing
 - Chemistries, error types/sources, and how to improve sequencing run quality
 - Sequencing approach selection

- Intro to data analysis (focus on Illumina... winner of recent past)
 - Sequence read quality assessment (QA) and quality control (QC)
 - Amplicon reconstruction
 - Microbial classification units (OTUs/ASVs/phylotypes/phylogenetic tree leaves)
 - Conceptual aspects of diversity analysis statistics
 - α -diversity (descriptive, hypothesis testing)
 - β -diversity (descriptive, hypothesis testing, differential abundance, co-occurrence, correlation, networks)

Tuesday 26 Oct. 09:00 – 16:00 at the “MSc” room (1st floor). **In-person presence capacity of 15 participants.**

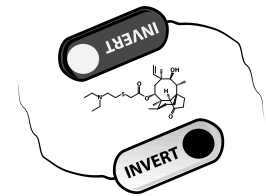
MS-Teams [link](#).

Intro to the R and “mothur” software

- First things first: Software installation (R and “mothur”)

- R intro and practical
 - what is R?
 - why do we need R for our microbiome analysis?
 - The R-Studio GUI environment
 - R brief history
 - Functionality primer
 - Help!!!
 - R as a calculator
 - Assigning to variables
 - Using a command/function and basic commands
 - Data types
 - Operators
 - Conditional statements
 - Loops
 - Plotting

- “mothur”
 - Why use “mothur” and its history (“dotur” and “sons”)
 - Prep your sequences
 - Remove putative erroneous sequences
 - Prepare the classification matrices



Wednesday, Thursday 27 & 28 Oct: you'd better study!!!

Friday 29 Oct. 09:00 – 15:00 at “Fotis Kafatos” (“ΦΩΤΗΣ ΚΑΦΑΤΟΣ”) teaching room (1st floor). **In-person presence capacity of 25 participants.**

MS-Teams [link](#).

Practical

- Hands on analysis (walking through worked examples)
 - mothur (OTU approach)
 - R Dada2 package (ASV approach)
 - other R packages for answering questions.

Monday 1 Nov. 9:00 – 12:30 at “Fotis Kafatos” (“ΦΩΤΗΣ ΚΑΦΑΤΟΣ”) teaching room (1st floor). **In-person presence capacity of 25 participants.**

MS-Teams [link](#).

Practical continue

- questions and answers

Tuesday 2 Nov. 9:00 – 14:00 at the “MSc” room (1st floor). **In-person presence capacity of 15 participants.**

MS-Teams [link](#).

Github intro by Olga Tsiouri (PhD candidate)

- A brief introduction of the version control platform Github will be provided by Olga Tsiouri (a possible follow-up deeper presentation will be carried out in the next months)

Practical continue

- questions and answers