Multi-omic data analysis with R/Bioconductor

Oulu Summer School, June 19-21, 2023

Contents and learning goals This course provides an introduction to multi-omic data integration and analysis with R/Bioconductor, a popular open source environment for scientific data analysis. After the course you will know how to organize multiple data sources into a coherent framework, implement reproducible workflows, and approach common data analysis tasks by utilizing available documentation and R tools. The primary focus is on microbiome research but the covered data science methods are generally applicable and we will discuss links with other application domains such as transcriptomics, metabolomics, and single cell sequencing.

Figure source: Moreno-Indias *et al.* (2021) *Frontiers in Microbiology* 12:11.

Target audience MSc students, PhD, postdoctoral, and other researchers who wish to learn new skills in statistical programming and data analysis. Academic students and researchers from Finland and abroad are welcome and encouraged to apply.

Teaching material We will follow open online documentation, Orchestrating Microbiome Analysis https://microbiome.github.io/OMA. The training material walks you through the standard steps of omics data analysis covering data access, exploration, analysis, visualization, and reproducible workflows. Preparatory material and video clips, and online support are available before the course. All teaching material will be shared openly.
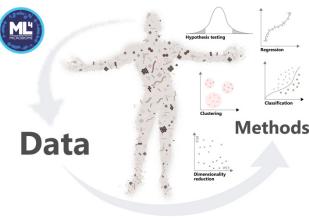
Schedule and registration

Venue University of Oulu. June 19-21, 2023 (Mon-Wed). The course is organized in a live format.

Website https://microbiome.github.io/course_2023_oulu

Costs no registration fee. Participants are expected to cover their own travel and accommodation (see course homepage for tips).

Registration See the course homepage for registration instructions. The course has maximum capacity of 20 participants. Applications from local students in Oulu, and applications sent before May 15 will be given priority.

Schedule Contact teaching daily between 9am – 4pm, including lectures, demonstrations, hands-on sessions, and breaks.

- Day 1 Reproducible workflows with R/Bioconductor and Quarto
- Day 2 Tabular data analysis (working with single 'omics)
- Day 3 Multi-assay data integration and analysis (multi-omics)

Teachers and organizers

Leo Lahti is the main teacher and Associate Professor in Data Science at the University of Turku. Dr. *Pande Erawijantari* (Turku) is a co-teacher. Course assistants: *Tuomas Borman* (Turku), *Giulio Benedetti* (Turku), *Anna Kaisanlahti* (Oulu). Docent *Justus Reunanen* is the course coordinator. The course is organized by Health and Biosciences Doctoral Programme (HBS-DP) University of Oulu Graduate School, Research Unit of Translational Medicine, University of Oulu, Finland. The Finnish IT Center for Science (CSC) provides the cloud computing services.