



Microbial Ecology Networks & Co-occurrence Analysis — Hands-on

Learn rigorous workflows to build, validate, and interpret microbiome co-occurrence and interaction networks. You'll handle compositionality and sparsity, apply state-of-the-art inference (SparCC, SPIEC-EASI, FlashWeave, CoNet), compute topology metrics, detect modules and keystone taxa, and relate network structure to phenotypes and environments. Emphasis on robust statistics, reproducibility, and clear reporting for manuscripts and decisions.

Microbial Ecology Networks & Co-occurrence Analysis

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Session 1

Fee: Rs 8800 [Apply Now](#)

Foundations, Compositionality & Nulls

Why networks? Ecology concepts & pitfalls

[niche/neutral views](#) [association \$\neq\$ interaction](#)
[confounding & covariates](#)

Compositional data handling

[CLR/rCLR, centered log-ratio](#) [proportionality \(\$\rho\$ \)](#)

prevalence filters & zeroes

Null models & permutation frameworks

frequency/constrained nulls bootstraps & stability
multitest FDR control

Session 2

Fee: Rs 11800 Apply Now

Network Inference Methods & QA

Association & conditional dependence

SparCC / FastSpar SPIEC-EASI (MB/GLASSO)
FlashWeave / CoNet

Thresholding & edge confidence

stability selection FDR/bootstraps signed vs
absolute edges

Quality assessment

degree/weight distributions small-worldness &
assortativity artifact checks (depth/batch)

Session 3

Fee: Rs 14800 Apply Now

Community Structure, Keystones & Trait Links

Modules & roles

Louvain/Leiden communities hubs/bridges
(betweenness) keystone candidates

Bipartite & multilayer views

taxa↔functions (pathways) taxa↔metabolites links
trait overlays & phenotypes

Network–outcome associations

module eigennets vs traits **GLMs/mixed models**
permutation testing

Session 4

Fee: Rs 18800 Apply Now

Dynamics, Visualization & Reproducible Reporting

Temporal & differential networks

sliding-window networks **differential edges (groups)**
robustness/attack tests

Visualization toolchain

igraph/networkx **Cytoscape/Gephi exports** **panel-ready figures**

Reporting & deliverables

Quarto notebooks & SOPs **tables/graphs + env files**
limitations & checklists