

2017 SISMID Module 6: Microbiome Data Analysis

Instructors:

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Wednesday, July 12

12:00 pm – 1:30 pm Registration

1:30 pm – 3:00pm Class Session:

1:30 pm – 1:45 pm Introductions

1:45 pm – 2:00 pm Lecture 1a: Introduction: Metagenomics in Biology and Medicine

2:00 pm – 3:00 pm Lecture 1b: Metagenomics assays and upstream informatics

3:00 pm – 3:30 pm Break

3:30 pm – 5:00 pm Class Session:

3:30 pm – 5:00 pm Laboratory 1: Sequence denoising w/ DADA2 and Intro to phyloseq

Thursday, July 13

8:00 am – 8:30 am Coffee

8:30 am – 10:00 am Class Session:

8:30 am – 9:15 am Lecture 2: Descriptive statistics, normalizations & testing

9:15 am – 10:00 am Laboratory 2: Quality control, transformations, filtering, univariate testing, multiple comparison

10:00 am – 10:30 am Break

10:30 am – 12:00 pm Class Session:

10:30 am – 11:30 am Lecture 3: Mixture models for microbiome data

11:30 am – 12:00 pm Laboratory 3: Mixture models for differential abundance testing

12:00 pm - 1:30 pm Lunch Break

1:30 pm – 3:00pm Class Session:

1:30 pm – 2:30 pm Lecture 4: Using trees in microbiome analysis

2:30 pm – 3:00 pm Laboratory 4: Data and network manipulation with phyloseq

3:00 pm – 3:30 pm Break

3:30 pm – 5:00 pm Class Session:

3:30 pm – 4:15 pm Lecture 5: Ecological distance metrics; Principal Coordinates Analysis

4:15 pm – 5:00 pm Laboratory 5: Computing distance matrices; PCoA

Friday, July 14

8:00 am – 8:30 am Coffee

8:30 am – 10:00 am Class Session:

8:30 am – 9:15 am Lecture 6: Generalized multivariate analysis of variance

9:15 am - 10:00 am Laboratory 6: PERMANOVA with extensions

10:00 am – 10:30 am Break

10:30 am – 12:00 pm Class Session:

8:30 am – 9:15 am Lecture 7: Machine learning with microbiome data

9:15 am – 10:00 am Laboratory 7: Clustering and classification

12:00 pm - 1:30 pm Lunch Break

1:30 pm – 3:00pm Class Session:

1:30 pm – 2:00 pm: Lecture 8: Predicting metagenomic composition from 16S survey data

2:00 pm – 3:00 pm: Laboratory 8: Working with functional data

3:00 pm – 3:30 pm Break

3:30 pm – 5:00 pm Class Session:

3:30 pm – 4:00 pm Lecture 9: Networks

4:00 pm – 4:30 pm Laboratory 9: SpiecEasi networks tutorial

4:30 pm – 5:00 pm Questions, feedback, references, resources