

Timetable for Microbial bioinformatics Blockkurs

Course Summary:

Week 1: Oxford Nanopore Technologies (ONT) sequencing of 8x *S. aureus* and 4x *E. coli* strains.

Week 2: Introduction to S3IT Science cluster and UNIX command line. Quality control of ONT and Illumina data. Assessment of different sequencing technologies. Assemblies of data: Illumina, ONT and hybrid. Typing using genomes.

Week 3: Phylogenetic analysis. Resistance and virulence genes. Supervised exercise using learnt tools on a published dataset.

Week 4: Diagnostics and virulence; primer design. Supervised exercise using learnt tools on a published dataset. Final assessment on last exercise and wrap up.

Room: KO2-F-173 except on first 2 days

Colour codes:

Breaks

Lab work

Lectures

Computer work

Home work

WEEK 1

Thursday 13.3. Kursraum IMM GLM-E12

0800: Introduction

0830: Welcome from Clinical Director (ON)

0900: Introduction to course: Routine diagnostics and NGS. Introduction to two projects (MRSA, UPEC)

1000: BREAK

1030: Introduction to sequencing technologies

1125: Streak bacterial strains

1200: LUNCH

1300: ONT library preparation and loading on GridION

Friday 14.3. Kursraum IMM GLM-E12

0830: Check streaked plates

0850: Look at live ONT sequencing data with BREAK

1045: Introduction to data quality control (QC)

1100: Explanation of assignment 1

1130: Tour of IMM diagnostic lab

1230: LUNCH

1330: Group/own research on assignment 1

WEEK 2

Tuesday 18.3. KO2-F-173

1300: Introduction to UNIX and containers

1430: BREAK

1500: Introduction to UNIX and containers

Wednesday 19.3. KO2-F-173

0800: QC of ONT and Illumina data

0930: Summary of differences between Illumina and ONT data

1000: Lecture genome assemblies

1100: Group/own research on assignment 1 and assessment preparation

1200: LUNCH

1300: Group/own research on assignment 1 and assessment preparation

1500: BREAK

1530: Presentation of Group I and discussion

Thursday 20.3. KO2-F-173

0800: Journal club: Genome assemblers

0900: Genome assemblies for ONT and Illumina data (test data set)

1000: BREAK

1130: Further assembling and genome annotation

1200: PIZZA LUNCH (GLN Seminar room)

1400: Discussion of assembly and introduction to assembly QC

1430: BREAK

1500: Assemblies of real data overnight: ONT/Illumina/Hybrid

1600: Introduction to Typing

Friday 21.3. KO2-F-173

0800: QC of assemblies

0930: BREAK

1000: Typing: MLST

1100: Introduction to cgMLST

1130: Typing: cgMLST (Pathogenwatch)

1200: LUNCH

1300: Typing: visualisation and results

1500: BREAK

1530: Discussion on typing

1600: Feedback on Assignment 1, Explanation of assignment 2

1615: Journal club: ML and sequencing

WEEK 3

Tuesday 25.3. KO2-F-173

1300: Own research on assignment 2

Wednesday 26.3. KO2-F-173

0800: Group/own research assignment 2 and assessment preparation

1200: LUNCH

1300: Presentation of Group II and discussion

1430: BREAK

1500: Introduction to phylogenetics

Thursday 27.3. KO2-F-173

0800: Phylogenetic analysis incl BREAK

1200: LUNCH

1300: Phylogenetic analysis continued incl BREAK

1515: Summary and discussion of phylogenies

1615: Explanation of assignment 3

Friday 28.3. KO2-F-173

0800: Feedback on assignment 2

0815: Visualising phylogenies and metadata for interpretation

0900: Identifying resistance and virulence factors

0945: BREAK

1015: Resistance and virulence factor detection using online tools

1100: Command line tools for resistance and virulence factor detection

1200: LUNCH

1300: Group analysis assignment 3

WEEK 4

Tuesday 1.4. KO2-F-173

1300: Group analysis assignment 3

Wednesday 2.4. KO2-F-173

0800: *papGII* as a virulence factor in UPEC

0830: Metadata exercise

0930: BREAK

0945: Virulence factors and diagnostics

1030: Primer design exercise

1200: LUNCH

1300: ONT and microbiome

1330: Group analysis assignment 3

Thursday 3.4. KO2-F-173

0800: Group analysis and assessment preparation

1200: LUNCH

1300: Presentation of Group III and discussion

1430: BREAK

1500: Farewell lecture

1515: Summary of course and final questions, Feedback