

How to Analyze and Interpret Large Datasets from Emerging – Omics Based Technologies in a Clinical Setting

October 24 – 27, 2016
Forskningens Hus, Room 405

This PhD course is offered by the Doctoral School in Medicine, Biomedical Science, and Technology at Aalborg University and the Clinical Cancer Research Center, Aalborg University Hospital

Organisers: Anna Amanda Schönherz (a.schonherz@rn.dk), Rasmus Froberg Brøndum (rfb@rn.dk) Lasse Hjort Jakobsen (lhjort@rn.dk) and Martin Bøgsted (m_boegsted@dcm.aau.dk)

Evaluation: Attendance at lessons and participation in exercises

ECTS: 3,2

Registration: If you want to sign up for the course, please register and login to Aalborg University's Moodle at: <https://phd.moodle.aau.dk/login/index.php>

Lecturers:

Martin Bøgsted, Professor MSO, PhD. *Department of Haematology, Aalborg University Hospital and Department of Clinical Medicine, Aalborg University.*

Rasmus Froberg Brøndum, Senior Bioinformatician, PhD. *Department of Haematology, Aalborg University Hospital.*

Anna Amanda Schönherz, Postdoc, PhD. *Department of Haematology, Aalborg University Hospital and Department of Clinical Medicine, Aalborg University.*

Lasse Hjort Jakobsen, PhD student. *Department of Haematology, Aalborg University Hospital and Department of Clinical Medicine, Aalborg University.*

Inge Søkilde, Molecular Biologist, PhD. *Department of Clinical Biochemistry, Aalborg University Hospital.*

Vang Quy Le, Bioinformatician, PhD. *Department of Clinical Biochemistry, Aalborg University Hospital.*

Allan Stensballe, Ass. Professor, PhD. *Department of Health Science and Technology, Aalborg University*

Reinhard Wimmer, Professor MSO, PhD. *Department of Biotechnology, Chemistry and Environmental Engineering, Aalborg University.*

Jorne Bicler PhD student, *Department of Haematology, Aalborg University Hospital.*

Programme for the course:

Monday, October 24, 2016

Introduction to molecular biology

09:00 – 09:45 Introduction to the Central Dogma of Molecular Biology – with a view towards high throughput technologies, Anna Schönherz

09:45 – 10:00 Break

Next generation sequencing

10:00 – 10:45 Sequencing technologies – an overview, Anna Schönherz

10:45 – 11:00 Break

11:00 – 11:45 Basic bioinformatics for sequencing technologies – challenges and pitfalls, Rasmus Froberg Brøndum

11:45 – 13:00 Lunch Break

13:00 – 13:45 Genome mapping and somatic mutation analysis, Rasmus Froberg Brøndum

13:45 – 14:00 Break

14:00 – 14:45 Genome-wide methylation analysis, Inge Søkilde and Vang Quy Le.

14:45 – 15:00 Break

15:00 – 15:45 Clinical examples: Gene Panels and Whole Exome Sequencing for mutation screening, Inge Søkilde and Vang Quy Le.

Tuesday, October 25, 2016

Clinical bioinformatics and statistics I

09:00 – 09:45 Reproducible statistical workflows for high dimensional data analysis using R/Bioconductor, Lasse Hjort Jakobsen

09:45 – 10:00 Break

10:00 – 10:45 Design and analysis of biomarker experiments, Martin Bøgsted.

10:45 – 11:00 Break

11:00 – 12:00 Exercises: Vang Quy Le, Martin Bøgsted, Lasse Hjort Jakobsen and Rasmus Brøndum, Anna Schönherz.

12:00 – 13:00 Lunch Break

Clinical bioinformatics and statistics II

13:00 – 13:45 Principal component analysis, cluster analysis, and heat maps, Rasmus Brøndum

13:45 – 14:00 Break

14:00 – 14:45 Differentially expressed features and multiple test correction, Lasse Hjort Jakobsen

14:45 – 15:00 Break

15:00 – 16:00 Exercises: Vang Quy Le, Martin Bøgsted, Lasse Hjort Jakobsen and Rasmus Brøndum, Anna Schönherz.

Wednesday, October 26, 2016

Proteomics

09:00 – 09:45 Introduction to clinical mass spectrometry based analysis, Allan Stensballe.

09:45 – 10:00 Break

10:00 – 10:45 Proteomics strategies in clinical proteome analysis, Allan Stensballe.

10:45 – 11:00 Break

11:00 – 12:00 Excercises: Clinical proteomic case studies, Allan Stensballe.

12:00 – 13:00 Lunch break

Clinical bioinformatics and statistics III

13:00 – 13:45 Feature enrichment, Lasse Hjort Jakobsen

13:45 – 14:00 Break

14:00 – 14:45 Prediction and classification techniques, Jorne Bicler

14:45 – 15:00 Break

15:00 – 16:00 Exercises, Vang Quy Le, Martin Bøgsted, Lasse Hjort Jakobsen and Rasmus Brøndum, Anna Schönherz.

Thursday, October 27, 2016

Metabolomics and NMR

09:00 – 09:45 Background of NMR: What is measured and what can be detected, Reinhard Wimmer.

09:45 – 10:00 Break

10:00 – 10:45 Metabolites and metabolomics – the place in the omics-suite. NMR and other techniques for metabolomics and applications of metabolomics, Reinhard Wimmer

10:45 – 11:00 Break

The end

11:00 – 12:00 Course evaluation, organizers and lecturers