

RNA-Seq Data Analysis Course

26th-27th September 2018

Organised and delivered by members of the WHG Bioinformatics Core group

Location: Room B, Wellcome Centre for Human Genetics

Tutors: Santiago Revale, Eshita Sharma, Ben Wright, Helen Lockstone

Course Overview

This 2-day course is aimed at those who would like to learn how to process RNA-Seq data, and use R statistical software and BioConductor (<https://www.bioconductor.org/>) packages to perform analysis. The course will include overview lectures and practical sessions to demonstrate the key steps involved in getting from raw data to lists of differentially expressed genes. Emphasis will be on understanding/choice of tools, and the importance of careful evaluation of data and setting up an appropriate analysis model.

Course Material

Course material can be found at this link during the course, and available afterwards:

http://www.well.ox.ac.uk/bioinformatics/training/RNASeq_Sept2018

Course Preparation

Attendees will need to bring their own laptop for the practical sessions. Please ensure you have the following installed ahead of time:

R software (v3.4.2 or higher): <https://www.r-project.org/>

RStudio interface: <https://www.rstudio.com/products/RStudio/>

Java SE Runtime Environment 8u181 (or 8uXXX if you have another version already)
<https://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html>

For Windows users, an SSH client (if you don't already have one we recommend smarTTY)

<http://smartty.sysprogs.com/download/>

You will also need wireless internet access (temporary accounts available if needed):

(<http://help.it.ox.ac.uk/network/wireless/services/eduroam/index>).

It is helpful but not essential to have some familiarity with R programming and Unix command line. If you are new to R, please have a look at these slides:

[http://www.well.ox.ac.uk/bioinformatics/training/Introduction to R/Course material/Introduction to R slides I.pdf](http://www.well.ox.ac.uk/bioinformatics/training/Introduction%20to%20R/Course%20material/Introduction%20to%20R%20slides%20I.pdf)

Course Schedule

Wednesday 26th September 2018

09:45 – 10:00	Welcome and introductory remarks (HL)
10:00 – 11:00	Lecture: Sequencing overview, data formats and quality (SR)
11:00 – 11:30	Coffee Break (including time to check set up for practicals)
11:30 – 12.15	Lecture: RNA-Seq applications and tools (ES)
12:15 – 13:00	Lunch break (<i>note lunch is not provided</i>)
13:00 - 14:00	Practical: Mapping and gene counts
14:00 – 14.30	Lecture: Data exploration and quality checks (BW)
14:30 – 14:45	Break
14:45 – 16:00	Practical: Data QC (BW)

Thursday 27th September 2018

10:00 – 11:00	Lecture: Gene expression technology and analysis tools (HL)
11:00 – 11:15	Coffee Break
11:15 – 12.45	Tutorial: Gene expression analysis using R (HL)
12:45 – 13:30	Lunch break (<i>note lunch is not provided</i>)
13:30 - 15:00	Practical: Differential gene expression (HL & BW)
15:00 – 15:15	Break
15:15 – 16:00	Optional session to complete practical (HL & BW)