

BIOF045: Next-Generation Sequencing Data Analysis

Hands-On Training - Online

March 14-18

NIH/FAES

Pre-Training Guide

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1. Tentative Agenda

Day1 (March 14)

Introduction to Cloud Computing
Linux Basics
Introduction to R and Rstudio Server

Day2 (March 15)

Next Generation Sequencing
 Data Types
 Quality Control
DNA-Seq
 Alignment
 Variant Calling
 Data Visualization

Day3 (March 16)

Shell Scripting
 Introduction to VIM text editor
RNA-seq
 Alignment
 Differential Gene Expression

Day4 (March 17)

RNAseq
 Differential Gene Expression
 Data Visualization (PCA, tSNE, clustering)
 Gene Set Enrichment

Single-Cell RNAseq
 Workflow Basics

Day5 (March 18)

Accessing Publicly Available Datasets and Resources
Final Projects

Daily Workshop Schedule
10:00AM - 4:00PM EST

Office Hours
4:00PM - 4:30PM EST

2. Installations

Please make sure that the following softwares are installed on your computer:

1. [X2Go Client](#)

Note: macOS users need to install XQuartz as well.

2. [IGV](#)

3. FileZilla

- a. [Windows](#)
- b. [macOS](#)

4. Zoom

3. Pre-Training Resources

Some great introductory resources to use before the first day of the workshop:

1. [Servers vs. Desktops](#)
2. [Linux](#)
3. [Illumina Sequencing](#)
4. [RNA-seq](#)

4. Workshop Logistics

4.1. Local Setup

Point 1: Make sure to install all the softwares before the start of the class.

Point 2: If you have access to two computers:

You could use one laptop/desktop to connect to the Zoom session, and use the other to follow the hands-on training. However, I recommend connecting to the zoom meeting on both computers in case you need to share your screen and troubleshoot.

4.2. Remote Linux Server

We will run an Ubuntu server instance for the full duration of the workshop. You will receive your unique Username/Password combination with instructions to connect to the remote server. Please make sure to test your connection before the class. Send me an email if you are unable to connect.

4.3. Training Material

I will publish most of the hands-on training materials on GitHub with detailed explanations.

4.4. Questions and Support During training

In case you face technical issues during the training, feel free to send a message to the TA or in the chat. We will use screen share and breakout rooms to give students in-person help.

4.5. Office Hours

We will stay after the workshop and during breaks to answer any questions you may have.

5. Contact

If you have any issues about the workshop, online materials, Zoom meeting, remote server, or any other subjects, feel free to contact Shahin using Gmail or Canvas:

Shahin Shahsavari: shhsvri@gmail.com

6. FAQs

Question 1: Should I have any prior programming background?

A: A background in R programming is expected. It would be very helpful if you have used another programming language in the past. We will cover what you need to work with the computing server on the first day.

Question 2: Can I use my government computer?

A: It would be best if you could use your personal computer to which you have administrative access. If you must use your work computer, make sure to install the X2GoClient, FileZilla, and IGV prior to the start of the workshop.

Question 3: How long do we have access to the server?

A: You will be provided with the server IP address and your unique username/password before the workshop. The server will be available for one day after the training (March 19th 10:00PM).