BIOF045: Next-Generation Sequencing Data Analysis

Hands-On Training - Online

July12-16

NIH/FAES

Pre-Training Guide

1. **Tentative Agenda**

Day1 (July 12)

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

Day2 (July 13)

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

Day3 (July 14)

ChIP-seq
      Alignment
      Peak Calling
      Genome Browser (UCSC)
      Motif Analysis

Day4 (July 15)

RNA-seq
      Alignment
      Differential Gene Expression
      Data Visualization (PCA, tSNE, clustering)
      Gene Set Enrichment

Day5 (July 16)

Accessing Publicly Available Datasets and Resources
Final Project

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

Office Hours
5:00PM - 5:30PM 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](#)

5. [ChIP-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
Jonathan Perrie: jonathan.perrie@gmail.com

6. FAQs

Question 1: Should I have any prior programming background?

A: A background in R programming is expected. 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 (July 17th 10:00PM).