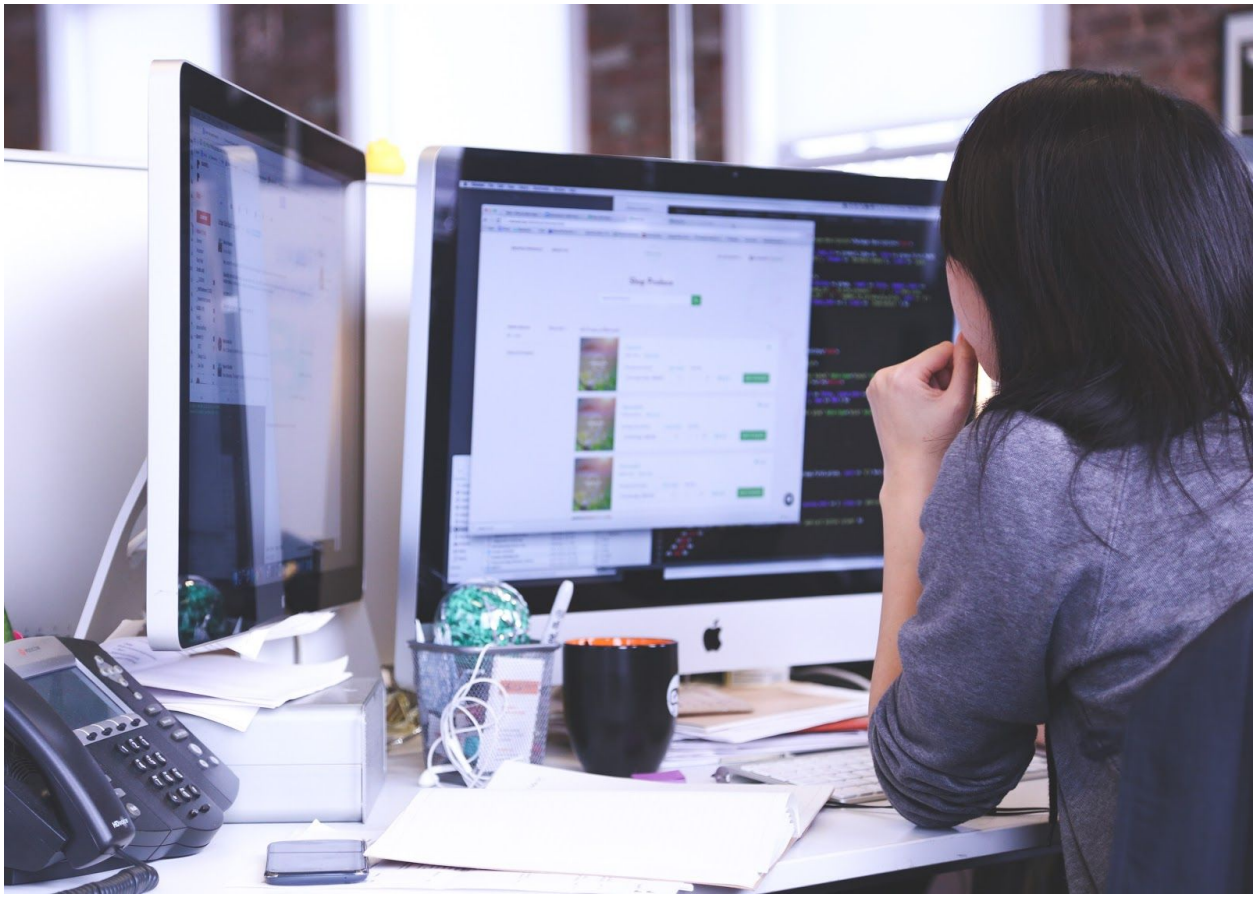
R Programming For Beginners



Course Description

Maximum number of participants: 30
Date: Thursday, June 27th, 2019
Time: 2 PM - 6 PM (3 hours course and 1-hour open question-answer session)
Location: PMH 7-605
Registration Page:
Instructors: Dr. Arvind Mer (amer@uhnresearch.ca)
Dr. Wail Ba-Alawi (wail.ba-alawi@uhnresearch.ca)

Princess Margaret Cancer Research Tower; 11-310
101 College St. Toronto, ON M5G 1L7

To-Do:

- ✓ Book Room (Jason) - PMH 7-605
- ❑ Registration Page (Jason)
- ❑ Prep Advertising (Jason/Wail/Arvind)

- ❏ Educational Content (Wail/Arvind)
- ❏ Pre-workshop survey (Jason/Wail/Arvind)
- ❏ Coffee/Treats (Jason)
- ❏ Workshop Evaluation (Jason/Wail/Arvind)

Pre-requisites:

1. Participants must bring their laptop for use during the course
2. No previous knowledge of R or other programming languages is required

Intended Learning Objectives:

Upon completion of the workshop, the learner will be able to:

1. Define the basic R data-types and structures
2. Plot data in R
3. Analyze a dataset in R using biostatistical methods
4. Apply their gained knowledge to evaluate a dataset

Learning Objectives

Syllabus:

1. Introduction to R (15 min)
    a. Why R and a brief history
    b. install and run Rstudio
    c. Saving and running R scripts

2. R data-types and structures (1 h)
    a. Variables types and creating variables
    b. Vectors, Data frames, Matrices and Lists
    c. If else, for loop etc.
    d. Functions

Break

3. Plotting data in R (45 min)
    a. Scatter plot, line plot, bar plots, boxplots etc.
    b. Specifying color in the plot
    c. Saving plots for publication

4. Downloading and installing R packages (15 min)
    a. CRAN, Bioconductor and github
    b. Getting help

5. Read and write data in R (15 min)

    a. Read and write CSV, xlsx etc.
    b. Save data in RDS etc.

Break

6. Biostatistics and data analysis (30 min)
    a. T-test, Wilcoxon test (non-parametric) etc.
    b. Correlation analyses
    c. Visualization of results

7. The Do's and Don'ts of R
    a. Memory in R
    b. Factor vs character
    c. Tips and tricks

8. Short data analysis project
    a. Read the data in R
    b. Performs analysis
    c. Visualization of results

Workshop Overview:

In this workshop, participants will learn how to use R for data analysis. We will start from the basics, by first introducing participants to the fundamentals of R programming such as variables and conditional statements. They will also learn how to visualize data beautifully using R. Building upon this, participants will perform a statistical analysis of real biological data.

During the course, we will provide interactive lessons which will include a theoretical understanding of R programming and hands-on coding. Participants will be able to write and work with real code. With the gained knowledge, participants will be ready to take their very own first step in data analysis using R.

Presenters:

Dr. Wail Ba-Alawi is a postdoctoral fellow in Dr. Haibe-Kains's lab at Princess Margaret Cancer Centre. He holds a Ph.D. in computer science with a focus on machine learning and its applications in computational biology from King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. His current focus is in pharmacogenomics and building interpretable machine learning models that can predict drug sensitivity.

Dr. Arvind Mer is a postdoctoral fellow at Haibe-Kains's lab, Princess Margaret Cancer Centre, working in the field of cancer pharmacogenomics and machine learning. He has more than 8 years of experience in R programming. Dr. Mer has recently developed an R tool called Xeva for management and analysis of patient-derived xenograft data. He is passionate about analyzing and interpreting data using machine learning and data visualization.