Fundamentals of R for Biological Scientists Virtual Workshop

Application Deadline: Thursday, August 26, 2021

Handling large biological datasets is now a routine activity for researchers in the cancer and regenerative medicine fields. R is a popular scripting language that has become a common tool for managing biological datasets, however the flexibility and power of R can be difficult to navigate for new users. To assist researchers, BioCanRx and Stem Cell Network are partnering to provide a multi-session introductory workshop that will equip scientists with the fundamental knowledge to use R in their research. The workshop is intended for researchers who have little or no programming experience.

Workshop Formats and Dates:

This virtual workshop comprises four 60-90-minute sessions which run weekly on **September 22, 29, October 6 and 13, 2021 at 2:00 p.m. Eastern Time** (11:00 a.m. PT).

Who Should Attend?

This R workshop is designed for researchers from the cancer immunotherapy and regenerative medicine fields who are looking to gain an understanding of the R scripting language and how it can be utilized for the analysis of biological datasets. Note: Spaces are limited and access costs for this training opportunity will be covered by BioCanRx/SCN for successful applicants who complete all components; a charge will be levied for applicants that do not complete the components or attend the sessions (see Conditions below for details).

Workshop Learning Objectives

The proposed workshop will consist of four online classes presented weekly with small homework assignments. By the end of the workshop the attendees will have experience with, and a basic understanding of:

- The R programming language
- The RStudio Integrated Development Environment
- knitr markup and report generation
- The Cancer Genome Atlas Datasets (TCGA) through the TCGAbiolinks R library

The workshop content will be provided primarily as guided walkthroughs of RStudio notebooks, with time for participant interaction and questions. Notebooks will be provided to attendees and annotated in sufficient detail for attendees to run all the analyses content without further support required. Any supplemental slides will be provided as PowerPoint files. The workshop is not intended to provide comprehensive knowledge of any of the above topics, rather it is intended to provide attendees with direct experience of the use of these tools and resources to enable further independent development.

Draft of the per-class topics that will be covered:

Class 1: RStudio and the R Language

- Workshop outline and scope
- Rstudio introduction
- Project environments and source control
- R language basics

Class 2: Data Frames, Libraries, Loading and Saving Data

- R language basics (continued)
- R libraries
- Knitr and report generation
- Loading and Saving files
- Writing a simple program

Class 3: Accessing Cancer Experimental Data using TCGAbiolinks

- TCGA overview; projects and data types available
- The TCGAbiolinks R library
- Downloading experimental data (Lung Adenocarcinoma RNASeq, Tumor and Normal read counts)
- Clinical Data
- Experimental Data

Class 4: Data analysis and Visualization

- Fold change analysis of RNASeq count data.
- Volcano plots
- PCA plots
- Heatmaps
- Gene Ontology Enrichment analysis and visualization

The workshop content is developed and presented by Dr. Gareth Palidwor and the team at the Ottawa Bioinformatics Core Facility.

Workshop Location: Online. A link to the online sessions will be provided to successful applicants.

Application Procedure and Deadline:
Due to the interactive nature of this training event, spaces on this online workshop are limited; all those interested in participating must submit an application to attend the Fundamentals of R for Biological Scientists workshop by **11:59 p.m. (sender's time) Thursday, August 26, 2021**

Selected applicants will be notified by Tuesday September 7, 2021 and will be instructed on how to proceed with registration for the workshop.

Conditions:

- Application deadline is **11:59 p.m. (sender's time) on** Thursday, August 26, 2021
- Spaces are limited on this important training opportunity. BioCanRx/SCN will cover the registration costs (paid directly to the organizers) of this event for applicants from their networks who attend all sessions and complete all elements of the online content in this training event within the designated period. **For applicants that fail to attend all sessions or complete the course content a fee of $500 will be charged** to their supervisor to cover the costs associated with delivering this training event.

Eligibility for support to attend the workshop:

- Applicants must be a SCN trainee / highly qualified personnel (HQP) (i.e. a graduate student, post-doc, research associate and/or technician) currently working in the field of stem cells/regenerative medicine in a Canadian lab. Non-academic applicants are welcome to apply, however academic applicants are prioritised. A $500 fee will apply to all non-academic applicants; or
- Applicants must be a BioCanRx trainee / highly qualified personnel (HQP) (i.e. a graduate student, post-doc, research associate and/or technician) currently working in the field of cancer immunotherapy in a Canadian lab. Non-academic applicants are welcome to apply, however academic applicants are prioritised. A $500 fee will apply to all non-academic applicants.
- If you're unsure whether you are a SCN HQP, please email Rebecca Cadwalader at rcadwalader@stemcellnetwork.ca for confirmation.
- If you're unsure whether you are a BioCanRx HQP, please email Megan Mahoney at memahoney@biocanrx.com for confirmation.
- Applicants must clearly demonstrate that they will apply the techniques learned at the course to their own regenerative medicine/cancer immunotherapy research project within one year.

Application Procedure:

1. **For SCN applicants**: Complete the application form and return it, along with any additional documents required, by email to rcadwalader@stemcellnetwork.ca **by 11:59 p.m. (sender's time)** Thursday, August 26, 2021
2. **For BioCanRx applicants:** Complete the application form and return it, along with any additional documents required, by email to memahoney@biocanrx.com **by 11:59 p.m. (sender's time)** Thursday, August 26, 2021
3. The BioCanRx/SCN Training & Education Committees will review all complete applications, and applicants will be informed of the competition outcome by Tuesday, September 7, 2021.

Workshop Requirements:

Participants must have a computer with a microphone (and optionally a camera) which is able to run R, and a high-speed internet connection. Participants will also need to download free software tools before attending the workshop and will be advised of what software is required following their registration in the workshop. A second monitor or screen will be required to enable participants to simultaneously use the software tools and view the workshop video stream.

Reporting and Communication Requirements:

By accepting a place on this workshop, the recipient agrees to complete a post-event evaluation survey describing the value of the training opportunities made available through the award. This information will be used at SCN's discretion on its website, newsletters and for the purpose of reporting to their funding agencies.

Questions: For further information on this workshop or for application related enquiries please contact Rebecca Cadwalader (SCN) at rcadwalader@stemcellnetwork.ca or Megan Mahoney (BioCanRx) at memahoney@biocanrx.com.