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| **Workshop**: | Programming in R/R for Advanced Users | |
| **Lecturers:** | Dr. Dries Debeer (KU Leuven) / Benjamin Becker (IQB Berlin) | |
| **Date:** | Part 1: | Thursday, 18.03.2021, 14:00 – 18:00 h |
|  | Part 2: | Friday, 19.03.2021, 14:00 – 18:00 h |

**Abstract**

In various scientific fields R has emerged as a popular tool for data wrangling, data analysis and visualization. It is an open source and fully functioning programming language, extended by a wide variety of libraries, which are maintained by an active scientific community. However, most R users do not have a programming background and often a large proportion of R’s potential remains untapped. Especially as more and more journals require researchers to provide syntaxes alongside their manuscripts, writing elegant and efficient R code is becoming more and more desirable.

In this workshop we want to provide R users with advanced tools, which they can use in their daily R-life. Participants will learn how writing clean code and version controlling will benefit their own work. Furthermore, we will focus on different ways of automating R code, including writing and understanding functions and iteration (vectorization, loops, functionals). We will also give a short outlook on more advanced tools such as S3 methods and writing packages, with literature for further self-study. As the workshop will be held remotely, there will be a strong focus on practical exercises.

***Contents.***

After a short overview of the fundamental elements and the basic data types of the R programming language, the following topics will be covered during the course:

- Writing code in R: code style and best practices

- Functions in R: when and why to use them

- Object oriented programming in R, an introduction to S3

- Writing packages:

- Writing tests

- Version Control using git and github

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- Object oriented programming in R II with S4

- Continuous integration

- Debugging and profiling

***Previous knowledge required.***

Participants should have previous experience using R and RStudio. Participants should be able to efficiently:

* Read and write data in R
* Manipulate data.frames
* Fit statistical model
* Make visualizations of data

***Literature.***

Wickham, H. (2019). *Advanced R*. CRC press.

***Software requirements.***

R [>= 4.0.0], RStudio

The following packages should be installed:

* devtools
* testthat