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| **Workshop**: | Programming in R | |
| **Lecturer:** | Dr. Dries Debeer (KU Leuven, Belgien) / Benjamin Becker, M.Sc. (IQB Berlin) | |
| **Date:** | Part 1: | Thursday, 31.03.2022, 9:00 – 13:00 Uhr |
|  | Part 2: | Friday, 01.04.2022, 9:00 – 13:00 Uhr |

**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, 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

- Writing functions, testing and debugging

Outlook on:

- Object oriented programming in R, an introduction to S3

- Version Control using git and Github

***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.

Chambers, J. (2008). *Software for data analysis: Programming with R*. Springer Science & Business Media.

***Software requirements.***

R [>= 4.0.0], RStudio