



**Basic Course on R**  
**17–21 December, 2018**  
*vs.181119*

The Erasmus Postgraduate School Molecular Medicine has two main activities: the organization of education for postgraduate students; and the stimulation of cooperation between several departments with regards to translational research.

The school organizes this four-day course on the open-source statistical software program R. **R** (<http://www.r-project.org/>) has become the 'lingua franca' of data analysis and statistical computing. Its great success is attributed to its free availability and the capability for a wide range of analysis and graphics. This course is meant for PhD-students and other researchers who are just starting to program in R. This course will feature both practical sessions behind a computer and presentations. The course will begin with building the foundation of R as a programming language and move into the use of R as a statistical tool for analyzing data.

The course will be given for the 13th time by **Elizabeth Ribble**, Ph.D., Associate Professor of Statistics and Associate Chair of the Department of Mathematical and Computer Sciences, Metropolitan State University of Denver, Colorado. She will be assisted by David Nieuwenhuijse from the Dept. of Viroscience, Erasmus MC.

This course will be held in rooms **C00-3** and **OWR-22** at the Medical Faculty of the Erasmus MC.

See the MolMed website for maps and travel directions: [www.molmed.nl](http://www.molmed.nl). Full participation in this five-day course is **1,8** ECTS. Course registration fee is **€600**. See at the end of this program for more information on the discount options.

<b>DAY 1: Monday 17 December 2018</b>			
<b>Location: C00-3</b>			
<b>Time</b>	<b>Title</b>	<b>Keywords</b>	<b>Teachers, assistants</b>
08.30 – 09.00	<i>Registration and Coffee</i>		
09.00 – 10.00	Introduction, R history	R history, getting familiar with R console, RStudio	Elizabeth Ribble
10.00 – 10.45	Objects	Objects, data structures, classes	David Nieuwenhuijse
10.45 – 11.00	<i>Coffee Break</i>		
11.00 – 11.30	Functions	Functions, arguments	David Nieuwenhuijse
11.30 – 12.30	<b>PRACTICAL</b> 'Objects and functions'		David Nieuwenhuijse, Elizabeth Ribble, Sara Baart, <i>Job van Riet</i>
12.30 – 13.15	<i>Lunch in foyer-C</i>		
13.15 – 14.15	Manipulating/selecting data	Containers, names, selection rules, accessing data frame elements, lists	David Nieuwenhuijse
14.15 – 14.30	<i>Coffee Break</i>		
14.30 – 15.45	<b>PRACTICAL</b> 'Manipulating/selecting data'		David Nieuwenhuijse, Elizabeth Ribble, <i>Job van Riet, Wesley van de Geer</i>

<b>DAY 2: Tuesday 18 December 2018</b>			
<b>Location: C00-3</b>			
<b>Time</b>	<b>Title</b>	<b>Keywords</b>	<b>Teachers, <i>practical assistants</i></b>
08.30 – 09.00	<i>Registration and Coffee</i>		
09.00 – 09.45	Entering and importing data	c, cbind, rbind; View; dim; importing from a file; working directory	Elizabeth Ribble
09.45 – 10.00	<i>Coffee Break</i>		
10.00 – 11.00	<b>PRACTICAL</b> 'Entering and importing data'		Elizabeth Ribble, <i>Sara Baart, Job van Riet, Wesley van de Geer</i>
11.00 – 11.45	Basic plotting	Boxplots, bar graphs, scatterplots, line graphs	Elizabeth Ribble
11.45 – 12.30	<i>Lunch in OWR-39</i>		
12.30 – 13.30	<b>PRACTICAL</b> 'Basic plotting'		Elizabeth Ribble, <i>Sara Baart, Job van Riet, Wesley van de Geer</i>
13.30 – 13.45	<i>Coffee Break</i>		
13.45 – 14.30	More on plotting in R: ggplot2	ggplot2 package for visualizations	Elizabeth Ribble
14.30 – 15.30	<b>PRACTICAL</b> 'ggplot2'		Elizabeth Ribble, <i>Job van Riet, Wesley van de Geer</i>

<b>DAY 3: Wednesday 19 December 2018</b>			
<b>Location: C00-3</b>			
<b>Time</b>	<b>Title</b>	<b>Keywords</b>	<b>Teachers, <i>practical assistants</i></b>
08.30 – 09.00	<i>Registration and Coffee</i>		
09.00 – 10.00	Hypothesis Testing and Confidence Intervals 1	Summary statistics, t-test, Mann-Whitney U test in R	Elizabeth Ribble
10.00 – 10.15	<i>Coffee break</i>		
10.15 – 11.15	<b>PRACTICAL</b> 'Hypothesis Testing and Confidence Intervals 1'		Elizabeth Ribble, <i>Sara Baart</i>
11.15 – 12.15	Hypothesis Testing and Confidence Intervals 2	Correlations, ANOVA, Tukey's method, chi-squared test in R	Elizabeth Ribble
12.15 – 13.00	<i>Lunch in Foyer-C</i>		
13.00 – 14.00	<b>PRACTICAL</b> 'Hypothesis Testing and Confidence Intervals 2'		Elizabeth Ribble, <i>Sara Baart</i>
14.00 – 14.15	<i>Coffee break</i>		
14.15 – 14.45	Distribution-free ANOVA	Kruskal-Wallis test, Friedman's test	Elizabeth Ribble
14.45 – 15.30	<b>PRACTICAL</b> 'Distribution-free ANOVA'		Elizabeth Ribble, <i>Sara Baart</i>

**DAY 4: Thursday 20 December 2018****Locations: OWR-22**

Time	Title	Keywords	Teachers, <i>practical assistants</i>
08.30 – 09.00	<i>Registration and Coffee</i>		
09.00 – 10.00	Linear Regression	building linear models in R, diagnostics	Elizabeth Ribble
10.00 – 10.15	<i>Coffee break</i>		
10.15 – 11.00	<b>PRACTICAL</b> 'Linear Regression'		Elizabeth Ribble, David Nieuwenhuijse, <i>Harmen van de Werken</i>
11.00 – 11.45	Logistic Regression	building logistic models in R	Elizabeth Ribble
11.45 – 12.30	<i>Lunch in OWR-39</i>		
12.30 – 13.30	<b>PRACTICAL</b> 'Logistic Regression'		Elizabeth Ribble, David Nieuwenhuijse, <i>Harmen van de Werken</i>
13:30 – 14:30	Programming structures 1	writing your own functions, if/else functions, loops	David Nieuwenhuijse
14:30 – 14.45	<i>Coffee break</i>		
14.45 – 15:45	<b>PRACTICAL</b> 'Programming structures 1'		David Nieuwenhuijse, Elizabeth Ribble

**DAY 5: Friday 21 December 2018****Location: OWR-22**

Time	Title	Keywords	Teachers, <i>practical assistants</i>
08.30 – 09.00	<i>Registration and Coffee</i>		
09.00 – 09.45	Programming structures 2	scope, recursion, replacement, search path	Elizabeth Ribble
09.45 – 10.30	<b>PRACTICAL</b> 'Programming structures 2'		Elizabeth Ribble, David Nieuwenhuijse, <i>Job van Riet</i>
10.30 – 10.45	<i>Coffee break</i>		
10.45 – 11.30	Object-oriented programming and performance enhancement	generic functions and methods, writing faster code, vector preallocation, bytecode compilation	Elizabeth Ribble
11.30 – 12.30	<b>PRACTICAL</b> 'Object-oriented programming and performance enhancement'		Elizabeth Ribble, David Nieuwenhuijse, <i>Job van Riet</i>

### **Attendance fees**

The subscription fee of non-commercial participants for the Course is **€ 600**. Discounts are handled as followed:

- All MSc students and PhD students get a discount of **50 % and pay € 300**.
- All participants from the MolMed school get a discount of **100 % and pay € 0**.
- Master students from elsewhere who pay the fee from their personal budget get a discount of **75 % and pay € 150**.

*If these financial requirements pose a problem but you wish to attend the Course and Workshops, please contact Frank van Vliet, managing director of the Erasmus Postgraduate School Mol Med, at: [f.vanvliet@erasmusmc.nl](mailto:f.vanvliet@erasmusmc.nl)*

### **Invoice**

Fees can be paid upon an INVOICE. After your registration you will receive an INVOICE per postal mail. The payment can then be done per bank transfer. All the information necessary will be on the invoice, including the unique INVOICE number.

Late participants can also pay cash upon signing in for the Course.

### **Cancellations**

The fees are for all the days of the course. There is no discount for participating in only a part of the course. Our cancellation policy is that **cancellation is possible up to one week before the start** of the Course. Later cancellation will not be accepted, but you are allowed to send a substitute.

### **Commercial participants & sponsors**

Companies are invited to inquire for participation and sponsoring.