

# Biomiot R workshop 1 - Intro to R Studio, R data types and Creating histograms

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## Introduction to R and its programming environment

### What is R?

R is an open source interpreted programming language distributed under GNU general public license. It has a huge support community and thousands of available programming libraries (bunch of useful functions) that can be used for various specialised purposes. It is most powerful among statisticians, data scientists, bioinformaticians and data journalists and usually used for the following tasks:

- General statistics
- Statistical modeling
- Data visualisation
- Data wrangling
- Machine learning
- Reproducible analysis pipelines
- Interactive web dashboards
- Bioinformatics
- Highthroughput data analysis
- Data journalism
- Geo spatial data analyses
- etc. *Whatever is possible in data analysis and visualisation you can probably do it in R and usually a specialised library for this purpose can be found in the online repository*

Among biologists R is most popular because of the ease in which it is possible to create custom high resolution publication quality plots, statistical analyses and the plethora of libraries related to highthroughput biological data analyses which can be downloaded from the [Bioconductor project repository](#).

### What is RStudio?

[RStudio](#) is an integrated development environment (IDE) for R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management

**Instaling R studio** The free version of Rstudio can be downloaded from [here](#)

## An overview of the Rstudio features

RStudio is composed of 4 panels:

- Top left - here you write and run your code scripts, manage files and export them to various output formats
- Bottom left - various terminals - an programming R console, system terminal and others
- Top right - the data panels where all the datatypes in the environment are listed, you can create new, import from various sources etc. When you use version control an additional tab appears here.
- Bottom right - This panel contains tabs: files - listing files in your current project or working directory ; Plots - for displaying and exporting plots; Packadges - for installing and downloading libraries (packadges); Help- to display help for functions and feauteres

**What is R project?** R project is created by “New project” - it saves all the files in the current project/working directory. When working with multiple files it is adviced to work using project. When you open the project all the files from the last project session are automatically loaded to R studio.

**What is R markdown file?** This workshop notes are made with R Markdown. R Markdown is a file format for making dynamic documents with R Studio. An R Markdown document is written in markdown (an easy-to-write plain text format) and contains chunks of embedded code. The output of the code may be displayed bellow the chunk. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents.

Code chunks in R Markdown files are started and ended with “````” signs. The start is followed by {programming language} such as “R” or python.

```
# This is a chunk of code written in R Markdown. Below you will find the output. The # sign is used for  
2+2
```

```
## [1] 4
```

```
2+2 == 4
```

```
## [1] TRUE
```

## Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.