

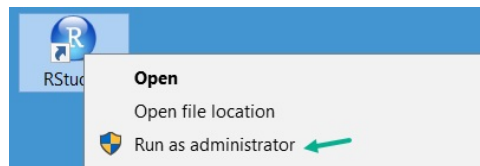
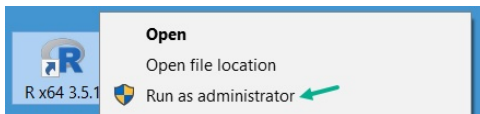
R Packages

- I. **What are Packages** – All R functions are stored in packages. Only when a package is loaded are its contents available. The standard (or Base) packages, considered part of the R source code, contain the basic functions that allow R to work. They should be automatically available in any R installation. There are thousands of contributed packages for R, written by many different authors. Some of these packages implement specialized statistical methods, others give access to data or hardware, and others are designed to complement textbooks. Some (the recommended packages) are distributed with every binary distribution of R. Most are available for download from CRAN (<http://CRAN.R-project.org/> and its mirrors), and other repositories such as Bioconductor (<http://www.bioconductor.org/>).

- II. **Where to Find Packages** – To see what packages are available – go to <http://www.r-project.org> and chose CRAN and select a mirror site. Select **Packages** for listings of the currently 13,000+ CRAN packages. Click on *Table of available packages, sorted by date of publication* or *Table of available packages, sorted by name* to see the list of packages. For more information about a package click on its name. There will be its pdf reference manual which can be opened then saved to your computer.

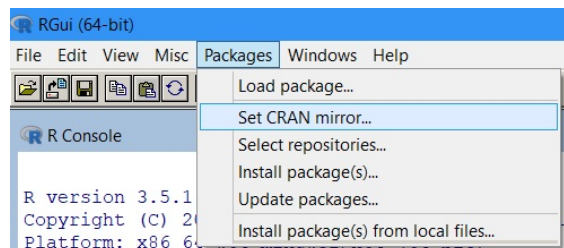
- III. **Before Installing Packages** – Whether in RGui or RStudio, Windows may have security issues when installing software, this includes R packages. Therefore whenever you are installing or updating your R packages it is a good idea to start by selecting *Run as administrator*.

Right mouse button click on the R shortcut and select **Run as administrator**.

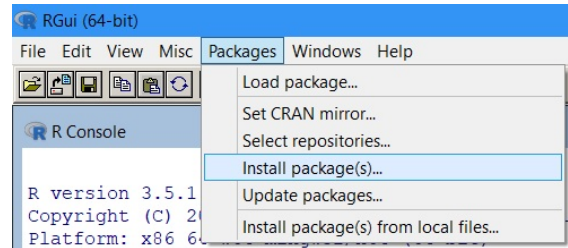


IV. Installing Packages in RGui

1. In R select **Packages** from the top menu bar, in the drop down menu chose **Set CRAN mirror...**, From the list of mirror sites pick a site that you like, click **OK**

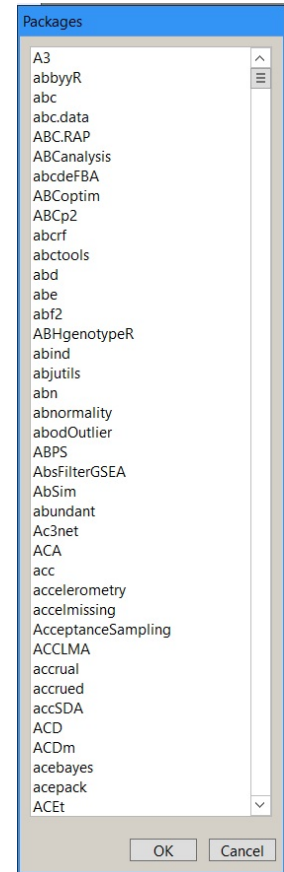


- Again select **Packages** but now chose **Install package(s)...** ,



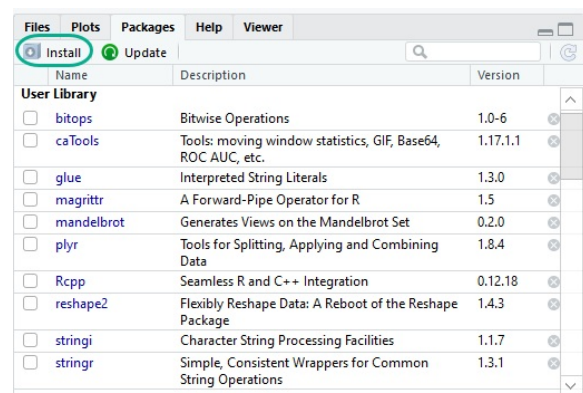
- Scroll through the alphabetic list of packages and click on the one(s) that you want to install. Holding down the Ctrl key as you click on package(s) allows you to select individual packages, whereas holding down the Shift key allows you to select a contiguous block of packages by selecting the first and last package in the block. Once you have highlighted the package(s) you want to install click on **OK**

The selected package(s) and any other packages (dependencies) that the package(s) needs will be will download and installed.



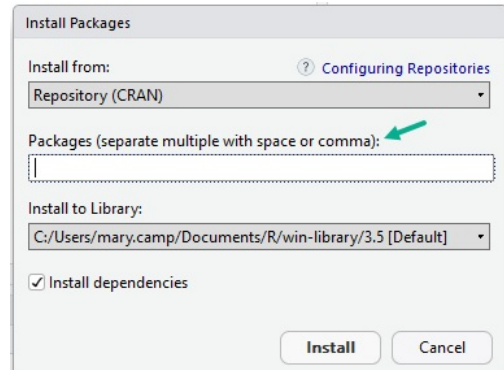
V. Installing Package(s) in RStudio

- In RStudio select the **Packages** tab, usually in the lower right Pane.



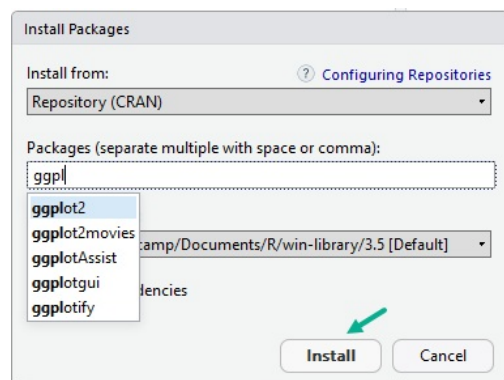
- The **Install Packages** window will open and the package name(s) can be entered in the **Packages** line.

RStudio has its own mirror site which is the default (<https://blog.rstudio.com/2013/06/10/rstudio-cran-mirror/>). Can select another mirror site from Tools > Global > Packages > CRAN mirror: then click on Change... for a list of alternative sites, notice that they are all https sites.

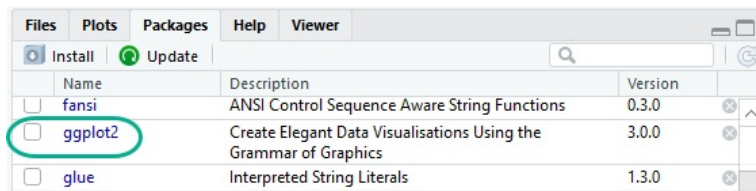


- As a name is entered a list of Package names will appear starting with that letter and as more letters are typed the list will narrow. Can continue typing the full name or click on it to put in the window.

When done entering name(s) click on **Install** and the selected package(s) and any other packages (dependencies) that the package(s) needs will be will download and installed.



- Once the Package(s) are installed the name(s) will appear in the list in the **Packages** tab window and are ready to be used.



VI. Commands to Use with Packages – These commands can be used at the **Console** window in both RGui and RStudio:

Display list of the installed packages: **library()**

Display list of packages currently loaded: **search()** or **sessionInfo()**

Load an installed package: **library(package name)**

Remove a loaded package: **detach("package:packagename", unload=TRUE)** Note: *unload=TRUE* is optional.

Uninstalls, that is ,deletes the package from computer: **remove.packages("package:packagename", lib=~R/win-library/librarynumber)**. Note: if *lib=...* is omitted, the package is removed from the current R library.

Vignettes – some package writers have included extra help or discussions with the package in the form of a vignette (often a pdf file).

To see which packages have vignettes in all the installed packages: **vignette(all=TRUE)**

To see the vignette for a particular package: **vignette("packagename")**

VII. Package Help – Various types of help are available in an R session. Some that are available for both RGui and RStudio are provided by typing in the **Console** window at the prompt:

A. Commands for Help with Installed Packages

1. **help("topic's name")** – accesses help on a topic.
2. **??("topic's name")** – searches the installed R packages for occurrences of the topic.
3. **example("function's name")** – runs the examples for the named function in the installed package in which it resides.
4. **demo()** – list the packages that have demos and their demo name. To run a demo type:
> demo(demo's name, package="package's name")
5. **Help Menu** – Package help will only appear for those packages which are installed on the computer, although the package(s) do not need to be loaded. Choosing a package will list the functions in that package. Selecting a function will show the description, arguments, details, references and examples for that function.
 - a. RGui – Click on **Help** in Menu bar, then select **Html help**. From the window that opens click on **Packages** and the Package Index, a list of the packages, will open. Click on the name of the package want help with.
 - b. RStudio – Clicking on the **Help** tab in the Files, Plots, Packages, Help, Viewer pane will open the Help menu.

B. Help with Packages – Searching the Web

1. R search information – In the Menu bar click **Help > Html help** (RGui) or **Menu tab + the home icon** (RStudio), then select **Search Engine & Keywords** to see package search in base R.
1. Web browser search – to use a search engine such as Google, put **[R]** before the search topic to help limit the hits to R software.
2. **www.stackoverflow.com** – site with R questions and Users' answers.
3. **https://r-project.org/search.html** – a list of alternative R search capabilities, each of which may be best for different types of inquiries.
4. **http://search.r-project.org** – R search site searches R functions, vignettes and the R Help mailing lists (Jonathan Baron).
5. **www.rseek.org** – dedicated R search engine that searches through all R-related websites (Sasha Goodman).