



Tools for biologists

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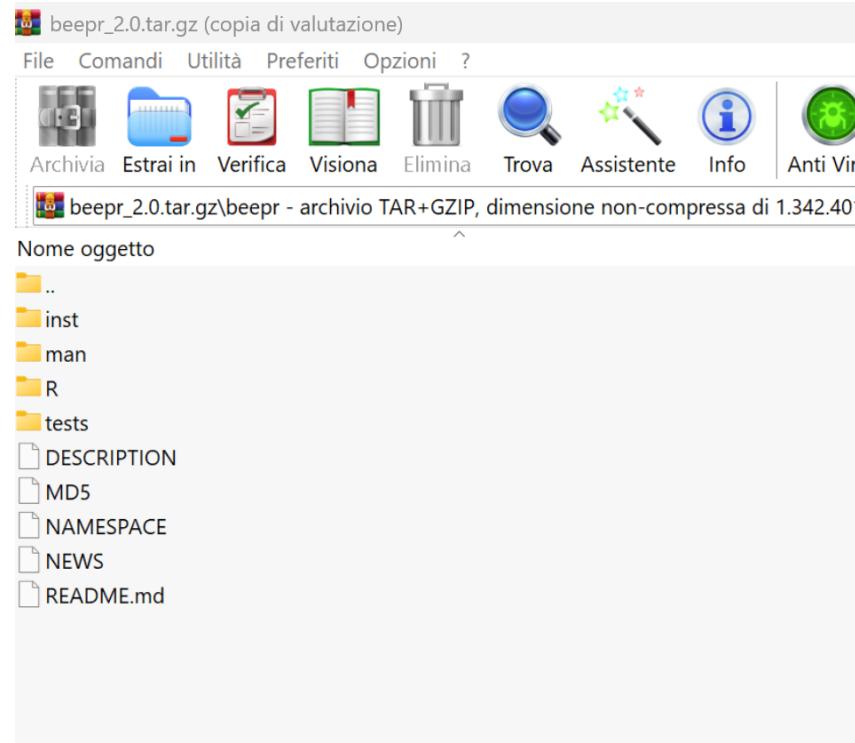
Luca Rindi ([luca.rindi@unipi.it](mailto:luca.rindi@unipi.it))

# What is an R package?

Collection of R functions, data and documentation

Organized into a structured folder system

Can include functions, datasets, vignettes, help files



There are different servers to store an R

package:

CRAN (official R packages)

**GitHub**

Bioconductor

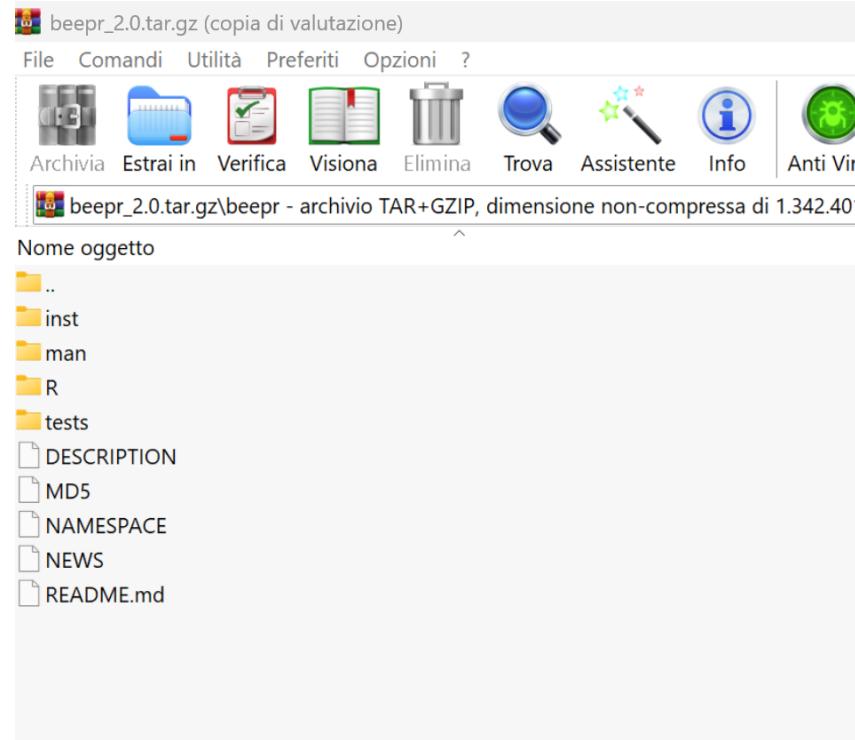
etc.

# What is an R package?

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Readme file

Description file

Functions are listed in the folder R

Help page in the folder man

# Let's start from the R functions

```
#' NAME FUNCTION
#'
#' DESCRIPTION FUNCTION
#' @param ARGUMENT1:
#' @param ARGUMENT2:
#' @return OUTPUT
#' @author
#' @examples EXAMPLE CODE
#' @export
eucl_dist<-function(P1,P2) {
  X1<-P1[1]
  Y1<-P1[2]
  X2<-P2[1]
  Y2<-P2[2]
  step1<- (X1-X2)^2
  step2<- (Y1-Y2)^2
  d<-sqrt(step1+step2)
  return(d) }
```

Must coincide with the name of the function

Replace ARGUMENT1 with the real name of the argument

Replace OUTPUT with the real name of the value

Important to close the help page

# The Description file

Package: Name of the package

Type: Package

Title: Title

Version: 0.9

Authors@R: c(person(given="Antonio", family="Profico", email = "antonio.profico@gmail.com", role=c("aut", "cre")))

Description: Add description

Depends: **R (>= 3.4.0)**

Imports: lattice (>= 0.2), mgcv (>= 1.8), Rvcg (>= 0.18), Morpho (>= 2.0), Arothron (>= 1.2), oce (>= 1.1), rgdal (>= 1.4), raster(>= 3.0), sp (>= 1.3), geometry (>= 0.4.0), rgl (>= 0.1), colorRamps (>= 2.3), DescTools (>= 0.99), grDevices (>= 3.5), graphics (>= 3.5), morphomap (>= 1.3)



**Don't write in your code library(xxx),  
install.packages('xxx'), require(xxx)**

License: GPL-2

Author: Antonio Profico [aut, cre],

Maintainer: Antonio Profico <antonio.profico@gmail.com>

**Save the file Description (without extension) in the main folder**

# Let's create our R package on GitHub

The screenshot shows a GitHub user profile for "AProfico". The profile page displays several repositories: "functions\_bioR" (Public, updated May 28, 2024), "BioR2" (Public, R, updated May 28, 2024), and "VoxFeR" (Public, R, 1 star, updated Jul 2, 2018). A large blue arrow points from the right side of the profile page towards the "Create a new repository" form on the right.

**Create a new repository**

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (\*).

**1 General**

Owner \* Repository name \*

Great repository names are short and memorable. How about [supreme-memory](#)?

Description

0 / 350 characters

**2 Configuration**

Choose visibility \* Choose who can see and commit to this repository

Public

Start with a template Templates pre-configure your repository with files.

No template

Add README READMEs can be used as longer descriptions. [About READMEs](#)

Off

Add .gitignore .gitignore tells git which files not to track. [About ignoring files](#)

No .gitignore

Add license Licenses explain how others can use your code. [About licenses](#)

No license

Add Repository Name and Description and click on Create Repository

# Let's create our R package on GitHub

The screenshot shows a GitHub repository page for 'Mypackage'. At the top, there are sections for 'Set up GitHub Copilot' and 'Add collaborators to this repository'. Below these, a 'Quick setup — if you've done this kind of thing before' section provides links for 'Set up in Desktop', 'HTTPS', and 'SSH', along with the URL <https://github.com/AProfico/Mypackage.git>. It also suggests creating a new repository or pushing an existing one from the command line, providing corresponding git commands.

```
echo "# Mypackage" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/AProfico/Mypackage.git
git push -u origin main

git remote add origin https://github.com/AProfico/Mypackage.git
git branch -M main
git push -u origin main
```

ProTip! Use the URL for this page when adding GitHub as a remote.

The screenshot shows a GitHub commit dialog for the repository 'Mypackage'. It features a large text area with the placeholder 'Drag files here to add them to your repository' and 'Or choose your files'. A teal arrow points to this area. Below it is a 'Commit changes' section with fields for 'Add files via upload' and 'Add an optional extended description...'. A green button labeled 'Commit changes' and a red 'Cancel' button are at the bottom. Another teal arrow points to the 'Commit changes' button.

Click on uploading and existing file

# Install your package from R

The screenshot shows a GitHub repository page for 'Mypackage'. It includes sections for 'Set up GitHub Copilot', 'Add collaborators to this repository', and a 'Quick setup' guide. The 'Quick setup' section provides instructions for creating a new repository via command line or pushing an existing one, along with the corresponding Git commands.

```
echo "# Mypackage" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/AProfico/Mypackage.git
git push -u origin main
```

```
git remote add origin https://github.com/AProfico/Mypackage.git
git branch -M main
git push -u origin main
```

The screenshot shows a GitHub repository page for 'Mypackage'. A teal arrow points to the 'Commit changes' button in a modal dialog. The dialog contains fields for 'Add files via upload' and 'Add an optional extended description...'. Above the dialog, there is a large text input field with the placeholder 'Drag files here to add them to your repository' and a link 'Or choose your files'.

```
install.packages("devtools")
library(devtools)
install_github("https://github.com/AProfico/Mypackage")
library(Mypackage)
eucl_dist(c(0,1),c(1,1))
```

**Click on uploading and existing file**

We can install the R package but the help page is not available, let's fix that

# Update your package

```
install.packages("devtools")
library(devtools)
install_github("https://github.com/AProfico/Mypackage")
library(Mypackage)
eucl_dist(c(0,1),c(1,1))
```

```
remove.packages("Mypackage")
```

**Restart R**



```
setwd("C:/Users/anton/OneDrive - University of
Pisa/Desktop/Mypackage")
library(devtools)
document()
```

A screenshot of a Windows File Explorer window. The path is OneDrive > Antonio - University of Pisa > Desktop > Mypackage. The window shows a list of files and folders: man, R, DESCRIPTION, and NAMESPACE. The DESCRIPTION file is selected. The table below provides a detailed view of the file list.

Nome	Stato	Ultima modifica	Tipo	Dimensione
man	✓	18/02/2026 18:21	Cartella di file	
R	✓	18/02/2026 18:05	Cartella di file	
DESCRIPTION	✓	18/02/2026 18:20	File	1 KB
NAMESPACE	🕒	18/02/2026 18:20	File	

Upload the entire main folder on GitHub

# Install your package from R

```
library(devtools)
install_github("https://github.com/AProfico/Mypackage")
library(Mypackage)
?eucl_dist
eucl_dist(c(0,1),c(1,1))
```

The screenshot shows the RStudio interface with the following components:

- Code Editor:** Shows the R script being run, which installs the devtools package, installs the Mypackage from GitHub, loads it, and runs the eucl\_dist function.
- Console:** Shows the output of the R session, including the package installation process and the execution of the eucl\_dist function.
- Environment:** Shows the global environment with the Mypackage loaded.
- Documentation View:** Displays the help page for the eucl\_dist function. It includes sections for Description, Usage, Arguments, Value, Author(s), Examples, and Run examples. The Value section states: "d A numeric value representing the Euclidean distance between P1 and P2". The Arguments section defines P1 and P2 as numeric vectors of length 2 representing coordinates.

And voilà!

# Include a dataset

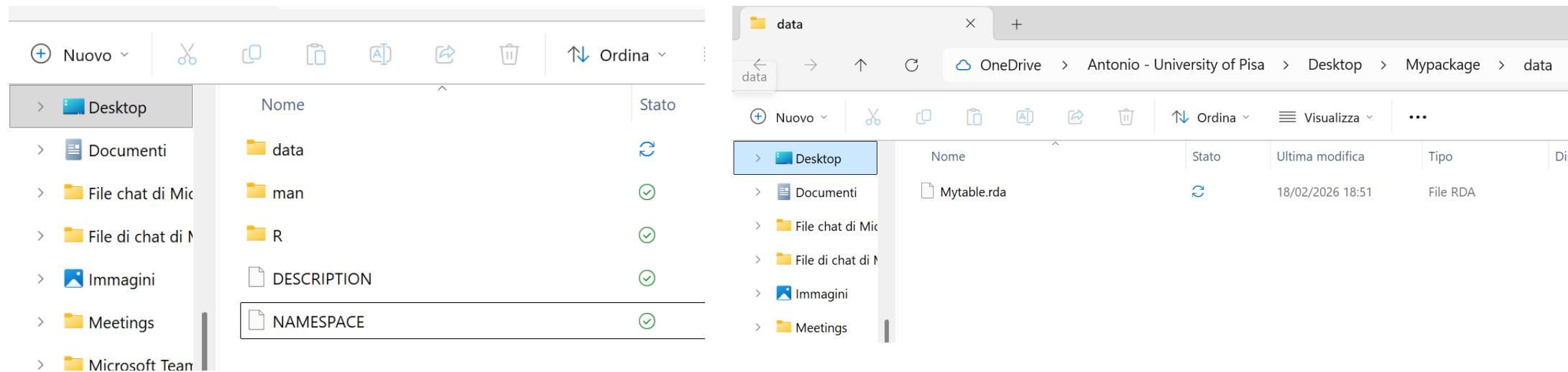
You can store also data in R

Create a matrix with 25 rows and 2 columns and assign it to an object called Mytable

Mytable

```
save(Mytable,file = "Mytable.rda")
```

Create a sub folder called data and move the file *Mytable.rda* within it



# Compile and update your package from R

```
setwd("C:/Users/anton/OneDrive - University of Pisa/Desktop/Mypackage")
remove.packages("Mypackage")
library(devtools)
document()
```

## **Update again the R package on GitHub**

```
library(devtools)
install_github("https://github.com/AProfico/Mypackage")
library(Mypackage)
data("Mytable")
eucl_dist(Mytable[1,],Mytable[2,])
```

**Add the function scholar2cloud in your R package**