

# USF Genomics Program/USF Omics Hub Microbiome Workshop: Software requirements and installation walk-through

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# Minimum software requirements

- Operating system
  - Windows 7 (64-bit)
  - OS X 10.13 (64-bit) (“High Sierra”)
- Memory
  - 10 GB hard-drive space
  - 8 GB RAM

# We require the following installs:

- R: version 4.0.1
  - <https://cran.case.edu/>
- Rstudio IDE v. 1.3
  - <https://rstudio.com>
  - The knitr package (follow our directions later in this file)
- If you have a Mac, you'll also need to install Xquartz
  - <https://www.xquartz.org/>

# Install R from this website (cran.case.edu)



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## The Comprehensive R Archive Network

### Download and Install R

Precompiled binary distributions of the base system and versions of R: want one of these

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

### Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2020-06-06, See Things Now) [R-4.0.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

### What are R and CRAN?

R is 'GNU S', a freely available language and environment for statistical computing and graphics which provides a wide variety of statistical and graphical techniques: linear and nonlinear modelling, statistical tests, time series analysis, classification, clustering, etc. Please consult the [R project homepage](#) for further information.

CRAN is a network of ftp and web servers around the world that store identical, up-to-date, versions of code and documentation for R. Please use the CRAN [mirror](#) nearest to you to minimize network load.

### Submitting to CRAN

To "submit" a package to CRAN, check that your submission meets the [CRAN Repository Policy](#) and then use the [web form](#).

Select your operating system

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# For Mac Choose:

R for Mac OS X

This directory contains binaries for a base distribution and packages to run on Mac OS X (release 10.6 and above). Mac OS 8.6 to 9.2 (and Mac OS X 10.1) are no longer supported but you can find the last supported release of R for these systems (which is R 1.7.1) [here](#). Releases for old Mac OS X systems (through Mac OS X 10.5) and PowerPC Macs can be found in the [old](#) directory.

Note: CRAN does not have Mac OS X systems and cannot check these binaries for viruses. Although we take precautions when assembling binaries, please use the normal precautions with downloaded executables.

Package binaries for R versions older than 3.2.0 are only available from the [CRAN archive](#) so users of such versions should adjust the CRAN mirror setting (<https://cran-archive.r-project.org>) accordingly.

R 4.0.1 "See Things Now" released on 2020/06/06

Please check the MD5 checksum of the downloaded image to ensure that it has not been tampered with or corrupted during the mirroring process. For example type  
`md5 R-4.0.1.pkg`  
in the *Terminal* application to print the MD5 checksum for the R-4.0.1.pkg image. On Mac OS X 10.7 and later you can also validate the signature using  
`pkgutil --check-signature R-4.0.1.pkg`

Latest release:

[R-4.0.1.pkg](#) (notarized and signed)  
SHA1-hash: c21adbc6e3362cae24969dc9916c3bfff6de062b8  
(ca. 84MB)

**R 4.0.1** binary for macOS 10.13 (High Sierra) and higher, signed and notarized package. Contains R 4.0.0 framework, R.app GUI 1.72 in 64-bit for Intel Macs, Tcl/Tk 8.6.6 X11 libraries and Texinfo 6.7. The latter two components are optional and can be omitted when choosing "custom install", they are only needed if you want to use the `tcltk` R package or build package documentation from sources.

Note: the use of X11 (including `tcltk`) requires [XQuartz](#) to be installed since it is no longer part of OS X. Always re-install XQuartz when upgrading your macOS to a new major version.

**Important:** this release uses Xcode 10.1 and GNU Fortran 8.2. If you wish to compile R packages from sources, you will need to download and GNU Fortran 8.2 - see the [tools](#) directory.

[NEWS](#) (for Mac GUI)

News features and changes in the R.app Mac GUI

[Mac-GUI-1.70.tar.gz](#)  
MD5-hash: b1ef5f285524640680a22965bb8800f8

Sources for the R.app GUI 1.70 for Mac OS X. This file is only needed if you want to join the development of the GUI, it is not intended for regular users. Read the INSTALL file for further instructions.

Note: Previous R versions for El Capitan can be found in the [el-capitan/base](#) directory.

Binaries for legacy OS X systems:

[R-3.6.3.nn.pkg](#) (signed)  
SHA1-hash: c462c9b1f9b45d778f05b8d9aa25a9123b3557c4  
(ca. 77MB)

**R 3.6.3** binary for OS X 10.11 (El Capitan) and higher, signed package. Contains R 3.6.3 framework, R.app GUI 1.70 in 64-bit for Intel Macs, Tcl/Tk 8.6.6 X11 libraries and Texinfo 5.2. The latter two components are optional and can be omitted when choosing "custom install", they are only needed if you want to use the `tcltk` R package or build package documentation from sources.

[R-3.3.3.pkg](#)

**R 3.3.3** binary for Mac OS X 10.9 (Mavericks) and higher, signed package. Contains R 3.3.3 framework

CRAN

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# For Windows:



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## R for Windows

Subdirectories:

[base](#)

Binaries for base distribution. This is what you want to **install R for the first time**.

[contrib](#)

Binaries of contributed CRAN packages (for R >= 2.13.x; managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.

[old contrib](#)

Binaries of contributed CRAN packages for outdated versions of R (for R < 2.13.x; managed by Uwe Ligges).

[Rtools](#)

Tools to build R and R packages. This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.



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## R-4.0.1 for Windows (32/64 bit)

[Download R 4.0.1 for Windows](#) (84 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can compare the [md5sum](#) of the .exe to the [fingerprint](#) on the master server. You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

### Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

### Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is <CRAN MIRROR>/bin/windows/base/release.html.

# Install RStudio from rstudio.com

← → ↻ rstudio.com


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## RStudio IDE 1.3 Released

From spell check to a pro desktop, there is a lot to love.

**DOWNLOAD** **LEARN MORE**




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# Choose the free version of RStudio

## Choose Your Version

RStudio is a set of integrated tools designed to help you be more productive with R. It includes a console, syntax-highlighting editor that supports direct code execution, and a variety of robust tools for plotting, viewing history, debugging and managing your workspace.

[LEARN MORE ABOUT RSTUDIO FEATURES](#)



RStudio's new solution for every professional data science team. RStudio Team includes RStudio Server Pro, RStudio Connect and RStudio Package Manager.

[LEARN MORE](#)

	RStudio Desktop Open Source License <b>Free</b> <a href="#">DOWNLOAD</a> <a href="#">Learn more</a>	RStudio Desktop Commercial License <b>\$995</b> /year <a href="#">BUY</a> <a href="#">Learn more</a>	RStudio Server Open Source License <b>Free</b> <a href="#">DOWNLOAD</a> <a href="#">Learn more</a>	RStudio Server Pro Commercial License <b>\$4,975</b> /year (5 Named Users) <a href="#">BUY</a> <a href="#">Evaluation</a>   <a href="#">Learn more</a>
Integrated Tools for R	✓	✓	✓	✓
Priority Support		✓		✓
Access via Web Browser			✓	✓



# Choose the RStudio Installer for your operating system

## All Installers

Linux users may need to [import RStudio's public code-signing key](#) prior to installation, depending on the operating system's security policy.

RStudio 1.2 requires a 64-bit operating system. If you are on a 32 bit system, you can use an [older version of RStudio](#).

OS	Download	Size	SHA-256
Windows 10/8/7	<a href="#">RStudio-1.3.959.exe</a>	171.41 MB	<a href="#">3d493ae5</a>
macOS 10.13+	<a href="#">RStudio-1.3.959.dmg</a>	148.57 MB	<a href="#">7c5b695d</a>
Ubuntu 16	<a href="#">rstudio-1.3.959-amd64.deb</a>	124.57 MB	<a href="#">c2931495</a>
Ubuntu 18/Debian 10	<a href="#">rstudio-1.3.959-amd64.deb</a>	126.11 MB	<a href="#">411ab500</a>
Fedora 19/Red Hat 7	<a href="#">rstudio-1.3.959-x86_64.rpm</a>	146.24 MB	<a href="#">a144e4e6</a>
Fedora 28/Red Hat 8	<a href="#">rstudio-1.3.959-x86_64.rpm</a>	150.32 MB	<a href="#">57169bee</a>
Debian 9	<a href="#">rstudio-1.3.959-amd64.deb</a>	126.42 MB	<a href="#">b2d9366f</a>
SLES/OpenSUSE 12	<a href="#">rstudio-1.3.959-x86_64.rpm</a>	119.02 MB	<a href="#">bbc9387e</a>
OpenSUSE 15	<a href="#">rstudio-1.3.959-x86_64.rpm</a>	127.59 MB	<a href="#">a4f404f0</a>

Go to the  
RStudio  
Package  
installer in  
Tools → Install  
Packages

The screenshot shows the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Window, and Help. The 'Tools' menu is open, displaying options: Install Packages..., Check for Package Updates..., Version Control, Shell..., Addins, Keyboard Shortcuts Help, Modify Keyboard Shortcuts..., Project Options..., and Global Options... A red arrow points from the text on the left to the 'Install Packages...' option.

The Console pane on the left shows the following text:

```
R version 3.5.2 (2019-12-12) -- "Dark and Stormy Night"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin15.6.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/Box/Genomics/omicshub/omicshub_git/omicshub_official/microbiome_workshop/exercises/.RData]
> |
```

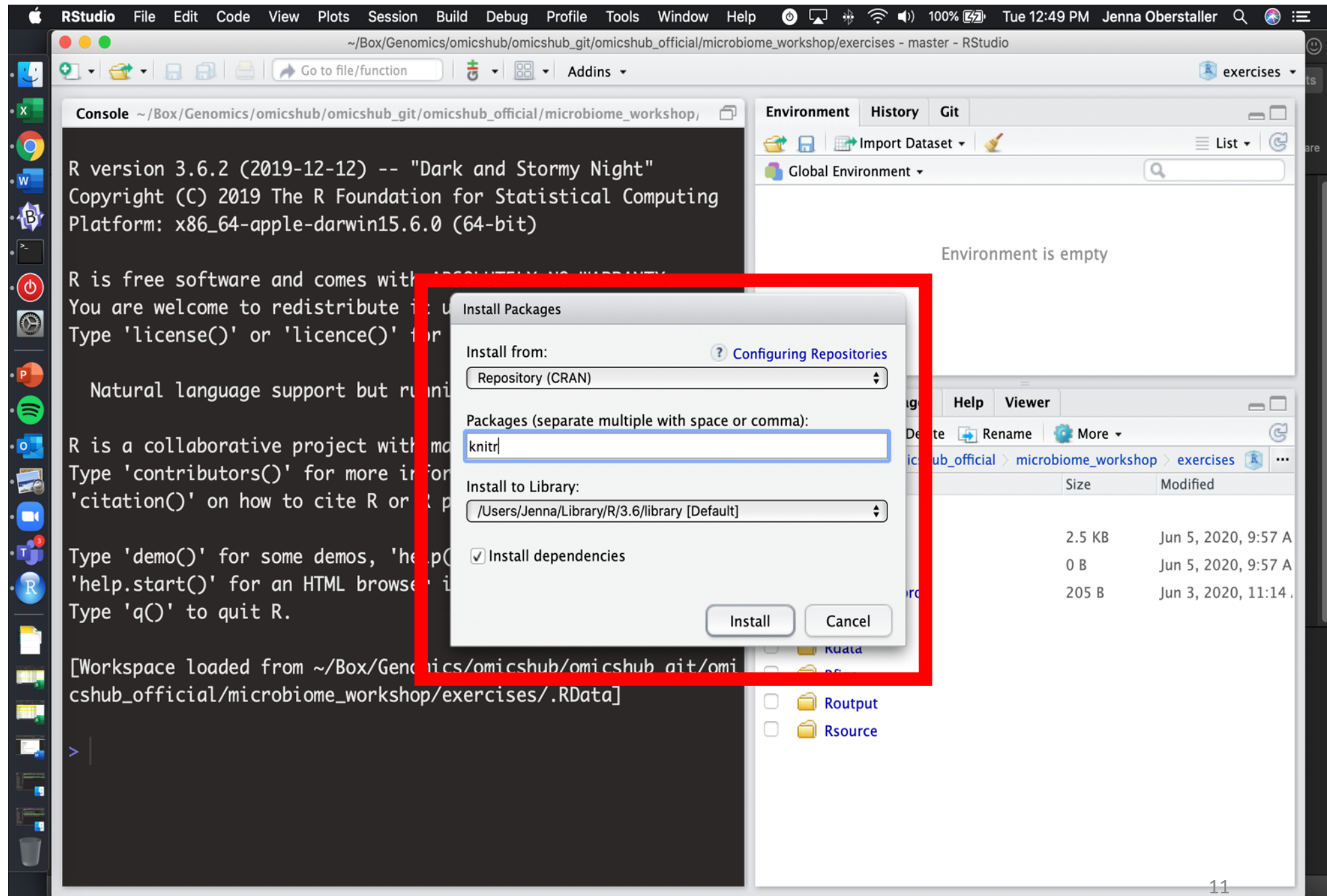
The Environment pane on the right shows "Environment is empty".

The Files pane at the bottom shows the file explorer with the following structure:

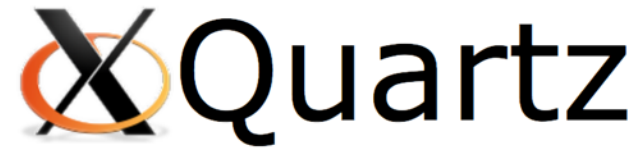
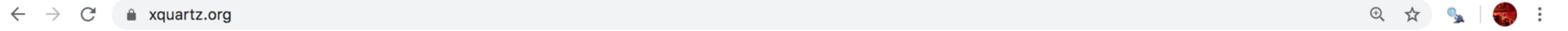
- micshub\_git > omicshub\_official > microbiome\_workshop > exercises

	Name	Size	Modified
<input type="checkbox"/>	..		
<input type="checkbox"/>	.RData	2.5 KB	Jun 5, 2020, 9:57 A
<input type="checkbox"/>	.Rhistry	0 B	Jun 5, 2020, 9:57 A
<input type="checkbox"/>	exercises.Rproj	205 B	Jun 3, 2020, 11:14 A
<input type="checkbox"/>	Ranalysis		
<input type="checkbox"/>	Rdata		
<input type="checkbox"/>	Rfigs		
<input type="checkbox"/>	Routput		
<input type="checkbox"/>	Rsource		

- Type “knitr” into the Packages field and click “Install”



# For Mac Users: Install Xquartz from xquartz.org



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The XQuartz project is an open-source effort to develop a version of the X.Org X Window System that runs on OS X. Together with supporting libraries and applications, it forms the X11.app that Apple shipped with OS X versions 10.5 through 10.7.

## Quick Download

Download	Version	Released	Info
 <a href="#">XQuartz-2.7.11.dmg</a>	2.7.11	2016-10-29	For OS X 10.6.3 or later