

# Working with :

## A University of Queensland Advanced Workshop



### Preliminaries for Participants



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Room 316, Building 69  
The University of Queensland  
9:00AM – 4:00PM

## 1 Introduction and welcome



This four-day workshop is intended for current  users who wish to deepen their understanding of the programming environment and of the data analysis and visualisation tools it provides. Some experience with  is assumed, but some experience with data analysis and programming in professional practice is probably just as important.



The workshop will involve formal presentations, interspersed with periods of free time for further investigation of the examples presented, and any related questions that arise. Participants are *encouraged to bring along their own data sets* and data analysis problems, and to discuss them with the presenters during the free periods. The best way to learn  is to *use  on real problems from your own professional disciplines.*

## 2 Materials and preparation

**Laptop** To take part in the sessions, participants will need to bring along their own laptop with  installed beforehand.

** version** The version of  installed should be the latest,  4.0.3.

Versions of  older than  3.5.0 will not be able to handle some of the course data sets.

[Note that going from  3.\*.\* (or older!) to  4.0.\* is a major upgrade requiring all your currently installed packages to be re-installed. This may take some time.]

**CRAN Packages** Participants should have the required capabilities to *install and maintain* *R* packages on the laptop they will be using for the workshop.

Participants are encouraged to *update their packages* to the latest versions available.

The workshop will use a number of additional *R* packages, and an *R* script, namely `WWR_packages_2021.R`, will be provided, *by email*, to install these beforehand. The simplest way to use the script is, from within an *R* console, issue the command

```
source("WWR_packages_2021.R")
```

making sure the script file itself is in the *R* working directory. This may be done immediately once the script is available.

Note that in addition to any required CRAN packages, this script will also install several other packages from a *GitHub* repo, namely <https://github.com/BillVenables>. The software to do this, if needed, will be installed automatically.

**RStudio** The *RStudio* API (‘application-programmer interface’) to *R* will be assumed and used extensively throughout the workshop.<sup>1</sup> The latest version is *RStudio* 1.4.1103 (as of now). We recommend you update to this release, (or later). A link to the download site is given [here](#). The free desktop version is adequate.

To update an existing installation, a good way to begin is to start up *RStudio* and go to the menu:

Help → Check for updates

and follow the advice.

**Other tools used with *R*** To take part fully in the workshop, some ancillary programming tools will be needed. These are mainly needed to deal with using fast compiled code in computations and package construction. These come in several forms, depending on the operating system on your machine:

**Windows** With *R* 4.0.0 and later the compiler tools are available as a **Windows** .exe file, which can be downloaded from [this link](#). In addition to running the .exe file, some additional steps may be required, as outlined on the download page.

**Mac OS X** On this system *R* is built using Apache Xcode 10.1 and GNU Fortran 8.2, which are required for compiled code within *R* itself. See [this link](#) for further details. (Disclaimer: Neither presenter has any experience with **Mac OS X**!)

**Version control** Though not a fundamental part of the workshop, participants will be encouraged to learn, and to use, version control. For this purpose the currently favoured tool is **git**<sup>2</sup> This is free and open-source software, available for all common operating systems, and freely located on the web. Installation is simple.

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<sup>1</sup>Other interfaces to *R* could be used if participants have a particular preference, but some aspects of the work will then not be easily available. We strongly recommend participants have *RStudio* installed, whether they use it routinely or not.

<sup>2</sup>The name is allegedly derived from the word ‘*git*’, which means ‘*stupid person*’ in British slang. An alternative derivation is an acronym for ‘*Global Information Tracking*’. Take your pick.

Eventually you may wish to get yourself a free **GitHub** (or **GitLab**) account to facilitate collaborative working, or to allow access on several machines. Details are left for the reader to investigate.

**T<sub>E</sub>X and L<sub>A</sub>T<sub>E</sub>X** The T<sub>E</sub>X document preparation system, which includes L<sub>A</sub>T<sub>E</sub>X and many other tools, is a major system and although it is free and available for all operating systems, installation can be a major undertaking. It also comes in several different distributions, which can also be a complication.

The system is mainly needed in **R** for rendering documents into pdf (rather than html or Word, for example) and for building some optional parts of **R** packages. Users for which this is important will clearly need to have it installed, but for this workshop it is optional. To some extent the **R** package `tinytex` provides enough functionality for basic applications, if users unfamiliar with the system wish to investigate.

### 3 Course materials

The main materials for the course will be provided in the form of an **RStudio Project** which will be delivered as a .zip file. This may be either downloaded from [this Dropbox link](#).

*The file is approximately 135Mb, so downloading may take some time.*

Once downloaded it may be expanded into a directory (or folder) that will form the *working directory* for the workshop. This directory will have several sub-directories with the file materials logically classified. When expanded, the folder name will be `WWR_2021`.

Users may locate this folder anywhere on the file system of their machines, or even on an attached memory device.<sup>3</sup>

Alternatively, participants using **git** may *clone* the folder directly from the **GitHub** repo, which is

[https://github.com/BillVenables/WWR\\_2021](https://github.com/BillVenables/WWR_2021)

### 4 Synopsis

The recommended set-up process is:

1. Make sure you have the correct write capabilities on your laptop to update **R** and install and update packages.

Make sure you are connected to the internet.

2. Update your **R** to **R** 4.0.3, if necessary, and update your currently installed packages to the latest CRAN versions.
3. Make sure you have **RStudio** installed and upgraded to the latest release.

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<sup>3</sup>Participants unfamiliar with, or preferring not to use **RStudio**, may use this project directory in the same way they would any **R** working directory.

4. From within an *R* session, run the script `WWR_packages_2021.R` to install any required new packages you will need for the workshop.
5. Download the file `WWR_2021.zip` from the link below and expand it to provide the `WWR_2021` folder, where you wish to locate it for use as the working directory during the workshop.

**NOTE 1:** This `.zip` folder will be available on memory sticks at the workshop itself. So if there is any problem, apart from updating *R* itself, it can be fixed at the workshop itself as necessary.

**NOTE 2:** Users with *git* and some experience with using it may prefer to clone the **GitHub** repo directly. The relevant address is

[https://github.com/BillVenables/WWR\\_2021](https://github.com/BillVenables/WWR_2021)

Alternatively the folder can be downloaded as a `.zip` from this same address. You should be able to go to the tab:

Code → Download ZIP

6. This should complete your preparations for the workshop. If you need further help you are free to contact Bill Venables at this email address: [Bill.Venables@gmail.com](mailto:Bill.Venables@gmail.com).

Good luck, and welcome to the workshop!