> The first principle I propose is that our *Mission*, as users and creators of software for data analysis, is to enable the best and most thorough exploration of data possible. That means that users of the software must be able to ask meaningful questions about their applications, quickly and flexibly.
>
> — John Chambers (Chambers, 2008)

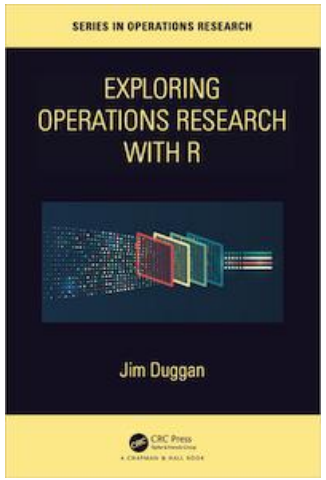
Data Science for Operational Researchers using R

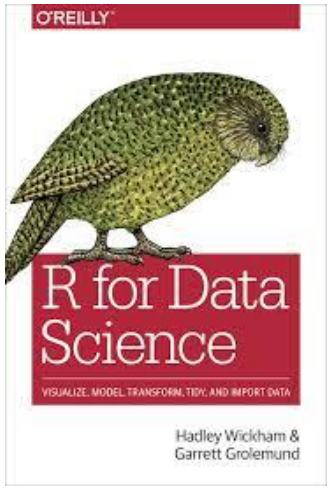
01 - Introduction

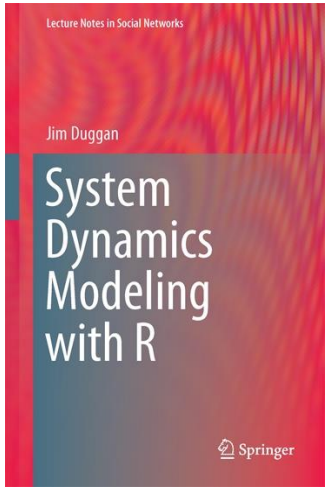
https://github.com/JimDuggan/explore_or

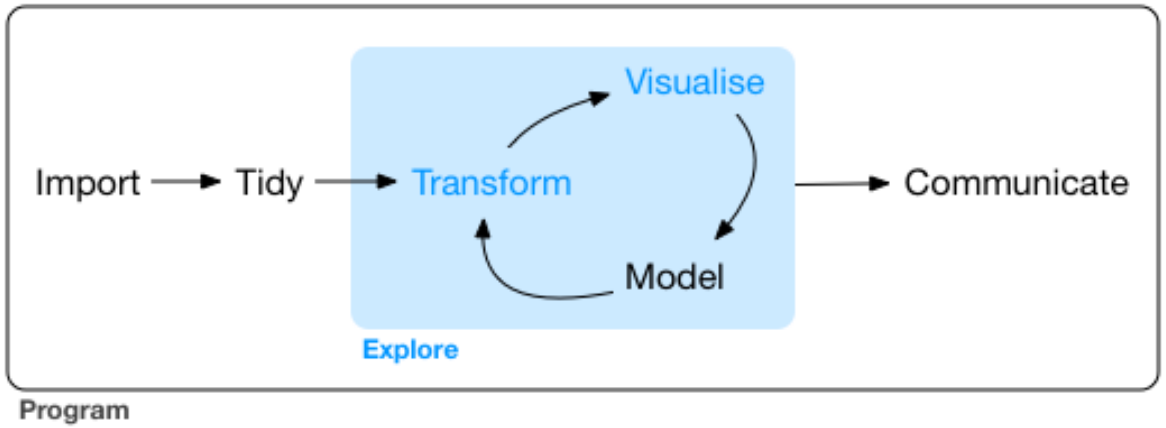
Goal

- Improve your personal productivity for generating rapid and insightful results from large data sets.
- Learn about the role of R in the overall data science life process.
- Appreciate the power of R and the 'tidyverse' set of packages for increasing productivity









https://r4ds.had.co.nz

Instructor –Jim Duggan

- Lectures in
  - Programming (R, MATLAB),
  - Modelling & Simulation
- Research interests:
  - System Dynamics
  - Computational Epidemiology
  - Data Science

https://education.rstudio.com/trainers/people/duggan+jim/

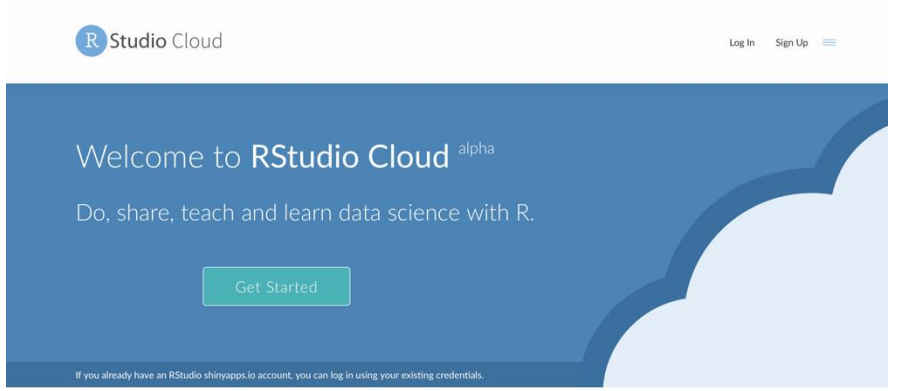
https://twitter.com/_jimduggan

Course Overview

Topic	Description
	Session 1 (half-day)
1	Introduction to R and Posit Cloud
2	Atomic Vectors
3	Functions, Lists and Functionals
4	Data Frames and Tibble
5	**ggplot2**
	Session 2 (half-day)
6	Data transformation with **dplyr**
7	Relational Data with **dplyr**
8	Processing data with **purrr**
9	Exploratory Data Analysis – Examples

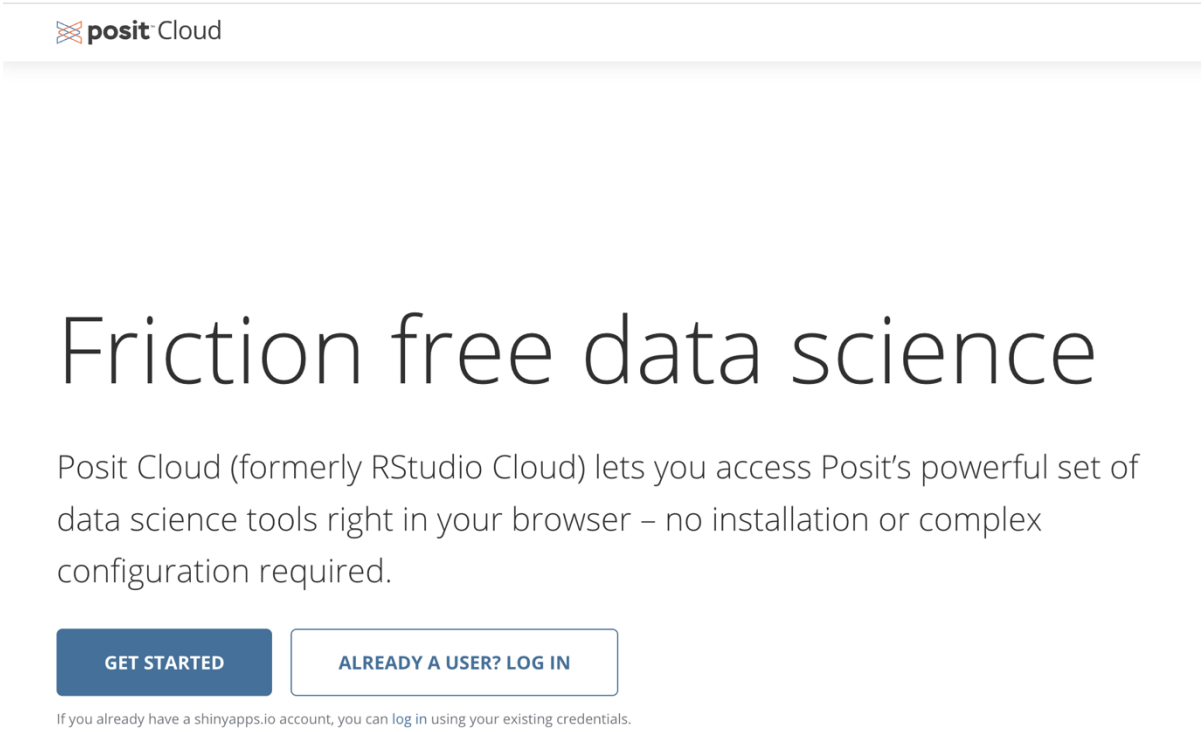
The R Project for Statistical Computing

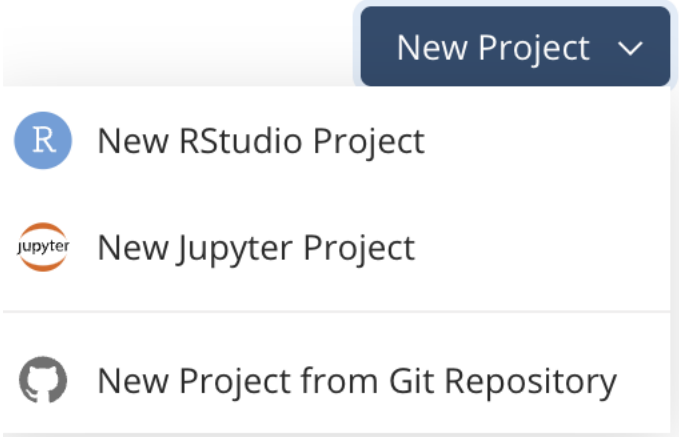
- R's *mission* is to enable the best and most thorough exploration of data possible (Chambers 2008).
- It is a dialect of the S language, developed at Bell Laboratories
- ACM noted that *S "will forever alter the way people analyze, visualize, and manipulate data"*

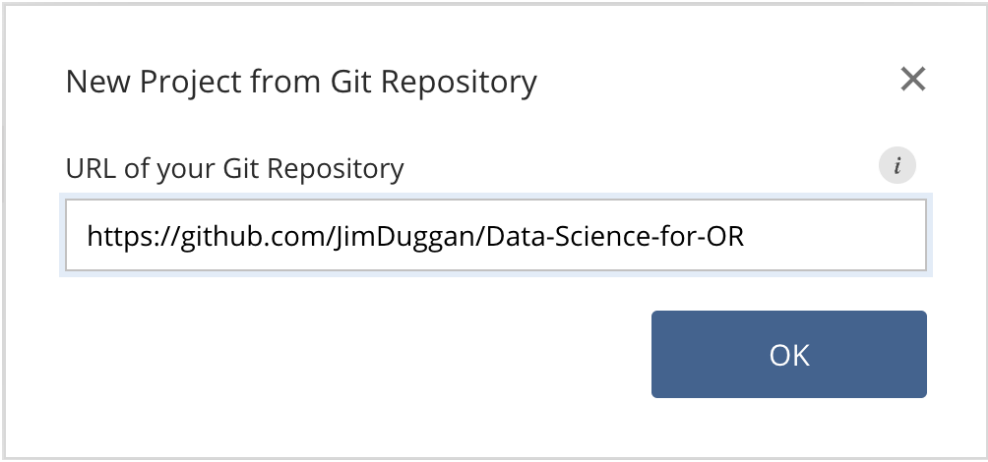



```r
# We use this for processing the answer
# In programming, we "stand on the shoulders of giants"
library(stringi)

# This gets the input from the user.
# The result is stored in a variable
# Variables are important in programming!
name <- readline(prompt="Enter a name: ")

# We call a specially designed function to get the answer
# In R, we call functions all the time
# A function is a "mini-program"
ans <- stri_reverse(name)

# After all this work, we output the result
cat("The reverse of ", name, "is ===>", ans)
```

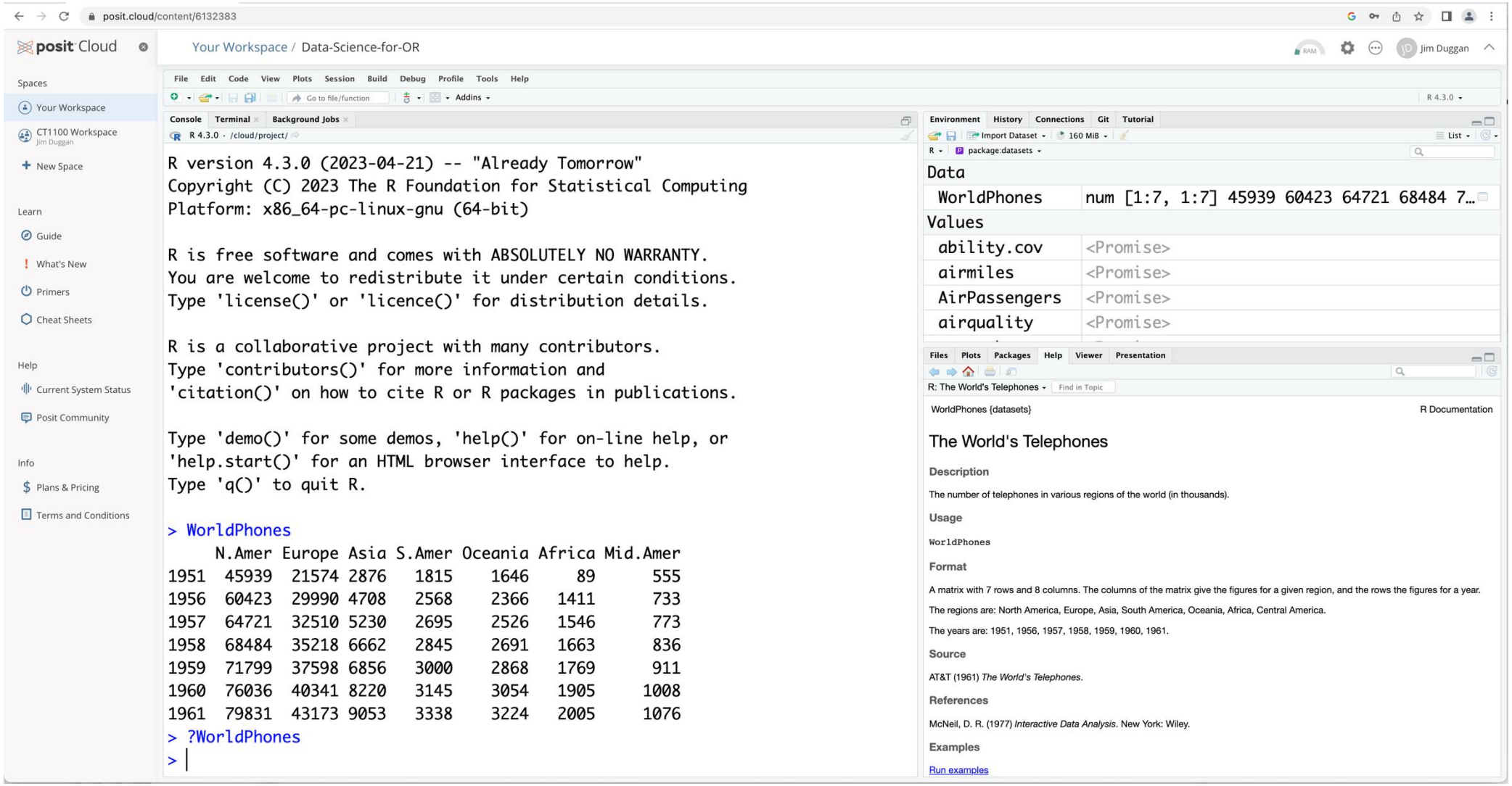
First Steps: Posit Cloud – Create Your Account



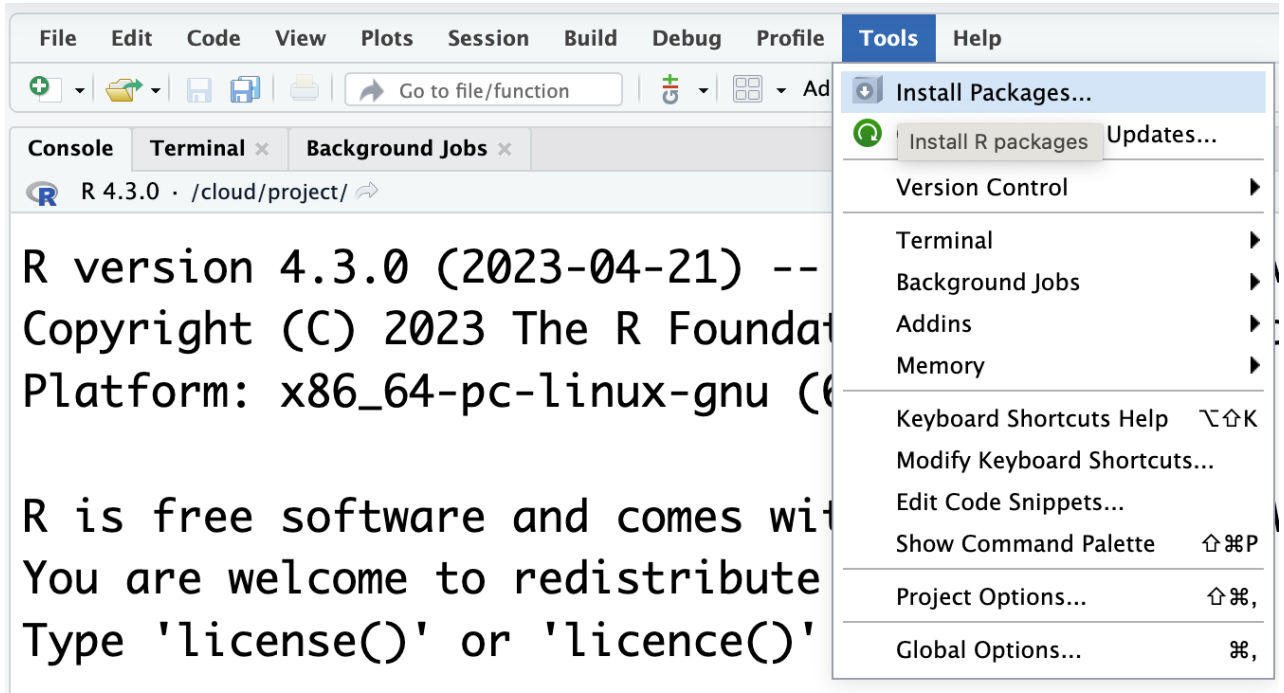


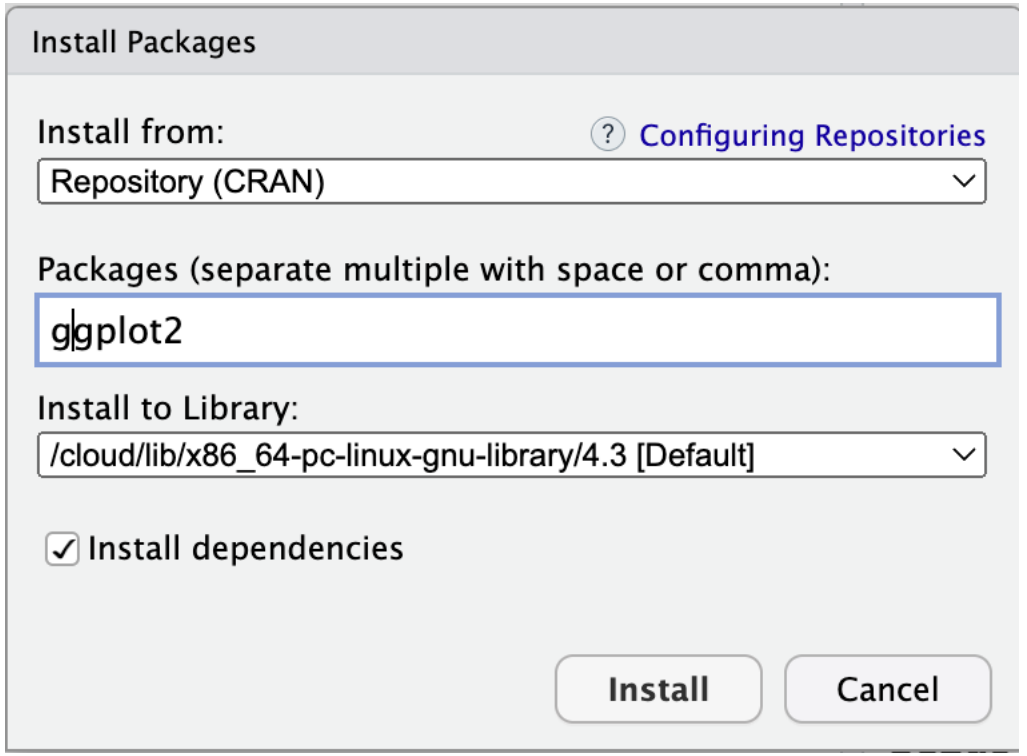


View the R IDE



(5) Install packages…






```
> install.packages("ggplot2")
Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
(as 'lib' is unspecified)
also installing the dependencies 'colorspace', 'utf8', 'farver', 'labeling', 'munsell', 'R6', 'RColorBrewer', 'viridisLite',
'fansi', 'magrittr', 'pillar', 'pkgconfig', 'cli', 'glue', 'gtable', 'isoband', 'lifecycle', 'rlang', 'scales', 'tibble', 'v
ctrs', 'withr'
```

(7) Packages required

Package	Purpose
ggplot2	Produce graphics for data
dplyr	Analysis of data held in tibbles/data frames
aimsir17	2017 Weather data for Ireland
purrr	To iterate over data structures
tidyr	To tidy rectangular data, and to nest data sets