



Demystifying R: A Guided Tour

David Keyes
R for the Rest of Us



Before We Start

Please take the survey at <https://rfortherestofus.com/survey/>

Demystifying R

Your familiarity with R

How familiar are you with R?

1 2 3 4 5

Not at all familiar ☐ ☐ ☐ ☐ ☐ Very familiar



Logistics

Everything will be posted at <https://rfortherestofus.com/presentation/vancouver/>

If you have any questions, please put them in the chat (I'll stop if necessary)

There will also be time for Q&A at the end



Who Am I?



Getting Started with R



What is R?



Download and Install R

The first thing you need to do is download the R software. Go to the [Comprehensive R Archive Network \(aka “CRAN”\) website](#) and download the software for your operating system (Windows, Mac, or Linux).

R





RStudio

R: Engine



RStudio: Dashboard



Courtesy [Modern Dive](#)



Download and Install RStudio

Download RStudio at the [RStudio website](https://www.rstudio.com/). Ignore the various versions listed there. All you need is the latest version of RStudio Desktop.

RStudio





Packages



Packages

R: A new phone



R Packages: Apps you can download



Courtesy [Modern Dive](#)



Examples of Packages

Tidyverse

Packages Articles Learn Help Contribute



R packages for data science

The tidyverse is an opinionated **collection of R packages** designed for data science. All packages share an underlying design philosophy, grammar, and data structures.

Install the complete tidyverse with:

```
install.packages("tidyverse")
```



Examples of Packages

gendercodeR

The goal of gendercodeR is to allow simple recoding of freetext gender responses.

Why would we do this?

Researchers who collect self-reported demographic data from respondents occasionally collect gender using a free-text response option. This has the advantage of respecting the gender diversity of respondents without prompting users and potentially including misleading responses. However, this presents a challenge to researchers in that some inconsistencies in typography and spelling create a larger set of responses than would be required to fully capture the demographic characteristics of the sample.

For example, male participants may provide freetext responses as "male", "man", "mail", "mael". Non-binary participants may provide responses as "nonbinary", "enby", "non-binary", "non binary"

This package uses dictionaries of common misspellings to recode these freetext responses into a consistent set of responses.



Why Use R?



Data Analysis in a Snap

gender	education	marital_status	height
male	High School	Married	164.7
male	High School	Married	164.7
male	High School	Married	164.7
male	NA	NA	105.4
female	Some College	LivePartner	168.4
male	NA	NA	133.1
male	NA	NA	130.6
female	College Grad	Married	166.7
female	College Grad	Married	166.7
female	College Grad	Married	166.7



Data Analysis in a Snap

```
nhanes %>%  
  group_by(gender) %>%  
  drop_na(height) %>%  
  summarize(mean_height = mean(height))
```

gender	mean_height
female	156.6159
male	167.1913



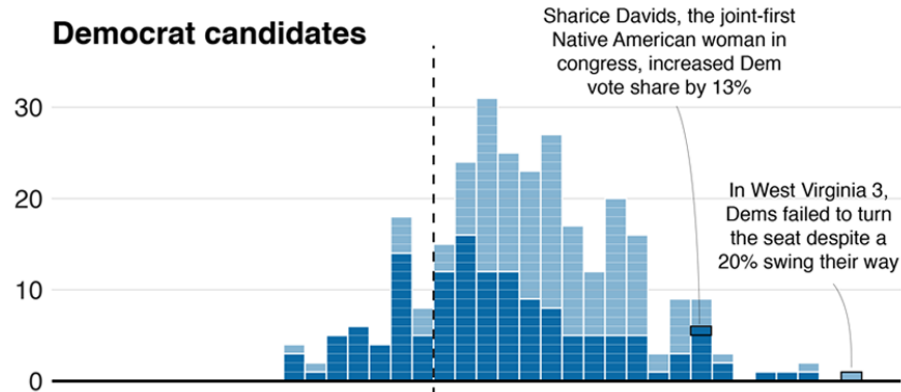
High-Quality Data Visualization



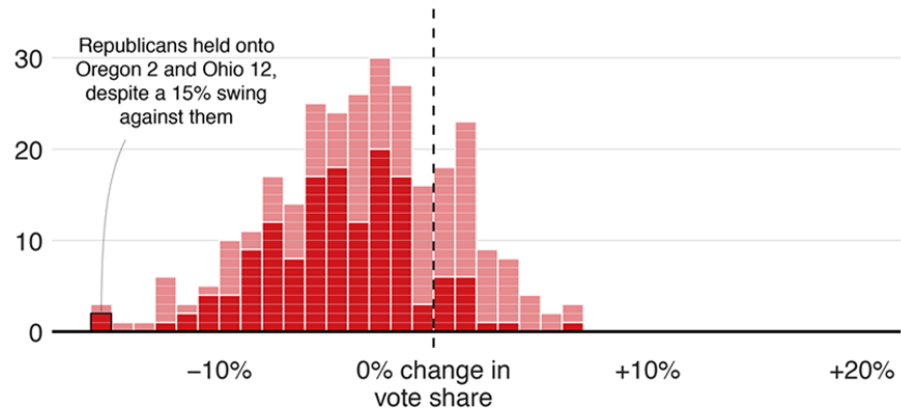
Blue wave

■ Won seat ■ Didn't win

Democrat candidates



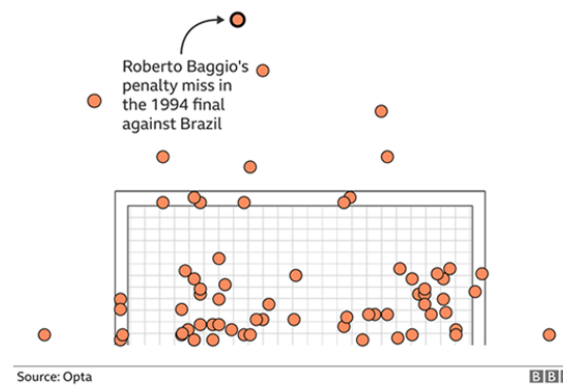
Republican candidates



Source: AP, 19:01 ET

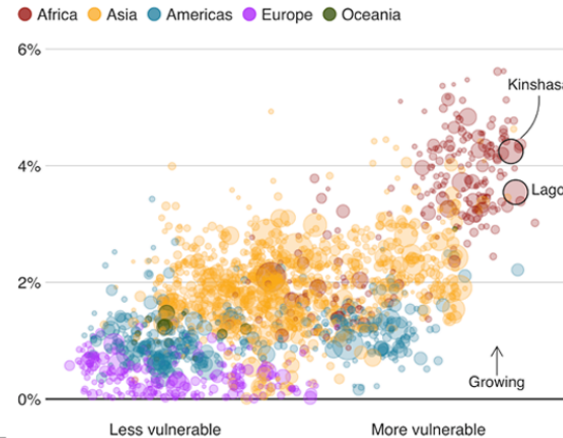
Where penalties are saved

World Cup shootout misses and saves, 1982-2014



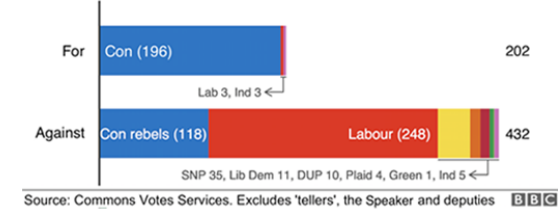
Fast-growing cities face worse climate risks

Population growth 2018-2035 over climate change vulnerability



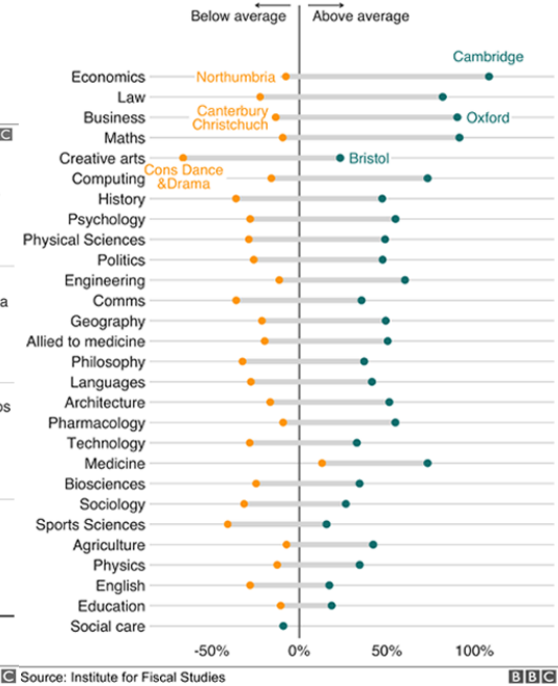
Source: Verisk Maplecroft. Circle size represents current population.

MPs rejected Theresa May's deal by 230 votes



Earnings vary across units even within subjects

Impact on men's earnings relative to the average degree





MULTNOMAH

Total population
778,193

Rural population
1%

Net migration, 2010-2016
(per 1,000 population)

41

Federally Recognized Tribes



Median income

Multnomah	\$57,449
Oregon	\$53,270

Total land area
466 mi²
Public land
36%



MEDIAN INCOME

Definition: The household income value at which 50% of households in the county earn less and 50% earn more.

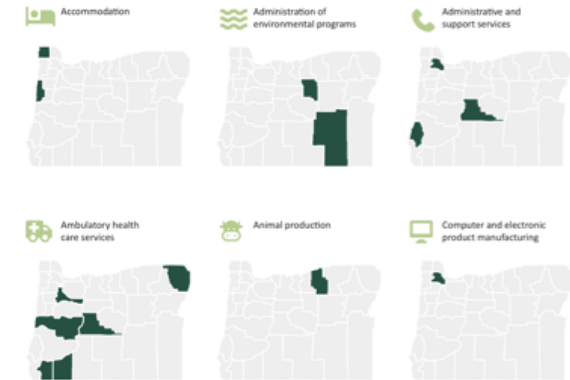
Median household income in this report provides a measure of the typical or "middle" income level in a county as well as the overall economic wellbeing for residents. One key drawback is that this measure treats all households equally regardless of the number of people in the household. The size of the household has a big impact on how the income is distributed to individuals. Nonetheless, median household income remains a broadly used measure. It is useful in tracking income growth, which is associated with the ability of residents to meet their needs, and comparing economic conditions across counties.

Rank	County	Amount
1	Washington	\$69,743
2	Clackamas	\$68,915
3	Multnomah	\$57,449
4	Hood River	\$56,581
5	Columbia	\$55,146
6	Yamhill	\$54,951
7	Morrow	\$54,441
8	Deschutes	\$54,211
9	Polk	\$54,010
	Oregon	\$53,270
10	Benton	\$52,015
11	Marion	\$50,775
12	Umatilla	\$49,287
13	Clatsop	\$47,492
14	Jefferson	\$47,063
15	Wasco	\$46,814
16	Linn	\$46,782
17	Jackson	\$46,343
18	Union	\$45,564
19	Lane	\$45,222
20	Tillamook	\$43,777
21	Wallowa	\$42,349
22	Douglas	\$42,052
23	Klamath	\$41,951
24	Baker	\$41,722
25	Sherman	\$41,389
26	Lincoln	\$41,303
27	Gilliam	\$40,556
28	Grant	\$40,193
29	Crook	\$39,583
30	Coos	\$39,110
31	Curry	\$38,661
32	Harney	\$38,431
33	Josephine	\$37,867
34	Malheur	\$34,720
35	Lake	\$33,453
36	Wheeler	\$33,400

TOP EMPLOYMENT INDUSTRIES

Definition: The three industries with the greatest number of employees in each county, using the 3-digit North American Industry Classification System (NAICS) codes.

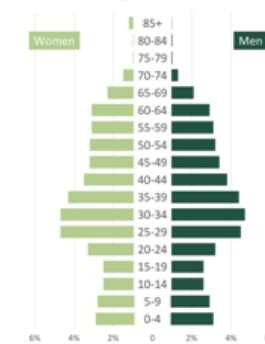
Identifying the top three employment industries in each county provides insight about the structure of the local economy. Employment industries have different average wage levels, so the top three figure prominently in determining the total wage earnings of a county. Examining this indicator across the state and between counties suggests notable employment trends and could point to policy opportunities. (Note: Each county profile shows the top three employment industries in ranked order from left to right.)



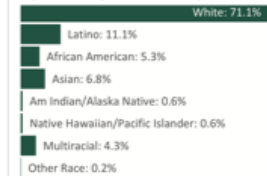
Source: US Census Bureau, American Community Survey, Table B19013, 2012-2016, 5-year estimates updated annually. Released 2017.

Source: State of Oregon Employment Department, Economic Data 2016, updated annually. Released 2017.

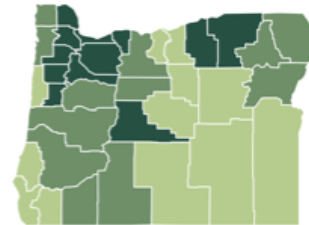
Population by age



Population by race/ethnicity



Top employment industries

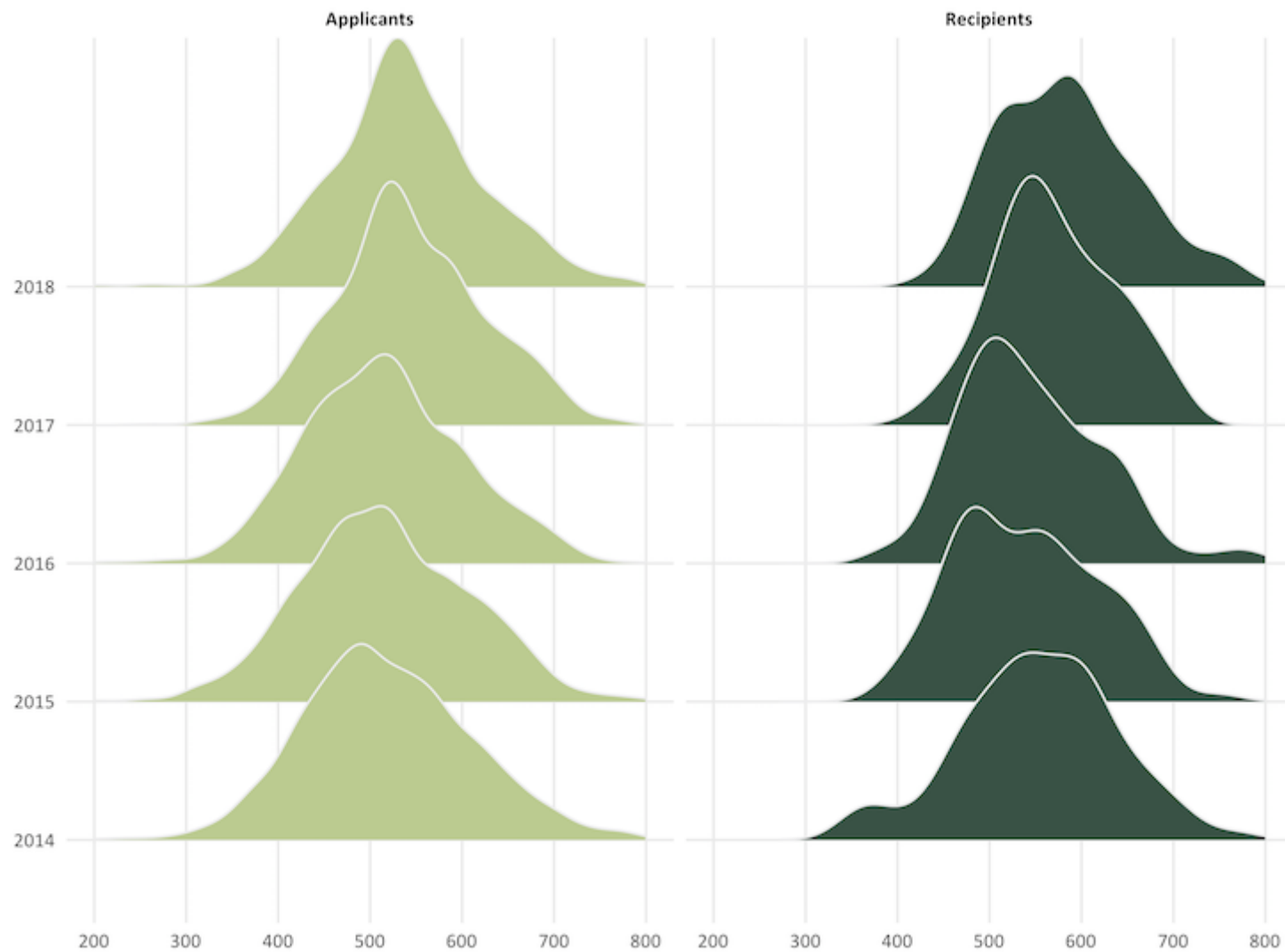


Top third Middle third Bottom third

Oregon by the Numbers
66

Oregon by the Numbers
98

Oregon by the Numbers
106





Unique Reporting Possibilities



Early Learning Programs

Capacity

1 900

Regulation Status

Registered, Certified, Exempt, Recorder ▾

Facility Location

☒ Home-Based ☒ Center-Based

Spark Rating

☒ C2Q ☒ 3 ☒ 4 ☒ 5 ☒ No Rating

Also Show

☒ Accepts DHS

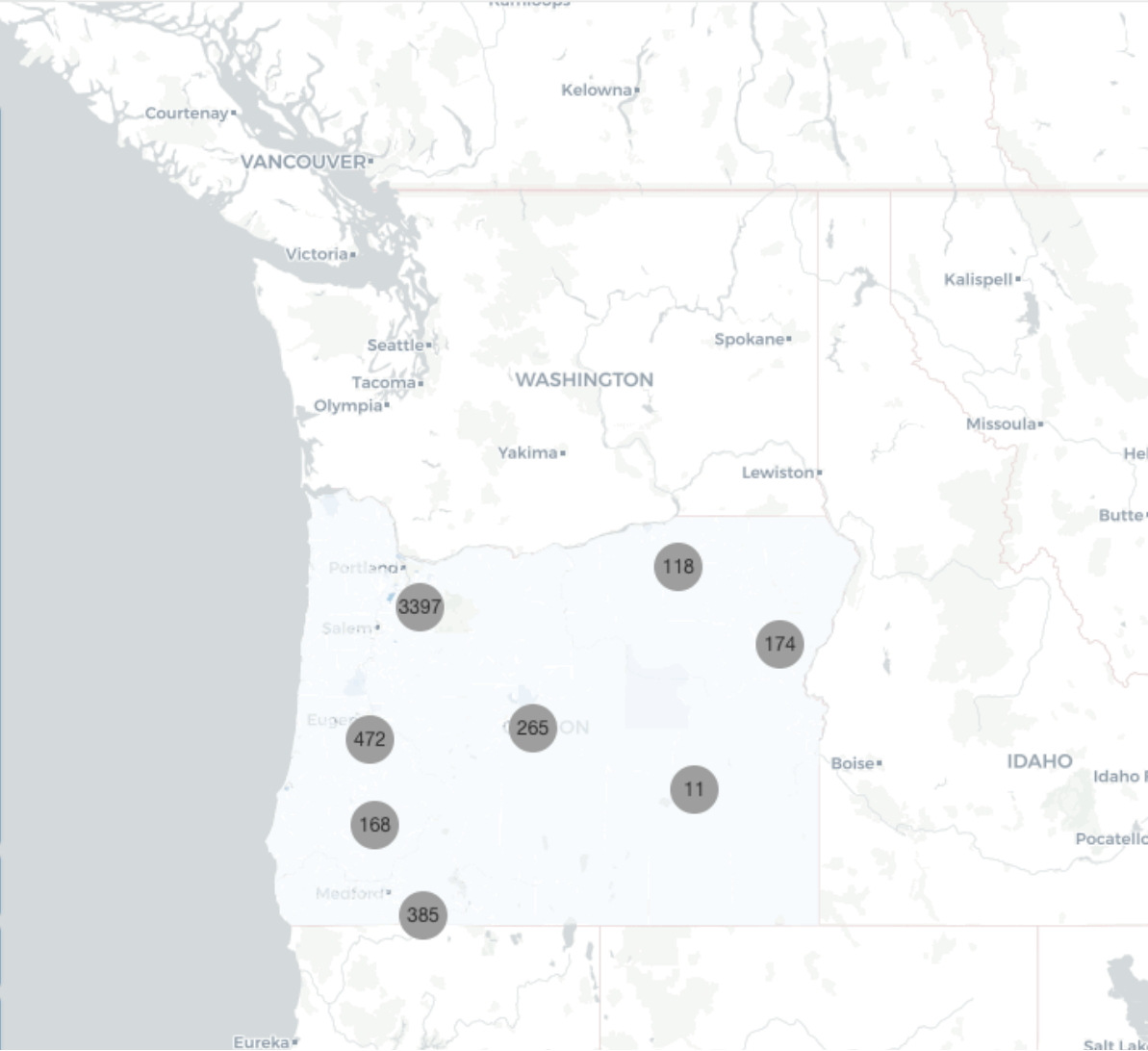
☒ Head Start

☒ Relief Nursery

Systems

Schools

Communities





R's Killer Feature: RMarkdown



Analysis



Visualization



Reporting



RMarkdown

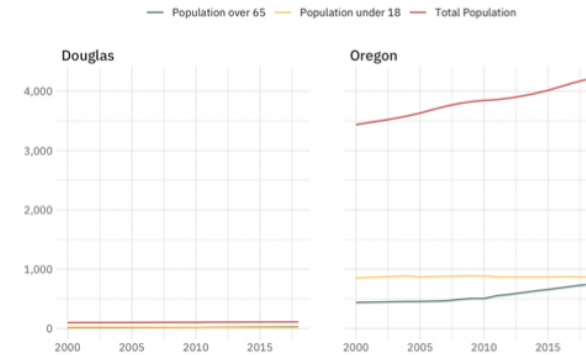
```
77 # Population
78 The populations of Douglas County and Oregon are shown below.
79
80 ```{r}
81 population <- read_excel("data/dc-data.xlsx",
82                           sheet = "Population") %>%
83   clean_names() %>%
84   gather("geography", "number", -c(indicator, year)) %>%
85   mutate(number = number / 1000) %>%
86   dk_replace_dc() %>%
87   mutate(group = paste(indicator, geography))
88
89 ggplot(population, aes(year, number,
90                         group = indicator,
91                         color = indicator)) +
92   geom_line() +
93   facet_wrap(~geography) +
94   scale_y_continuous(labels = comma_format()) +
95   dk_remove_color_title +
96   dk_set_colors
97
98 ```
99
100
```



RMarkdown

Population

The populations of Douglas County and Oregon are shown below.



Word



*[A] If the work is done up front and then for every session ... **I only need to spend 15 minutes generating the report and sending it to them.***

[Using R for Immediate Reporting in Evaluation by Dana Wanzer](#)



R Familiarity Survey



The Best Reason to Learn R



Eileen Parkes
@eileen_parkes

Follow

▼

Today I downloaded "R" 🤔
Can a 37 year old mother of two learn to code?
Watch this space...

9:00 AM - 8 May 2019

262 Retweets 5,830 Likes



💬 555

↻ 262

📄

❤️ 5.8K

✉️

🔒





Questions?



Start Your R Journey



Materials

All **materials** from this webinar will be posted at
<https://rfortherestofus.com/presentation/vancouver/>



Introduction to R Workshop

VANCOUVER // DECEMBER 3



More info at rfortherestofus.com/vancouver/



joe wertz ✓
@joewertz



Had a great small workshop on [#rstats](#) this week with [@dgkeyes](#). If you want sharp, patient [#data](#) instruction you'll actually use/retain, I highly recommend [@rfortherest](#). He's on the road a bunch, so he's probably coming to a city near you ->



Workshops - R for the Rest of Us

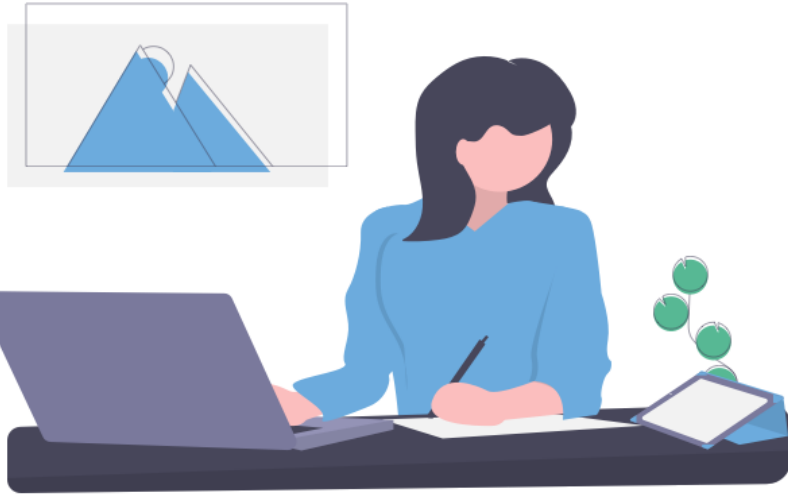
What You'll Learn My Introduction to R workshops will take you from from "I've heard of R" to "Wow, I can use R!" They are a live ...

[rfortherestofus.com](#)

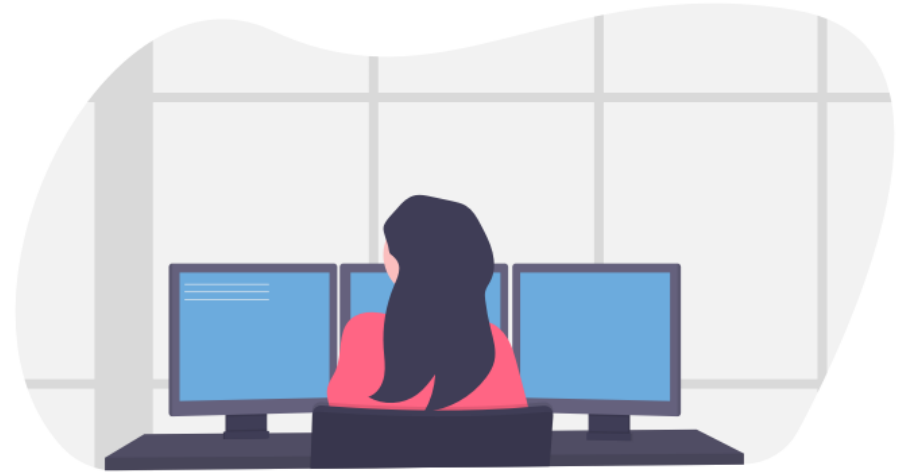
6:54 AM · Oct 23, 2019 · [Twitter Web Client](#)



Online Courses



Getting Started with R



Fundamentals of R



✉ david@rfortherestofus.com

🐦 [dgkeyes](https://twitter.com/dgkeyes)

🐦 [rfortherest](https://twitter.com/rfortherest)