

R Resources

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Key Readings

- **MAD – Data Analysis & Biostatistics in R** by Prof. Hunter
 - A text on the subject of the course in preparation
 - Will provide more detail of what I cover in classes {MAD - Materia de Analise de Dados}
- Statistics texts
 - Diez, Barr & Cetinkaya-Rundel, **OpenIntro Statistics 4**
 - Navarro, D. **Learning statistics with R: A tutorial for psychology students and other beginners**
- Basic R Books
 - Wickham & Grolemund, **R for Data Science**
 - Ismay & Kim, **Statistical Inference via Data Science: A modern dive into R and the Tidyverse**
 - Irietary, **Introduction to Data Science**

RStudio Cheat Sheets

- Series of 1 and 2 page summaries for a number of key packages of R functions
- <https://www.rstudio.com/resources/cheatsheets/>

rmarkdown :: CHEAT SHEET

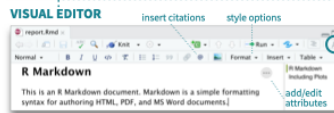
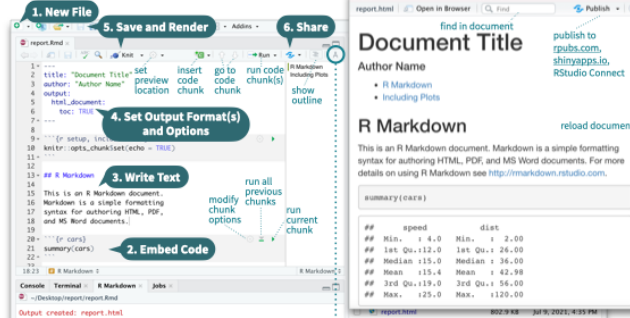
What is rmarkdown?

- .Rmd files** - Develop your code and ideas side-by-side in a single document. Run code as individual chunks or as an entire document.
- Dynamic Documents** - Knit together plots, tables, and results with narrative text. Render to a variety of formats like HTML, PDF, MS Word, or MS PowerPoint.
- Reproducible Research** - Upload, link to, or attach your report to share. Anyone can read or run your code to reproduce your work.

Workflow

1. Open a new .Rmd file in the RStudio IDE by going to **File > New File > R Markdown**.
2. **Embed code** in chunks. Run code by line, by chunk, or all at once.
3. **Write text** and add tables, figures, images, and citations. Format with Markdown syntax or the RStudio Visual Markdown Editor.
4. **Set output format(s) and options** in the YAML header. Customize themes or add parameters to execute or add interactivity with Shiny.
5. **Save and render** the whole document. Knit periodically to preview your work as you write.
6. **Share your work!**

SOURCE EDITOR



Embed Code with knitr

CODE CHUNKS

Surround code chunks with ````r` and ````` or use the Insert Code Chunk button. Add a chunk label and/or chunk options inside the curly braces after `r`.

```
```r chunk-label, include=FALSE)
summary(mtcars)
```
```

SET GLOBAL OPTIONS

Set options for the entire document in the first chunk.

```
```r include=FALSE)
knitr::opts_chunk$set(message = FALSE)
```
```

INLINE CODE

Insert ````r <code>` into text sections. Code is evaluated at render and results appear as text.

*Built with ````r getRversion()```` -> "Built with 4.1.0"

| OPTION | DEFAULT | EFFECTS |
|------------------------|-----------|---|
| echo | TRUE | display code in output document |
| error | FALSE | TRUE (display error messages in doc) FALSE (stop render when error occurs) |
| eval | TRUE | run code in chunk |
| include | TRUE | include chunk in doc after running |
| message | TRUE | display code messages in document |
| warning | TRUE | display code warnings in document |
| results | "markup" | "asis" (passthrough results) "hide" (don't display results) "hold" (put all results below all code) |
| fig.align | "default" | "left", "right", or "center" |
| fig.alt | NULL | alt text for a figure |
| fig.cap | NULL | figure caption as a character string |
| fig.path | "figure" | prefix for generating figure file paths |
| fig.width & fig.height | 7 | plot dimensions in inches |
| out.width | NULL | rescales output width, e.g. "75%", "300px" |
| collapse | FALSE | collapse all sources & output into a single block |
| comment | "##" | prefix for each line of results |
| child | NULL | files(s) to knit and then include |
| purrr | TRUE | include or exclude a code chunk when extracting source code with <code>knitr::purl()</code> |

See more options and defaults by running `str(knitr::opts_chunk$get())`

Write with Markdown

The syntax on the left renders as the output on the right.

Plain text.
End a line with two spaces to start a new paragraph.
Also end with a backslash to make a new line.
italics and **bold**
superscript²/subscript₂
~strikethrough~
escaped: \"_\" \\ endash: --, emdash: ---

Header 1
Header 2
Header 3
Header 4
Header 5
Header 6

unordered list
- item 1
- item 2a (indent 1 tab)
- item 2b
1. ordered list
2. item 2
- item 2a (indent 1 tab)
- item 2b

Insert Citations

Create citations from a bibliography file, a Zotero library, or from DOI references.

BUILD YOUR BIBLIOGRAPHY

Use BibTeX or CSL bibliographies to the YAML header.

```
---
title: "My Document"
bibliography: references.bib
link-citations: TRUE
---
```

If Zotero is installed locally, your main library will automatically be available.

Add citations by DOI by searching "from DOI" in the Insert Citation dialog.

INSERT CITATIONS

Access the Insert Citations dialog in the Visual Editor by clicking the @ symbol in the toolbar or by clicking Insert > Citation.

Add citations with markdown syntax by typing `[@cite]` or `@cite`.

Insert Tables

Output data frames as tables using `kable(data, caption)`.

```
```r
data <- faithful[1:4,]
knitr::kable(data,
 caption = "Table with kable")
```
```

Other table packages include `flextable`, `gt`, and `kableExtra`.

`<link url>`
[This is a link](link url)
[This is another link](d).
At the end of the document:
[id]: link url
If(Caption)[image.png]
or (Caption)[id]
At the end of the document:
[id]: image.png
"verbatim code"
...
multiple lines of verbatim code
> block quotes

equation: $S_e \sqrt{1/p} + 1 = 0.5$
equation block:
$$E = mc^2$$

horizontal rule: ---
Right Left Default Center
12 12 12 12
123 123 123 123
1 1 1 1

HTML Tabsets
Results (tabset)
Plots text
Tables more text

Results
Plots Tables
text

Online Courses

- edX - Harvard courses on R in data science taught by Irizzary
- Coursera - Johns Hopkins courses on R and R in biomedical applications
- Utrecht University (Netherlands) - Introduction to R and data
- Coursera - Duke University - sequence of R courses by Cetinkaya-Rundel

All excellent

Sites about R

- R Bloggers (<https://www.r-bloggers.com/>)
- Tidyverse (<https://www.tidyverse.org/learn/>)
- Stack Overflow (<https://stackoverflow.com/questions/tagged/r>)
- Twitter (#rstats)

R and RStudio Help Systems

- Very complete
- Every function (command) has a help screen
- Written by geeks for geeks
 - Explanations sometimes opaque
 - Especially error messages
- Last resort: copy error message and Google it
 - Someone, somewhere has not understood the same thing that troubles you