






Intro to Rmarkdown

Ronny A. Hernández Mora.

 [@RonnyHdezM](https://twitter.com/RonnyHdezM)
 [ronnyhdez](https://github.com/ronnyhdez)
 <http://ronnyale.com/>

What problems solves?



Your final report as
a result of your
data analysis

Pablo



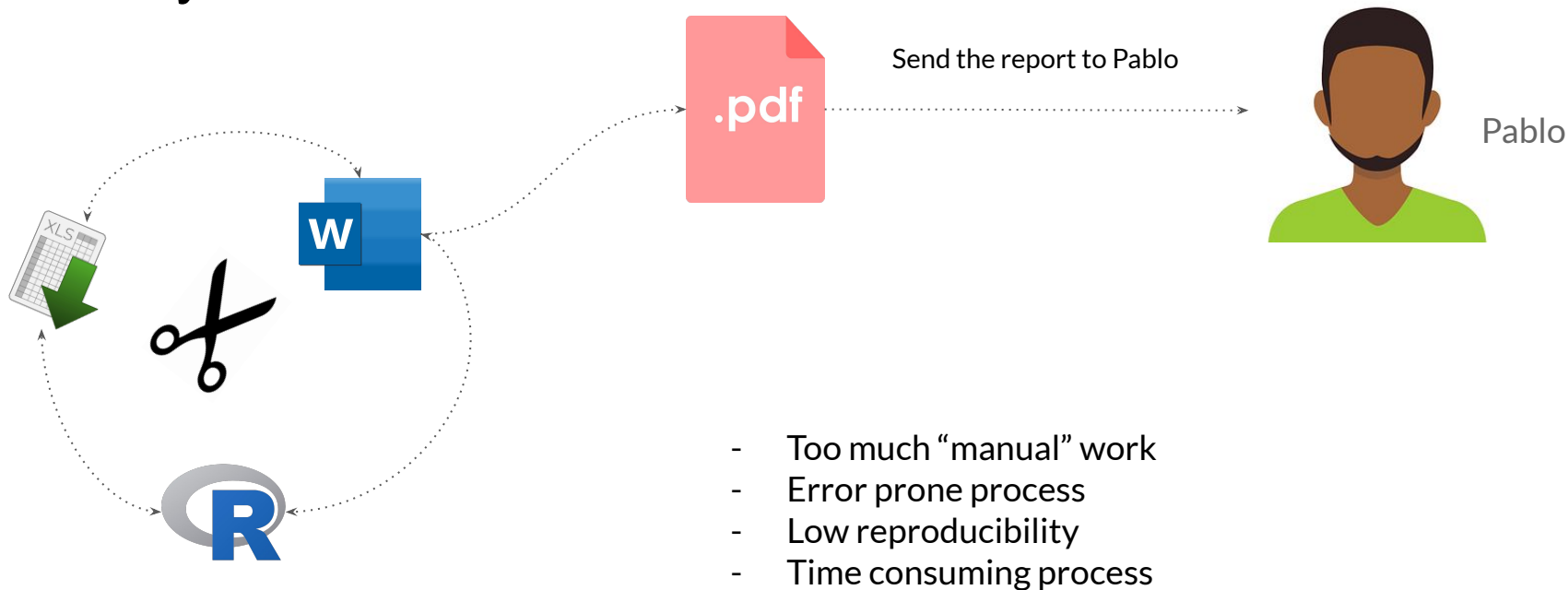
Needs the findings in the report (results, figures, tables, discussion) but he **does not care about the code** used to run the analysis

Marcela

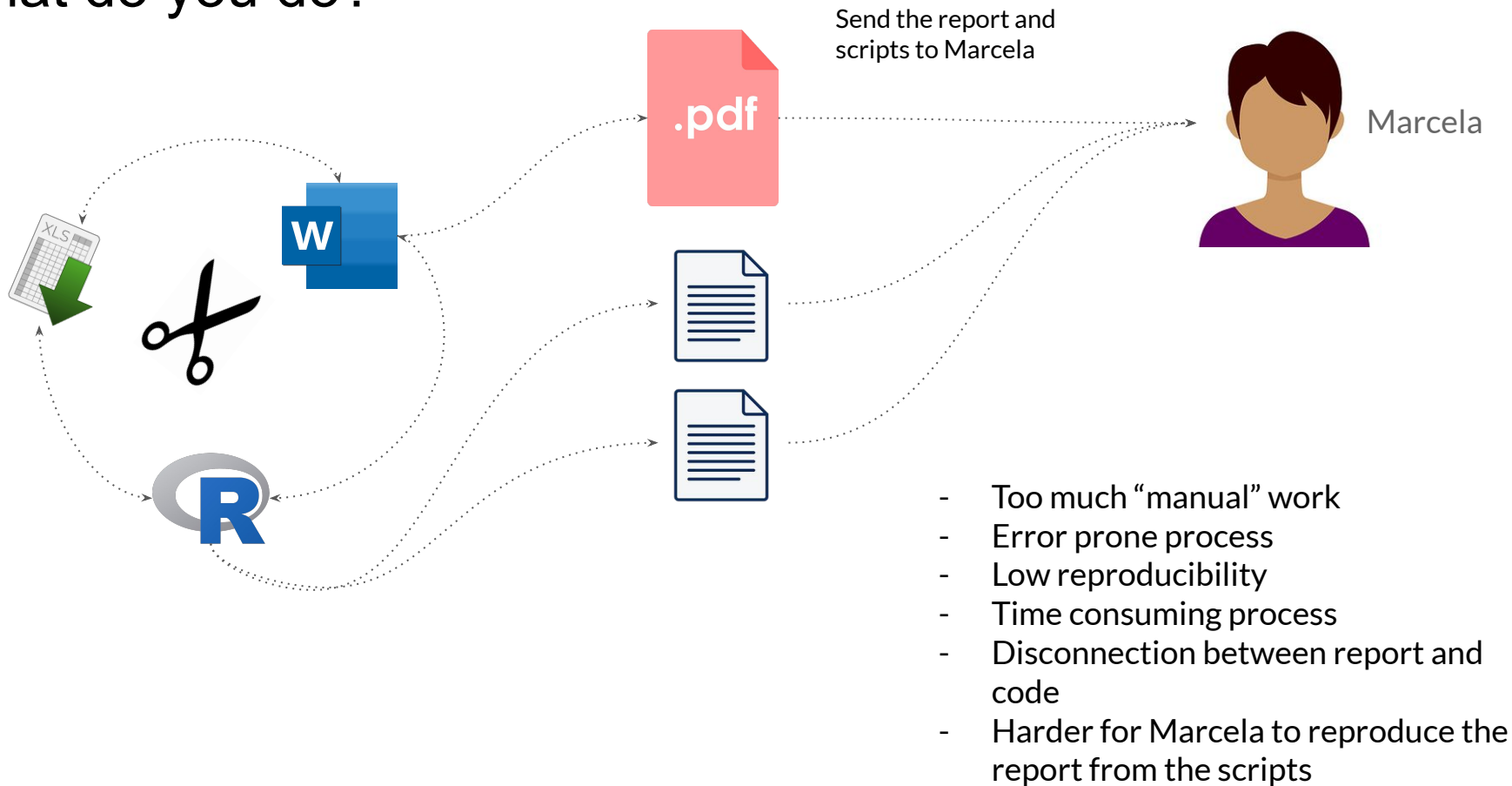


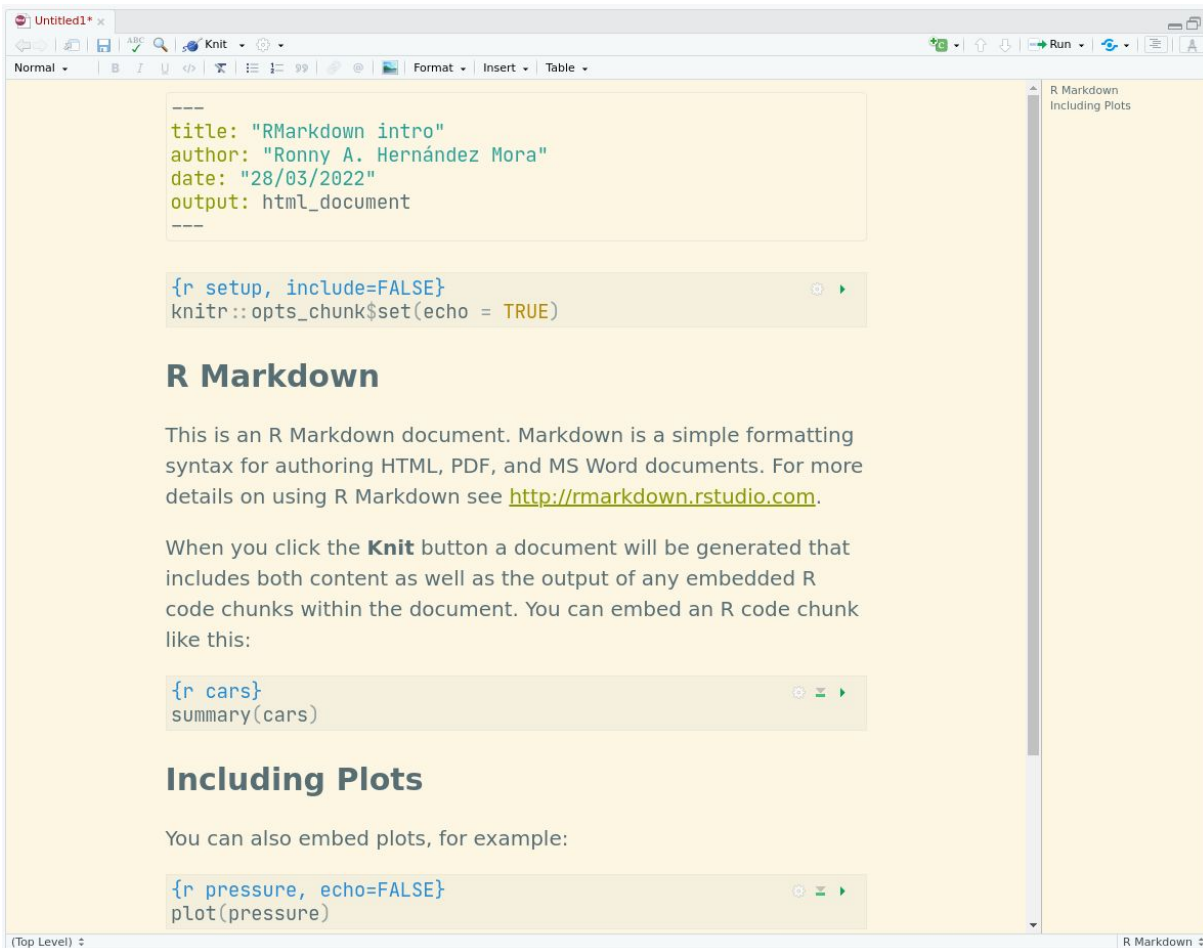
Needs the findings in the report (results, figures, tables, discussion) and also **the code** used to run the analysis

What do you do?



What do you do?





```
---
title: "RMarkdown intro"
author: "Ronny A. Hernández Mora"
date: "28/03/2022"
output: html_document
---
```

```
{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
{r cars}
summary(cars)
```

Including Plots

You can also embed plots, for example:

```
{r pressure, echo=FALSE}
plot(pressure)
```



R Markdown was designed for easier reproducibility, since both the **computing code and narratives are in the same document**, and **results are automatically generated from the source code**. R Markdown supports dozens of static and dynamic/interactive output formats

nature > technology features > article

TECHNOLOGY FEATURE | 28 February 2022

Cut the tyranny of copy-and-paste with these coding tools

'Executable manuscripts' insert results directly into documents, eliminating common mistakes.

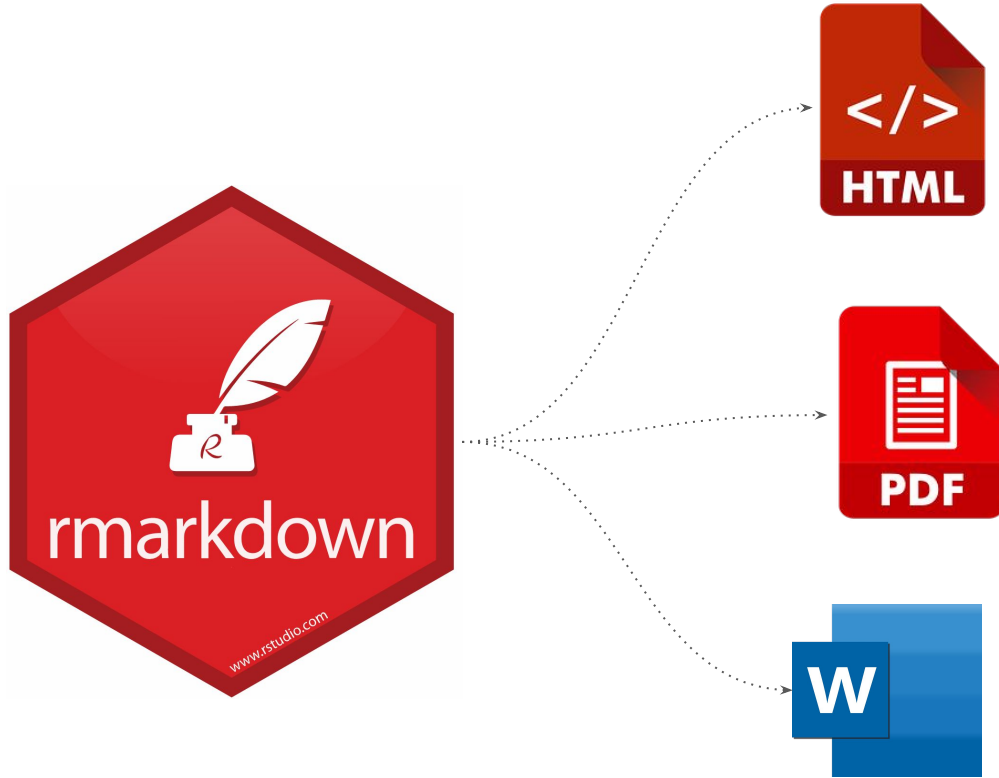
Jeffrey M. Perkel



Illustration by The Project Twins

Björn Peare Bartholdy, a bioarchaeologist at Leiden University in the Netherlands, used that approach when preparing a preprint he posted on bioRxiv last October ([B. P. Bartholdy and A. G. Henry Preprint at bioRxiv https://doi.org/hf5d](https://doi.org/hf5d); 2021). As he wrote up his findings on what starch granules in dental calculus can tell us about diet, Bartholdy **realized that he had made a mistake in extrapolating the final counts.** “All of the numbers changed,” he says. **But because those values were computed in R Markdown, it took him all of two minutes to correct his work.** “I don’t know how much time that would have saved,” he adds.

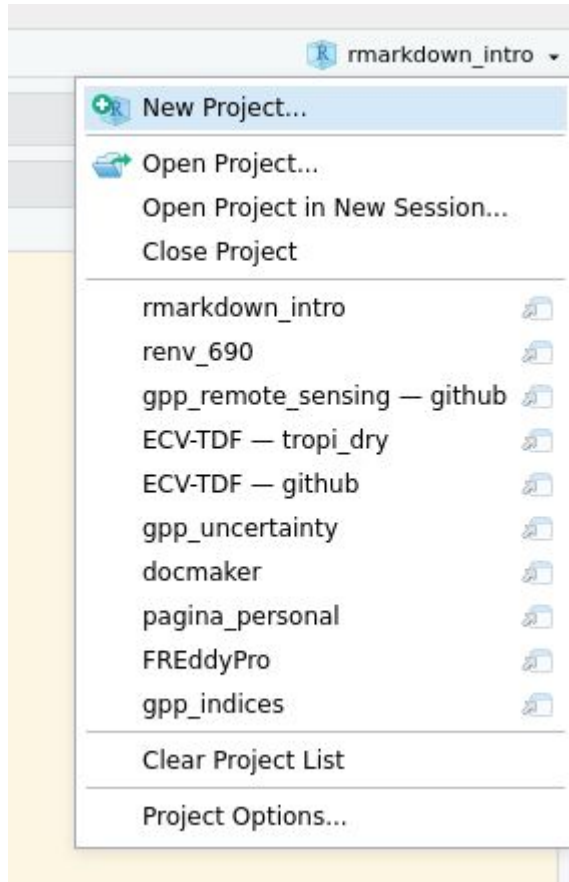
<https://www.nature.com/articles/d41586-022-00563-z>



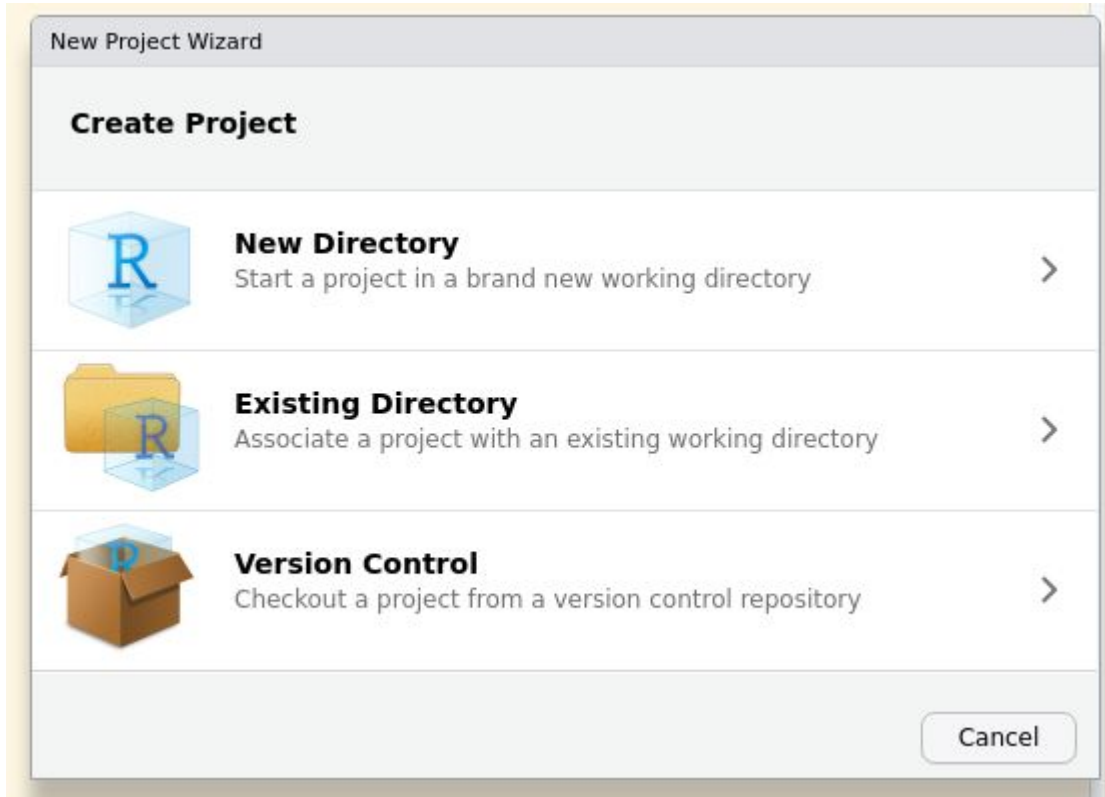
From the same .Rmd file, you can have different output files.



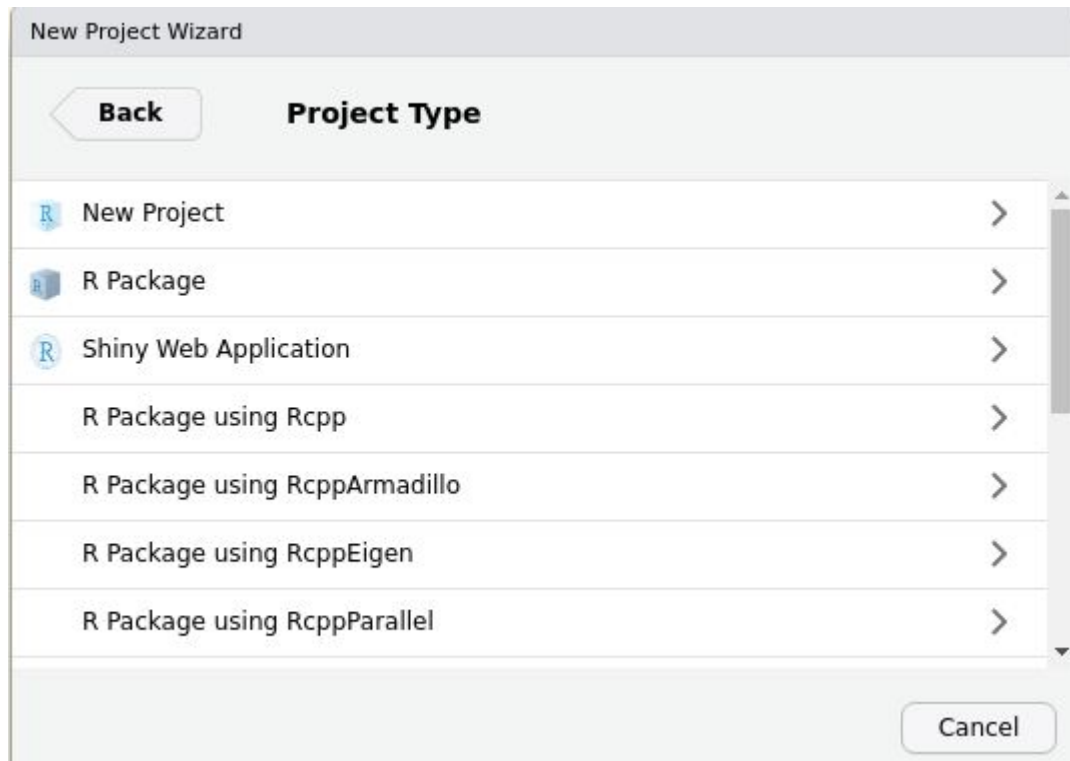
Let's get started!



1. Open a New Project in RStudio




2. Select New Directory



3. Select New Project

New Project Wizard

Back **Create New Project**



Directory name:

Create project as subdirectory of:

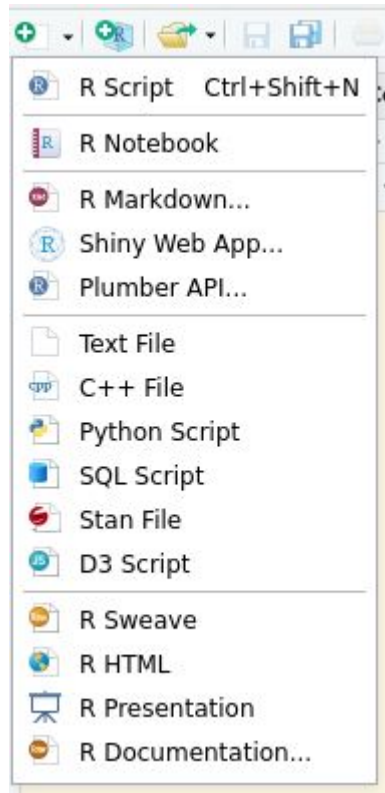
☐ Create a git repository

☐ Use renv with this project

☐ Open in new session


Create Project **Cancel**


4. Create a name for the directory and select where is going to be saved.





5. New File > R Markdown

New R Markdown

 Document

 Presentation

 Shiny

 From Template

Title:

Author:

Default Output Format:

☒ HTML
Recommended format for authoring (you can switch to PDF or Word output anytime).

☐ PDF
PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+ on OS X, TeX Live 2013+ on Linux).

☐ Word
Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux).

Create Empty Document

OK Cancel

6. Create the main title of your report and the author and click OK.

This is going to create a template file.

What are the main sections in a RMarkdown file?

```
1- ----
2- title: "My report"
3- author: "Ronny A. Hernández Mora"
4- date: "28/03/2022"
5- output: html_document
6- ----
7-
8- ```{r setup, include=FALSE}
9- knitr::opts_chunk$set(echo = TRUE)
10- ```
11-
12- ## R Markdown
13-
14- This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and
15- MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
16-
17- When you click the Knit button a document will be generated that includes both content as well
18- as the output of any embedded R code chunks within the document. You can embed an R code chunk like
19- this:
20-
21- ```{r cars}
22- summary(cars)
23- ```
24-
25- ## Including Plots
26-
27- You can also embed plots, for example:
28-
29- ```{r pressure, echo=FALSE}
30- plot(pressure)
31- ```
32-
33- Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R
34- code that generated the plot.
```

YAML section. These are configuration options

This is **text** with markdown

This is a **chunk**. All code that we want to execute should be inside a chunk.

To create a chunk, there is a shortcut: **ctrl + alt + i**

YAML section

```
1 ---
2 title: "My report"
3 author: "Ronny A. Hernández Mora"
4 date: "28/03/2022"
5 output: html_document
6 ---
```

```
1 ---
2 title: "baby_names_setup"
3 author: "Ronny A. Hernández Mora"
4 date: "28/03/2022"
5 always_allow_html: yes
6 output:
7   html_document:
8     code_folding: hide
9     self_contained: true
10    number_sections: no
11    theme: spacelab
12    toc: yes
13    toc_float:
14      collapsed: false
15 editor_options:
16   chunk_output_type: console
17 ---
```

This has to be between the "---"

Indent sensitive

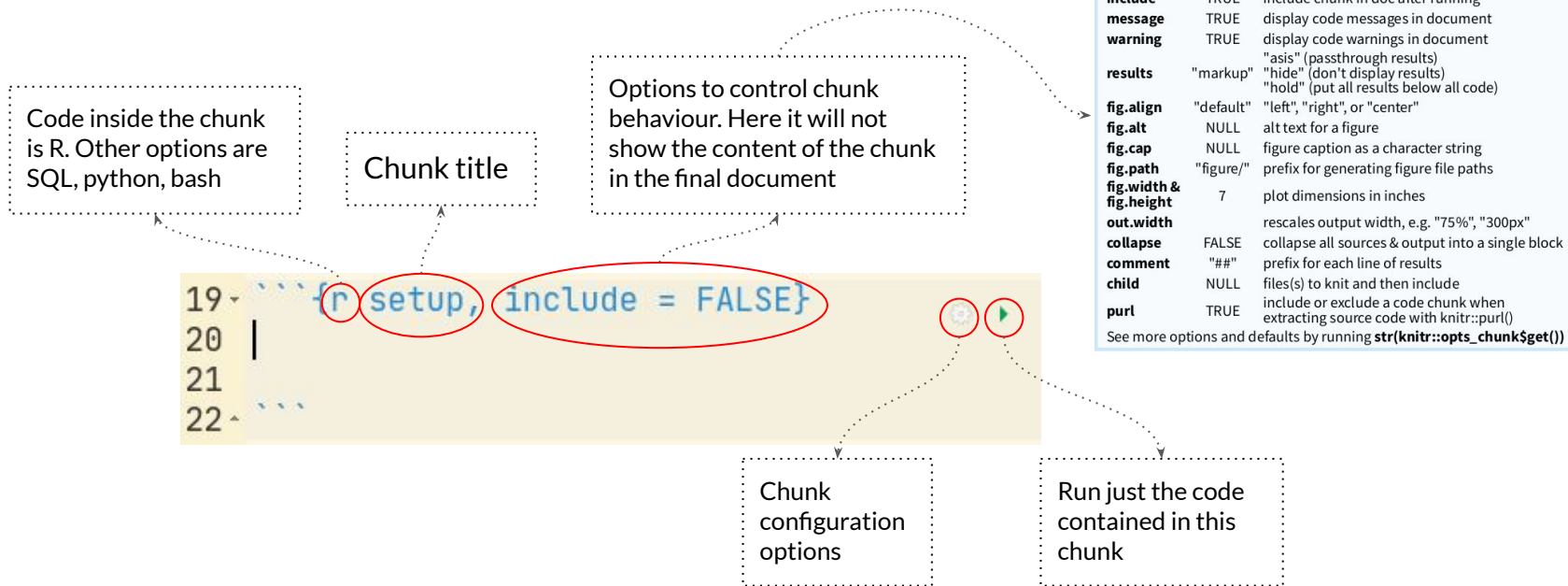
Here goes the render configuration of your file. In this example, it has:

- Information (title, author, date)
- Output file indication: a HTML document (if you want a pdf, you should change this to pdf_document)

This example have more configuration options:

- Information (title, author, date)
- Output file indication: a HTML document (if you want a pdf, you should change this to pdf_document)
- Code_folding: code is going to be hidden behind a button.
- self_contained: figures files are not going to be stored as different files.
- number_sections: titles and subtitles are sections and will have sequential numbers
- toc: table of contents
- toc_float: table of contents is going to move while you view the final document
- collapsed: At first, just main titles are shown.
- Editor_options: While you are working in the file, you want the output such as figures to be shown in the viewer panel

Code chunks



Markdown syntax

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****

superscript^{^2^}/subscript_{~2~}

~~strikethrough~~

escaped: * _ \\

endash: --, emdash: ---

Header 1

Header 2

...

Header 6

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 6

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

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

<link url>

[This is a link.](link url)

[This is another link]([id]).

At the end of the document:
[id]: link url

!([Caption])(image.png)
or !([Caption])([id2])

At the end of the document:
[id2]: image.png

`verbatim code`
...

multiple lines
of verbatim code
...

> block quotes

equation:
$$e^{i\pi} + 1 = 0$$

equation block:
$$E = mc^2$$

horizontal rule:

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

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

<http://www.rstudio.com/>

This is a link.

This is another link.



Caption.

verbatim code

multiple lines
of verbatim code

block quotes

equation:
$$e^{i\pi} + 1 = 0$$

equation block:
$$E = mc^2$$

horizontal rule:

RStudio RMarkdown cheat sheet

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!**

Embed Code with knitr

CODE CHUNKS

Source code chunks with `'''` 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)
'''
```

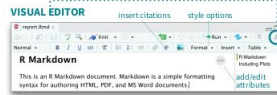
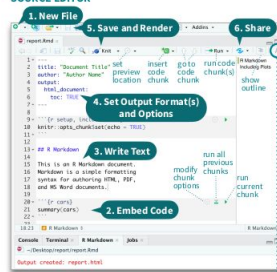
INLINE CODE

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

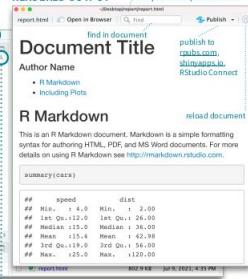
"Built with `"r getRversion()"` > "Built with 4.1.0"



SOURCE EDITOR



RENDERED OUTPUT



Insert Citations

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

BUILD YOUR BIBLIOGRAPHY

- Add 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**.

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.
"fancy" and "bold"
superscript
subscript
italicized
escaped: `"`, `\`
endash: `--`, emdash: `---`

Header 1
Header 2
Header 3
Header 4
Header 5
Header 6
- unordered list
- item 1
- item 2 (indented 1 tab)
- item 3
1. ordered list
2. item 1
- item 2 (indented 1 tab)
- item 3

Code
This is a link [link url]
This is another link [id]
At the end of the document:
[id] link url
(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: $E = mc^2$
equation block:
$$E = mc^2$$

horizontal rule

HTML Tables
Results (Tableset)
Plot
Text
Tables
more text

Results
Plots
Tables
text



Now that you know the basics of RMarkdown:



Write your thesis
with RMarkdown

[https://github.com/
ismayc/thesisdown](https://github.com/ismayc/thesisdown)



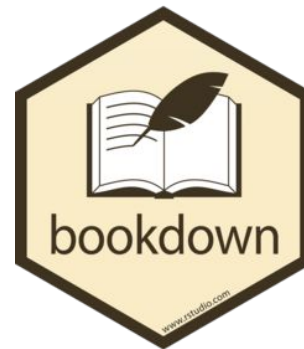
Create your website

[https://bookdown.org/
yihui/blogdown/](https://bookdown.org/yihui/blogdown/)



Show your results in a
dashboard

[https://pkgs.rstudio.co
m/flexdashboard/](https://pkgs.rstudio.com/flexdashboard/)



Write and publish a
book

[https://pkgs.rstudio.co
m/bookdown/](https://pkgs.rstudio.com/bookdown/)



Supplementary text

The R Series

R Markdown

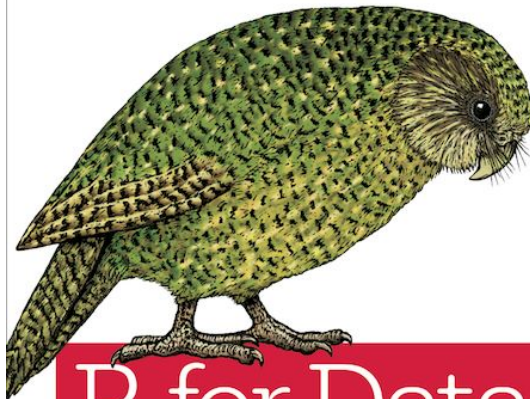
The Definitive Guide



Yihui Xie
J. J. Allaire
Garrett Grolemund

 CRC Press
Taylor & Francis Group
A CHAPMAN & HALL BOOK

O'REILLY®



R for Data Science

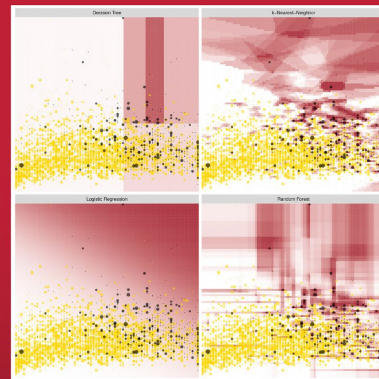
VISUALIZE, MODEL, TRANSFORM, TIDY, AND IMPORT DATA

Hadley Wickham &
Garrett Grolemund

Texts in Statistical Science

Modern Data Science with R

Second Edition



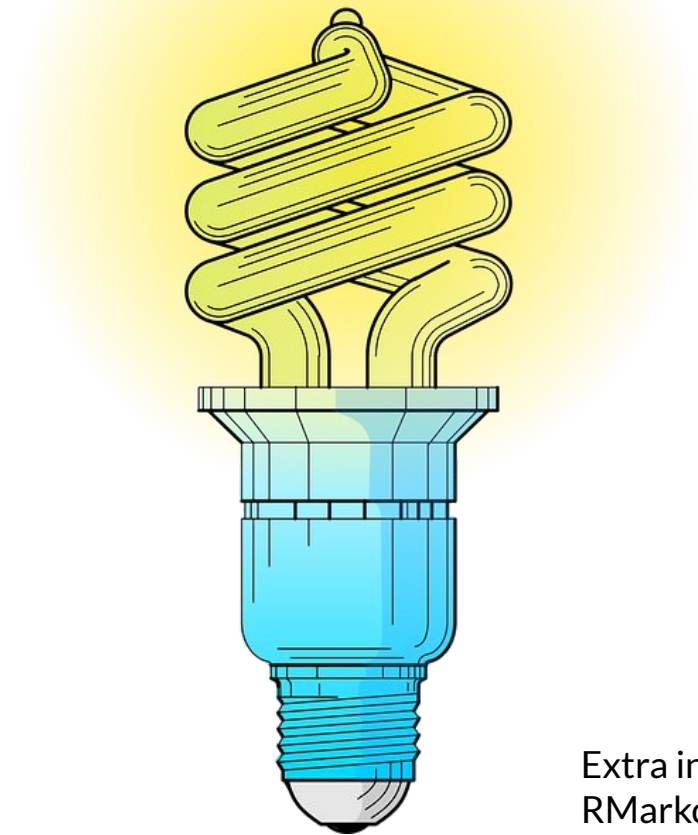
Benjamin S. Baumer
Daniel T. Kaplan
Nicholas J. Horton

 CRC Press
Taylor & Francis Group
A CHAPMAN & HALL BOOK

<https://bookdown.org/yihui/rmarkdown/>

<https://es.r4ds.hadley.nz/>

<https://es.r4ds.hadley.nz/>



Extra information about where the
RMarkdown idea comes from

Where this idea comes from?

Text using Markdown syntax	Corresponding HTML produced by a Markdown processor	Text viewed in a browser
<p>Heading</p> <p>Sub-heading</p> <p>Paragraphs are separated by a blank line.</p> <p>Two spaces at the end of a line produce a line break.</p>	<pre><h1>Heading</h1> <h2>Sub-heading</h2> <p>Paragraphs are separated by a blank line.</p> <p>Two spaces at the end of a line
 produce a line break.</p></pre>	<p>Heading</p> <p>Sub-heading</p> <p>Paragraphs are separated by a blank line.</p> <p>Two spaces at the end of a line produce a line break.</p>
<p>Text attributes <i>italic</i>, bold, <code>monospace</code>. Some implementations may use <i>single-asterisks</i> for italic text.</p> <p>Horizontal rule:</p> <p>---</p> <p>Strikethrough:</p> <p>strikethrough</p>	<pre><p>Text attributes italic, bold, <code>monospace</code>. Some implementations may use <i>single-asterisks</i> for italic text.</p> <p>Horizontal rule:</p> <hr /> <p>Strikethrough:</p> strikethrough</pre>	<p>Text attributes <i>italic</i>, bold, <code>monospace</code>. Some implementations may use <i>single-asterisks</i> for italic text.</p> <p>Horizontal rule:</p> <p>Strikethrough:</p> <p>strikethrough</p>
<p>Bullet list:</p> <ul style="list-style-type: none">* apples* oranges* pears <p>Numbered list:</p> <ol style="list-style-type: none">1. lather2. rinse3. repeat	<pre><p>Bullet list:</p> apples oranges pears <p>Numbered list:</p> lather rinse repeat </pre>	<p>Bullet list:</p> <ul style="list-style-type: none">• apples• oranges• pears <p>Numbered list:</p> <ol style="list-style-type: none">1. lather2. rinse3. repeat

Taken from: <https://en.wikipedia.org/wiki/Markdown>



Aaron Swartz

Taken from <https://en.wikipedia.org/wiki/Markdown>



John Gruber

Recommendation: https://www.youtube.com/watch?v=3Q6Fzbgs_Lg



¡Gracias!

Ronny A. Hernández Mora.

 [@RonnyHdezM](https://twitter.com/RonnyHdezM)

 [ronnyhdez](https://www.instagram.com/ronnyhdez)

 <http://ronnyale.com>