

Swiss Institute of  
Bioinformatics

# KnitR

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# Writing reports

- Based on the idea of **literate programming**
- Combine program code and explanation/ documentation in same document (Donald Knuth, 1984)
- Documents in which the information is always up-to-date
- Writing report step by step while processing the data, in the same file
- Integrate your results in a report: *write the R code directly with the text, and later integrate the results directly into the text.*

# Knitr <http://yihui.name/knitr/>

[Home](#)[Objects](#)[Options](#)[Hooks](#)[Patterns](#)[Demos](#)

## knitr

Elegant, flexible and fast dynamic report generation with R



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### Overview

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The knitr package was designed to be a transparent engine for dynamic report generation with R, solve some long-standing problems in Sweave, and combine features in other add-on packages into one package (knitr = Sweave + cacheSweave + pgfSweave + weaver + animation::saveLatex + R2HTML::RweaveHTML + highlight::HighlightWeaveLatex + 0.2 \* brew + 0.1 \* SweaveListingUtils + more).

# Why it is relevant

- all-in-one: analysis, documenting, formatting, reporting
- no annoying and error-prone copy-pasting
- modifying input data or code: changes are directly reflected in report
- easy to display underlying code in report when needed
- split code in chunks, but can still access all previously defined variables (single R session)
- flexible: code externalization, child documents, caching,...

# In R

- R Studio provides most of what is needed to use `knitr`, starting with the `knitr` R package
- In order to create PDFs, a TeX distribution may be required (eg TeX Live).

# Documentation and references

- Knitr website: <http://yihui.name/knitr/>
- Knitr-examples on github:  
• <https://github.com/yihui/knitr-examples>
- Knitr book:  
• <https://github.com/yihui/knitr-book>
- Example of published documents:  
• <http://rpubs.com>
  
- Book: "R Markdown: The definitive guide"  
• <https://bookdown.org/yihui/rmarkdown/>

# How to write the report ?

- Markdown is a simple plain text format that allows you to specify the layout of a document, and which can easily be converted to different formats afterwards.
- R Markdown combines the core syntax of markdown (easy-to-write plain text format) with embedded R code chunks that are run so their output can be included in the final document.

# Open a new Rmd in R, this gives you the backbones

```
1 ---
2 title: "Untitled"
3 author: "Rachel Marccone"
4 date: '2023-03-30'
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
15 for authoring HTML, PDF, and MS Word documents. For more details on
16 using R Markdown see <http://rmarkdown.rstudio.com>.
17
18 When you click the Knit button a document will be generated that
19 includes both content as well as the output of any embedded R code
20 chunks within the document. You can embed an R code chunk like this:
21
22 ```{r cars}
23 summary(cars)
24 ```
```



# Code is within the `` and plots are possible

- ``` `{r}`
- `summary(cars)`
- ``` ``
- You can also embed plots, for example:
- ``` `{r, echo=FALSE}`
- `plot(cars)`
- ``` ``
- Note that the ``echo = FALSE`` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

# Lists and emphasis

- **Emphasis:** `*italic*`    `**bold**`  
                  `_italic_`    `__bold`
- **Headers**  
# Header 1  
## Header 2  
### Header 3
- **Unordered List:**
  - \* Item 1
  - \* Item 2
    - + Item 2a
    - + Item 2b
- **Ordered list:**
  1. Item 1
  2. Item 2
  3. Item 3
    - + Item 3a
    - + Item 3b

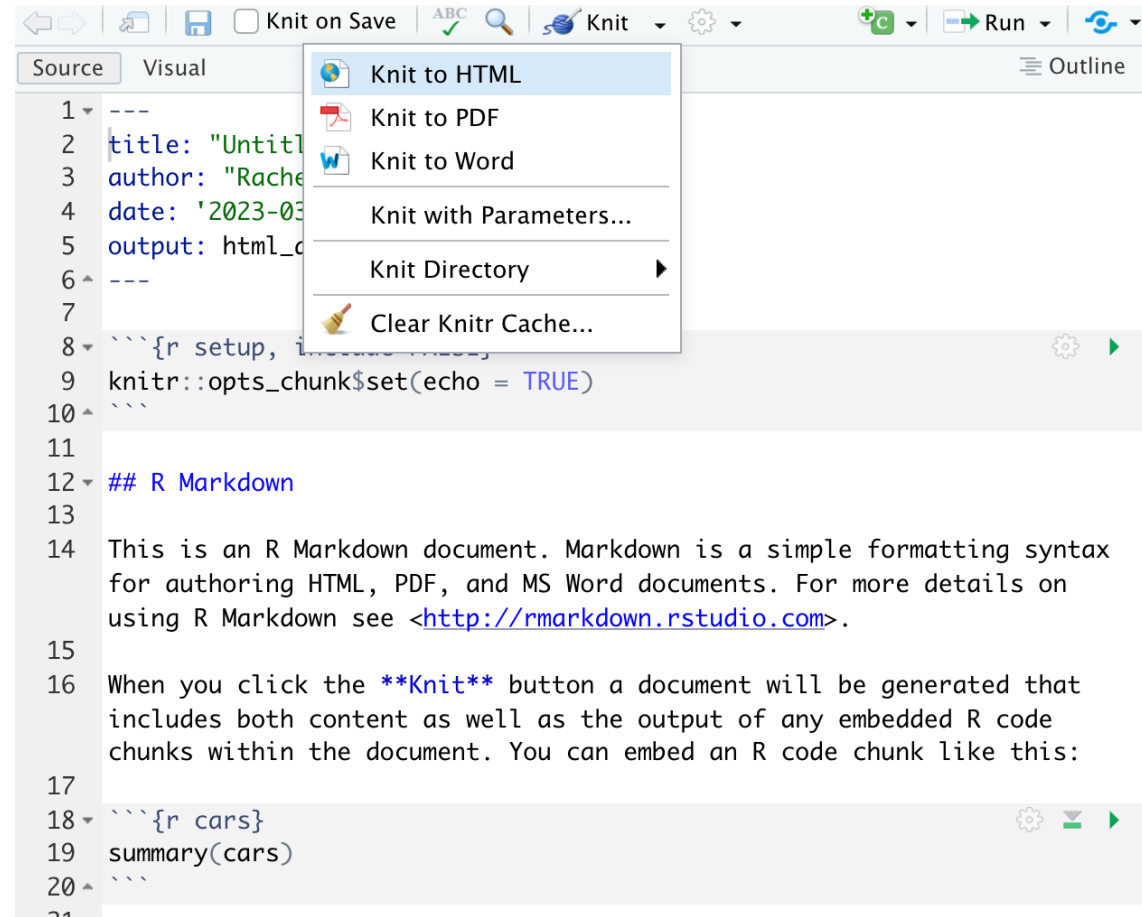
# R code

- Inline R Code
- There were ``r nrow(cars)` cars studied`
- Links: use a plain http address or add a link to a phrase:
- <http://example.com>
- `[linked phrase] (http://example.com)`
- Images on the web or local files in the same directory:
- `![alt text] (http://example.com/logo.png)`
- `![alt text] (figures/img.png)`

# Some parameters

- `message=FALSE`, this will suppress messages from functions in R
- `warning=FALSE`, this will suppress warning messages
- `echo=FALSE`, the R code will not be printed
- `eval=FALSE`, this will prevent the code from being run
- `Include =` prevents code and results from appearing in the finished file. R Markdown still runs the code in the chunk, and the results can be used by other chunks.
- `Fig.width`
- `Fig.height`

# How to Knit :



The screenshot shows the RStudio interface with the Knit menu open. The menu options are:

- Knit to HTML
- Knit to PDF
- Knit to Word
- Knit with Parameters...
- Knit Directory
- Clear Knitr Cache...

```
1 ---
2 title: "Untitled"
3 author: "Rache"
4 date: '2023-03'
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
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21
22 ```{r cars}
23 summary(cars)
24 ```
25
```

# Limitations of (R)markdown

- RMarkdown is a **simple** plain text format; it allows you to specify a simple layout.
- R chunks in LaTeX code (in a similar way to what is done with Rmarkdown)