

# Communicating Results with R Markdown

Damian Thomas

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# Objectives for this session

- ▶ Use Markdown syntax to format text
- ▶ Use R Markdown features to embed code in a document
- ▶ Complete an analysis and present results using R Markdown
- ▶ Output multiple document formats using R Markdown (html, pdf, slides)
- ▶ List the advantages of R markdown
- ▶ Define reproducibility and differentiate from related concepts (replication, tidiness, literate programming)

# What is R Markdown?

*“R Markdown provides an unified authoring framework for data science, combining your code, its results, and your prose commentary. R Markdown documents are fully reproducible and support dozens of output formats, like PDFs, Word files, slideshows, and more.”*

Garrett Grolemund and Hadley Wickham. R for Data Science (Ch 27)

# What is R Markdown?

- ▶ R code + Formatted text = Complete record of analysis

# Example: R Markdown Report

*Showcase compelling examples*

## How-To: Create a new R Markdown document

1. From the menu: File >> New >> R Markdown
2. Give the file a name with a `.Rmd` extension
3. Enter a title (optional)
4. Click OK

# R Markdown Document Structure

- ▶ Front Matter
- ▶ Markdown text
- ▶ R code blocks
- ▶ inline code

## How-To: Knit an R Markdown document

- ▶ Click on the “Knit” button
- ▶ Type `Ctrl + Shift + K`
- ▶ Use the menu: `File >> Knit Document`



# Edit a R Markdown Document

- ▶ Change the title
- ▶ Change text
- ▶ Change code block
- ▶ Error handling

# What happens in the background when you knit an R Markdown document

- ▶ Interpret the markdown text
- ▶ Run the code chunks
- ▶ insert the results into the document
- ▶ output a new file, if all is well

## How-To: Knit different file formats

- ▶ Click the dropdown next to the Knit button
  - ▶ select output format
- ▶ Change the the document header
  - ▶ `output: html_document`
  - ▶ `output: pdf_document`
  - ▶ `output: beamer_presentation (pdf)`

## More edits

- ▶ Hide code block
- ▶ Skip code block
- ▶ Inline Code
- ▶ Display plot
- ▶ Display table

## Motivation / benefits

- ▶ Share your work with others
- ▶ Check your work and update it, time saver in the future
- ▶ Answer questions about previous work
- ▶ Allow others build on what you have done, instead of working to recreate it
- ▶ Apply previously developed process to new data
- ▶ Encourage trust in the results, if peers can plausibly recreate
- ▶ Capture what you did, how you did it, and what you were thinking in a single presentation-ready document

## Slide with Bullets

- ▶ Bullet 1
- ▶ Bullet 2
- ▶ Bullet 3

## Slide with R Output

```
summary(cars)
```

##	speed	dist
##	Min. : 4.0	Min. : 2.00
##	1st Qu.:12.0	1st Qu.: 26.00
##	Median :15.0	Median : 36.00
##	Mean :15.4	Mean : 42.98
##	3rd Qu.:19.0	3rd Qu.: 56.00
##	Max. :25.0	Max. :120.00

## Slide with Plot

