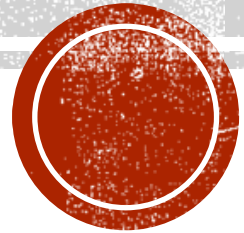
WRITING YOUR MANUSCRIPTS IN R MARKDOWN



Dr Gayathri Thillaiyampalam

Griffith Institute for Drug Discovery

25th Nov 2021

What is R Markdown?

- Rmarkdown is a type of text file (extension '.rmd') can be viewed and edited in any text editor (e.g., Notepad, gedit)

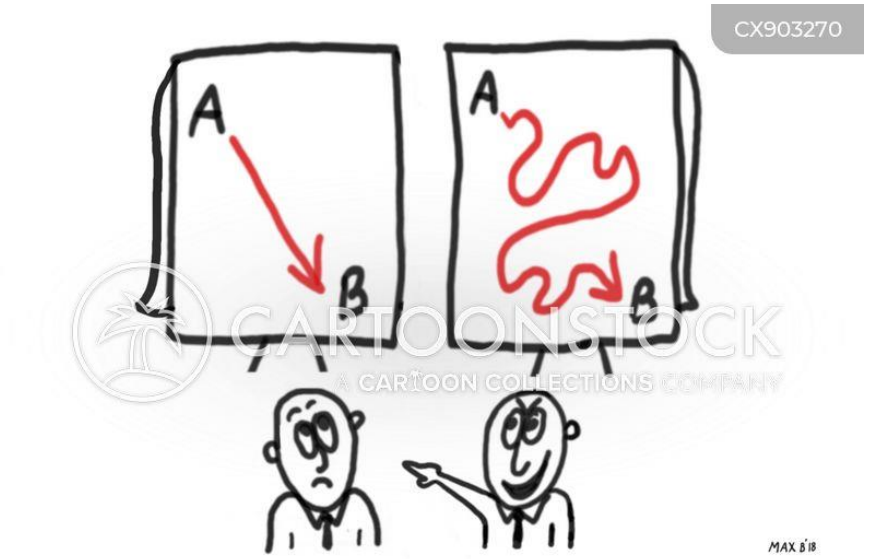
- Within Rstudio

- It is similar to writing in LaTeX that requires a high learning curve for effective usage

- It's a plain text writing, won't be able to see the output immediately.

At the end of this presentation …

- You should be able to
  - Start writing manuscripts in R Markdown
  - Including analyses done in R
  - Integrating references using BibTeX
  - Include equations through LaTeX code if need be
  - Implement version control



- Your solution is far too simple for a real expert...

````
---
title: "Untitled"
output: word_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)
```

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.
````

YAML header
Yet Another Markup Language

Global options, applied to every chunk in the file.

Your text with markdowns

Run

R code chunk

Markdown Basics

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
```

How to define the font sizes

Custom css style code

Hyperlink

http://example.com

[linked phrase](http://example.com)

Images with legend

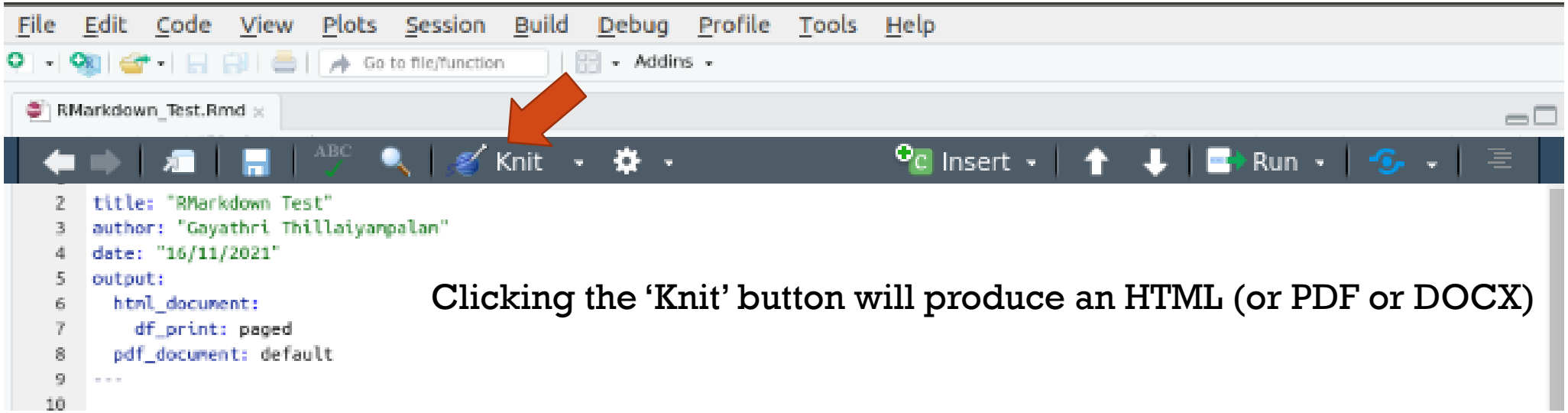
```
![](http://example.com/logo.png)

![optional caption text](figures/img.png)
```

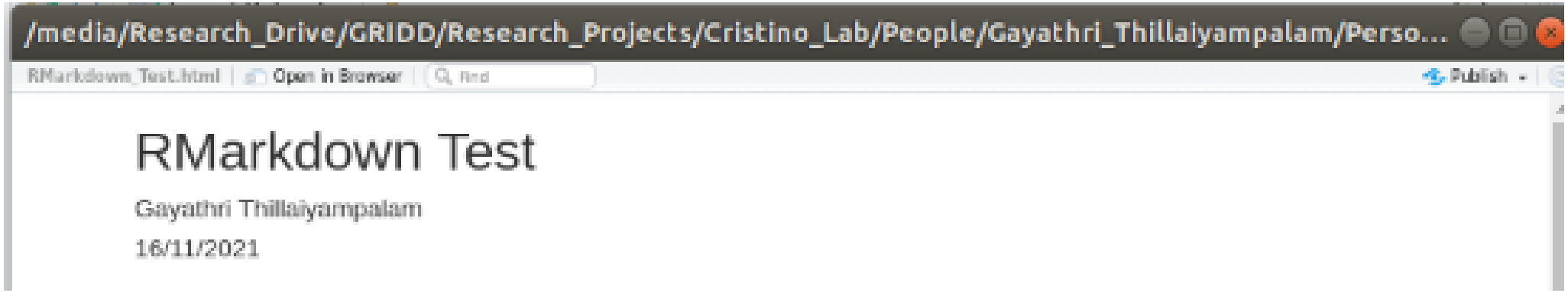
R objects inline in text

```
```{r}
x = 5  # radius of a circle
```

For a circle with the radius `r x`,
its area is `r pi * x^2`.
```



Clicking the 'Knit' button will produce an HTML (or PDF or DOCX)



RMarkdown_Test.Rmd

Knit | Insert | Run

```
---
title: "RMarkdown Test"
author: "Gayathri Thillaiyampalan"
date: "16/11/2021"
output:
  html_document:
    df_print: paged
  pdf_document: default
---

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

Rladies Brisbane
R Markdown

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```{r cars}
```


```

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins

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Knit | Insert | Run

```
---
title: "RMarkdown Test"
author: "Gayathri Thillaiyanpalan"
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****
```

/media/Research_Drive/GRIDD/Research_Projects/Cristino_Lab/People/Gayathri_Thillaiyampalam/Perso...

RMarkdown_Test.html | Open in Browser | Find | Publish

RMarkdown Test

Gayathri Thillaiyampalam

16/11/2021

Rladies Brisbane

R Markdown

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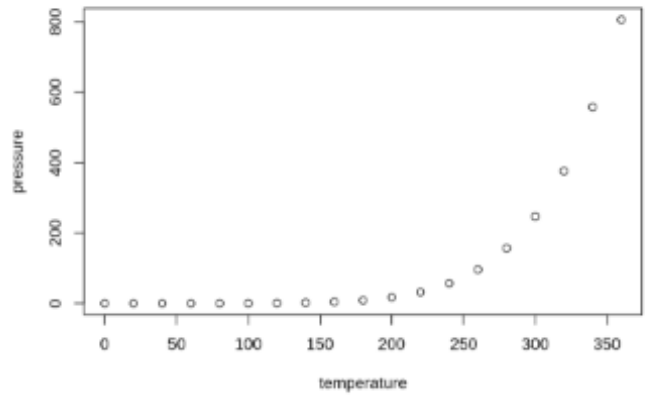
```
summary(cars)
```

```
##      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
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins

RMarkdown_Test.Rmd

Knit | Insert | Run

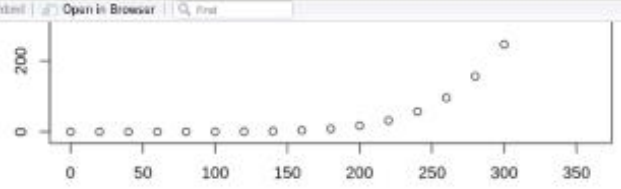
```
21
22 ```{r cars}
23 summary(cars)
24 ```
25
26 ## Including Plots
27
28 You can also enbed plots, for example:
29
30 ```{r pressure, echo=FALSE}
31 plot(pressure)
32 ```
33
34 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.
35
36 ****
37
38 ## Members of Cristino lab
39
40 Using bullet points
41
42 * Dr Alex Cristino
43   + Jamila Iqbal
44   + Daniel
45   + Oak
46   + David
47   + Caio
48   + Gayathri Thillaiyampalam
49
50 ![**Can you recognise any of then?**](4D59DB13-404A-475E-8171-1CDF8C012A25.jpeg)

(No image at path 4D59DB13-404A-475E-8171-1CDF8C012A25.jpeg)

51
52 </center>
53
```

/media/Research_Drive/GRIDD/Research_Projects/Cristino_Lab/People/Gayathri_Thillaiyampalam/Person...

RMarkdown_Test.html | Open in Browser | Find | Publish

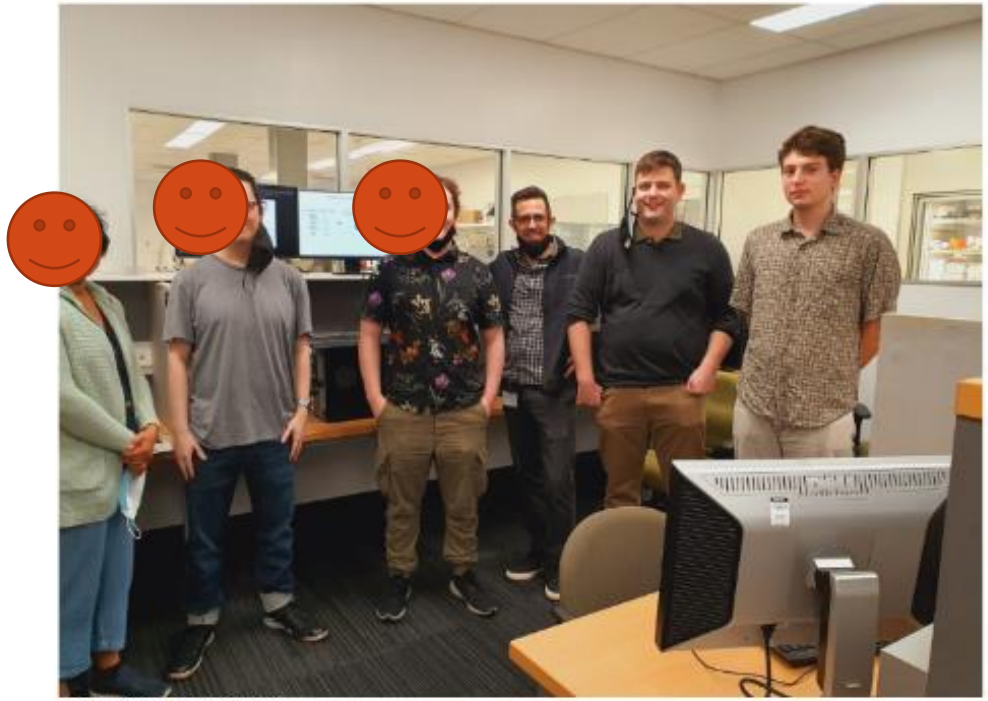


Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

Members of Cristino lab

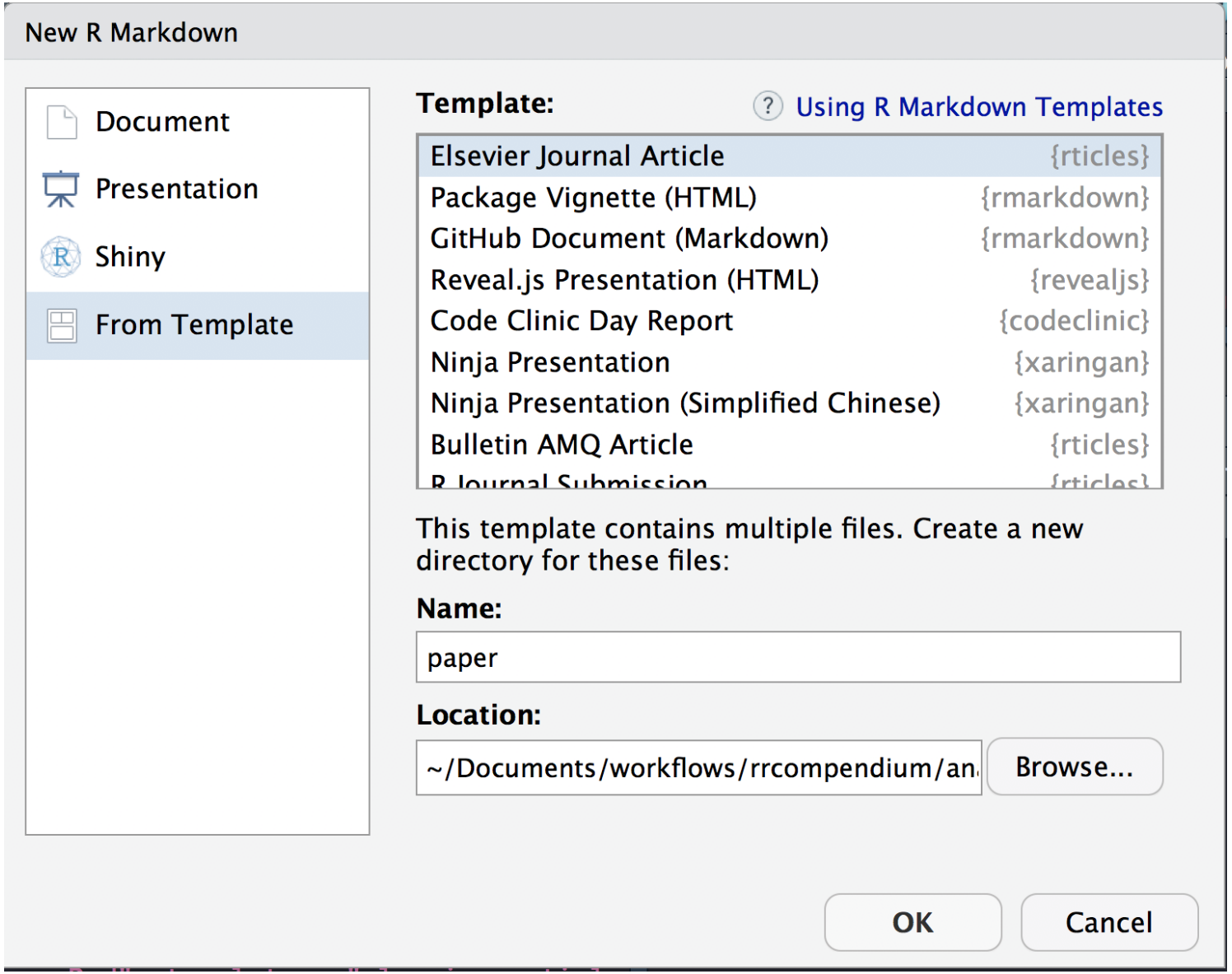
Using bullet points

- Dr Alex Cristino
  - Jamila Iqbal
  - Daniel
  - Oak
  - David
  - Caio
  - Gayathri Thillaiyampalam



Can you recognise any of them?

Create journal article template using 'rticles'




```
analysis/paper
├── elsarticle.cls
├── mybibfile.bib
├── numcompress.sty
└── paper.Rmd
```

elsarticle.cls : the citation language style for the references

mybibfile.bib: an example reference list

paper.Rmd: the file you will be working in

```
---
title: Markdown manuscript for Rladies
author:
  - name: Gayathri Thillaiyampalam
    email: gthillaiyampalam@example.com
    affiliation: Griffith University
    footnote: 1
  - name: A Second Author Who Did Less Work
    email: bbb@example.com
    affiliation: Another University
  - name: A Graduate Student
    email: ccc@example.com
    affiliation: Another University
    footnote: 2
  - name: Another Graduate Student
    email: ccc1@example.com
    affiliation: Some Institute of Technology
    footnote: 2
address:
  - code: Griffith University
    address: Department, Street, City, State, Zip
  - code: Some Institute of Technology
    address: Department, Street, City, State, Zip
  - code: Another University
    address: Department, Street, City, State, Zip
footnote:
  - code: 1
    text: "Corresponding Author"
  - code: 2
    text: "Equal contribution"

bibliography: refs.bib
layout:  3p
preamble: |
  \usepackage[nomarkers]{endfloat}
  \linenumbers
  \usepackage{setspace}
  \doublespacing
#linenumbers: true
#numbersections: true
abstract: |

  This is the abstract.

  It consists of two paragraphs.

journal: "An awesome journal"
date: "`r Sys.Date()`"
csl: elsevier-harvard.csl
output: rticles::elsevier_article
---

_Text based on elsarticle sample manuscript, see [http://www.elsevier.com/author-schemas/latex-instructions#elsarticle](http://www.elsevier.com/author-schemas/latex-instructions#elsarticle)_
\newpage
```

Markdown manuscript for Rladies

Gayathri Thillaiyampalam*,[a], A Second Author Who Did Less Work[c], A Graduate Student**,[c], Another Graduate Student**,[b]

[a]*Department, Street, City, State, Zip*
[b]*Department, Street, City, State, Zip*
[c]*Department, Street, City, State, Zip*

Abstract

This is the abstract.

It consists of two paragraphs.

Text based on elsarticle sample manuscript, see http://www.elsevier.com/author-schemas/latex-instructions#elsarticle

*Corresponding Author
**Equal contribution
Email addresses: gthillaiyampalam@example.com (Gayathri Thillaiyampalam), bbb@example.com (A Second Author Who Did Less Work), ccc@example.com (A Graduate Student), ccc1@example.com (Another Graduate Student)

Introduction: Why R Markdown

Hassle free writing -- user friendly (Knape & de Valpine 2011); and Embedded R code chunks (Coulson 2001). Provides version control ([@Bartlett1960; @Levins1966]).

@book{Bartlett1960, address = {London}, author = {Bartlett, Maurice S.}, publisher = {Methuen and Wiley}, title = {{Stochastic population models in ecology and epidemiology}}, year = {1960}}

The code and data for the simulations in this paper are maintained at <https://github.com/Rladies/example>.

Methods

Method 1:
Summarise method 1 (e.g. Boettiger et al. 2010), with a footnote^[This is a fotenote.]

An example equation

```
\begin{align}
\frac{\mathrm{d} n}{\mathrm{d} t} = \underbrace{c n \left(1 - \frac{n}{N}\right)}_{\textrm{birth}} - \underbrace{e n}_{\textrm{death}}, \label{levins}
\end{align}
```

where n individuals compete for a
finite number of suitable habitats N. Individuals die a constant
rate e, and produce offspring at a constant rate c who then
have a probability of colonizing an open patch that is simply
proportional to the fraction of available patches, 1 - n/N.

Update inline math

Inline LaTeX equations and parameters can be written between a pair of dollar signs using the LaTeX syntax,

e.g., $f(x) = 1/x$

Conclusions

This is the conclusion contains two paragraphs.

Acknowledgements

The author acknowledges rrtools: Tools for Writing Reproducible Research in R

References

Install citr package > Addins > Insert citations

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Methods

Method 1: Summarise method 1 (e.g. Boettiger et al. 2010), with a footnote[1]

An example equation

$$\frac{\mathrm{d}n}{\mathrm{d}t} = \underbrace{cn\left(1 - \frac{n}{N}\right)}_{\text{birth}} - \underbrace{en}_{\text{death}}, \tag{1}$$

where n individuals compete for a finite number of suitable habitats N. Individuals die a constant rate e, and produce offspring at a constant rate c who then have a probability of colonizing an open patch that is simply proportional to the fraction of available patches, 1 - n/N.

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References

Bartlett, M.S., 1960. Stochastic population models in ecology and epidemiology. Methuen; Wiley, London.

Levins, R., 1966. The strategy of model building in population biology. American Scientist 54, 421–431.

[1] This is a fotenote.

```{r libraries, include=FALSE}
  knitr::opts_chunk$set(echo = FALSE,
message=FALSE, warning=FALSE,
                      fig.width=7, fig.height=3.5)

library(dplyr)
library(readr)
library(ggplot2)
library(ggthemes)
#library(rrcompendium)
```

```{r set-theme, include=FALSE}
theme_set(theme_grey())

```

```{r figure1, include=TRUE, fig.cap = "This is Figure1 caption"}
# create colour palette
colours <- ptol_pal()(2)

# load-data
data <- read_csv("gillespie.csv")

# recode-data
data <- data %>%
  mutate(system_size = recode(system_size, large = "A. 1000 total sites",
small= "B. 100 total sites"))

# plot-gillespie
data %>%
  ggplot(aes(x = time)) +
  geom_hline(aes(yintercept = mean), lty=2, col=colours[2]) +
  geom_hline(aes(yintercept = minus_sd), lty=2, col=colours[2]) +
  geom_hline(aes(yintercept = plus_sd), lty=2, col=colours[2]) +
  geom_line(aes(y = n), col=colours[1]) +
  facet_wrap(~system_size, scales = "free_y")

```

List of Figures

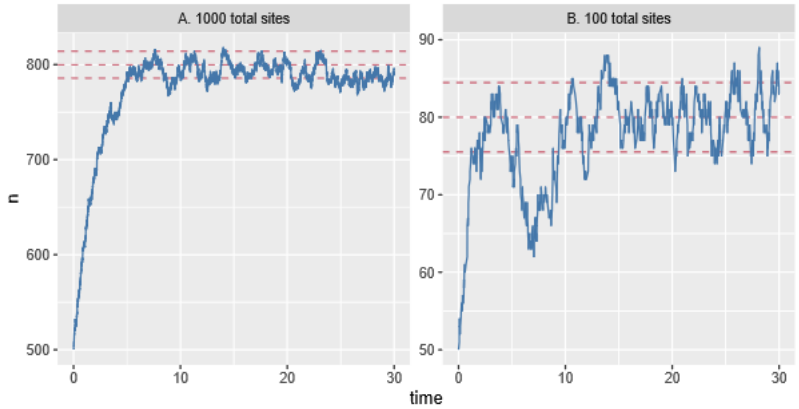

Figure 1: This is Figure1 caption

Git – Version control

Why version control?

- Sharing of your projects easy
- Facilitates collaboration
- You can revert back to a previous version
- You can see what changes between different versions

GitHub is a user-friendly webservice to store your project repository remotely. Alternatives are gitlab and bitbucket.

R in combination with Git provides a convenient setup to version control.

Step by step guide
https://stirlingcodingclub.github.io/version_control/vc_notes.html

Why R Markdown?

- Reproducibility - When large documents need to be converted to pdf
- Version control
- Searching made easier
- Inline data analysis
- Academic manuscripts using templates from journals

Limitations

- How familiar your collaborators are with R markdown

Some resources/ references

- https://rmarkdown.rstudio.com/authoring_basics.html
- https://stirlingcodingclub.github.io/Manuscripts_in_Rmarkdown/Rmarkdown_notes.html
- https://annakrystalli.me/rrtools-repro-research/paper.html#add_text
- https://stirlingcodingclub.github.io/version_control/vc_notes.html


THANK
YOU