

# Setting up your PhD (or other research project!) as an R package

Ella Kaye

Oxford R User Group, April 9th 2018

# Why?

- Keep all your data/code/analysis together and easily accessible
- Reproducible
- Easy to share (e.g. with supervisors, the world)
- It's easier than you may think!

# What I'm going to talk about

- How to set up a (PhD) **package**
- Basic package structure
- devtools and usethis
- bookdown for authoring vignettes/reports
- Setting up a personal package
- What I've done for my PhD

# What I'm not going to talk about\*

\*but which you should definitely consider as part of a package workflow

- git/GitHub
- packrat

# Setting up a package (demo)

- Use the latest version of RStudio (1.1.419 or higher)
- File > New Project > New Directory > R Package

# devtools and usethis

- devtools is a set of package development tools primarily written by Hadley Wickham to make it easy for Hadley Wickham to write packages
- usethis automates many common package and analysis setup tasks (splits off from devtools)
- `library(devtools)` (first)
- `library(usethis)` (second)

# Data (demo)

- `usethis::use_data_raw`
- `usethis::use_data`
- `devtools::load_all()` (Shift + Cmd + L)

# Document your data with roxygen2 (demo)

- data\_documentation.R (in R folder)
- Can now use markdown. Add the following to the DESCRIPTION:  

```
Roxygen: list(markdown = TRUE)
```
- devtools::document()



## In data-raw folder

- Data creations scripts
- Raw data (though these don't have to be in the package)

## In R folder

- Data import functions (for use in data creation scripts)
- data\_documentation.R for documenting your data
- Analysis functions
  - Be sure to document these too!
  - Consider putting functions that aren't specific to this project into a personal package - pros and cons

# Markdown

- **Markdown:**
  - sections, lists, links, images
- **Pandoc:**
  - adds footnotes, **citations**, tables
  - raw  $LATEX$  (including the ability to use  $LATEX$  packages)
  - makes it possible to generate HTML, LaTeX/pdf, Word and slides
- **R Markdown:**
  - Uses Pandoc markdown
  - adds code chunks

# bookdown

A package by Yihui Xie that **extends** R Markdown with features that actually make it feasible to write a statistics PhD.

- Number and reference equations
- Theorems and proofs
- Special headers
  - (PART)
  - (APPENDIX)
- Text references

(show bookdown\_examples.Rmd)

bookdown can be used to bring a thesis together

- Typically, each chapter is a separate .Rmd file
- Switch between HTML and pdf

Goodbye *L<sup>A</sup>T<sub>E</sub>X*!

# Analysis as vignettes

Keeps everything together.

- `usethis::use_vignette()`
- modify the .Rmd file
- `devtools::build_vignettes()`
- Install and Restart
- `browseVignettes("package_name")`

## Downsides

- Knitting only gets you a temp html file
- Building vignettes can be time-consuming
- Have to build all the vignettes together

# Analysis as separate files

- Make a 'reports' folder (can use Terminal in RStudio)
- `usethis::use_build_ignore("reports")`
- create .Rmd files and knit as usual

# Personal packages

- A great way to store functions that you write that you use across different projects
- Show EMK.Rproj
- <https://github.com/EllaKaye/EMK>
- Share your package (tweet link to GitHub, blog about it etc) - if you find your functions useful, chances are someone else will too!
- A blogpost on making a personal package:  
<https://hilaryparker.com/2014/04/29/writing-an-r-package-from-scratch/>

# A look at my Admissions package

# Main links

**R packages**: An (online) book on R packages by Hadley Wickham

**R packages cheatsheet**: Also available within RStudio from Help > Cheatsheets

**bookdown**: A bookdown generated book about bookdown by Yihui Xie

**Happy git with R**: Superb bookdown book on git and GitHub for the useR.



Thank you!

Any questions?

I'd love to hear from you!

[E.Kaye.1@warwick.ac.uk](mailto:E.Kaye.1@warwick.ac.uk)

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

[ellakaye.rbind.io](https://ellakaye.rbind.io)

[github.com/EllaKaye](https://github.com/EllaKaye)