AnVIL Book Name

January 10, 2022

Table of Contents

# About this Book

This book is part of a series of books for the Genomic Data Science Analysis, Visualization, and Informatics Lab-space (AnVIL) of the National Human Genome Research Institute (NHGRI). Learn more about AnVIL by visiting https://anvilproject.org or reading the [preprint](https://www.biorxiv.org/content/10.1101/2021.04.22.436044v1).

# 1 Introduction

## 1.1 Motivation

## 1.2 Target Audience

The course is intended for …

## 1.3 Curriculum

The course covers…

\*If you haven’t yet read the getting started Wiki pages; [start there](https://github.com/jhudsl/DaSL_Course_Template_Bookdown/wiki/Getting-started)

Every chapter needs to start out with this chunk of code:

## 1.4 Learning Objectives

\*Every chapter also needs Learning objectives that will look like this:

This chapter will cover:

* {You can use <https://tips.uark.edu/using-blooms-taxonomy/> to define some learning objectives here}
* {Another learning objective}

## 1.5 Libraries

For this chapter, we’ll need the following packages attached:

\*Remember to add [any additional packages you need to your course’s own docker image](https://github.com/jhudsl/DaSL_Course_Template_Bookdown/wiki/Using-Docker#starting-a-new-docker-image).

library(magrittr)

# 2 Topic of Section

You can write all your text in sections like this!

## 2.1 Subtopic

Here’s a subheading and some text in this subsection!

### 2.1.1 Code examples

You can demonstrate code like this:

output\_dir <- file.path("resources", "code\_output")  
if (!dir.exists(output\_dir)) {  
 dir.create(output\_dir)  
}

And make plots too:

hist\_plot <- hist(iris$Sepal.Length)



You can also save these plots to file:

png(file.path(output\_dir, "test\_plot.png"))  
hist\_plot

## $breaks  
## [1] 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0  
##   
## $counts  
## [1] 5 27 27 30 31 18 6 6  
##   
## $density  
## [1] 0.06666667 0.36000000 0.36000000 0.40000000 0.41333333 0.24000000 0.08000000  
## [8] 0.08000000  
##   
## $mids  
## [1] 4.25 4.75 5.25 5.75 6.25 6.75 7.25 7.75  
##   
## $xname  
## [1] "iris$Sepal.Length"  
##   
## $equidist  
## [1] TRUE  
##   
## attr(,"class")  
## [1] "histogram"

dev.off()

## png   
## 2

### 2.1.2 Image example

How to include a Google slide. It’s simplest to use the leanbuild package:



But if you have the slide or some other image locally downloaded you can also use html like this:

### 2.1.3 Video examples

You can use knitr::include\_url() like this:

knitr::include\_url("https://www.youtube.com/embed/VOCYL-FNbr0")

## PhantomJS not found. You can install it with webshot::install\_phantomjs(). If it is installed, please make sure the phantomjs executable can be found via the PATH variable.

OR this works:

### 2.1.4 Links to files

This works:

Or this:

[This works](https://www.messiah.edu/download/downloads/id/921/Microaggressions_in_the_Classroom.pdf).

Or this:

### 2.1.5 Links to websites

Examples of including a website link.

This works:

knitr::include\_url("https://yihui.org")

OR this:

![Another link](data:text/html; charset=utf-8;base64,)

Figure : Another link

OR this:

### 2.1.6 Citation examples

We can put citations at the end of a sentence like this ([Allaire et al. 2021](#ref-rmarkdown2021)). Or multiple citations Xie, Allaire, and Grolemund ([2018](#ref-Xie2018)).

but they need a ; separator ([Allaire et al. 2021](#ref-rmarkdown2021); [Xie, Allaire, and Grolemund 2018](#ref-Xie2018)).

In text, we can put citations like this Allaire et al. ([2021](#ref-rmarkdown2021)).

## 2.2 Print out session info

sessionInfo()

## R version 4.0.2 (2020-06-22)  
## Platform: x86\_64-pc-linux-gnu (64-bit)  
## Running under: Ubuntu 20.04.3 LTS  
##   
## Matrix products: default  
## BLAS/LAPACK: /usr/lib/x86\_64-linux-gnu/openblas-pthread/libopenblasp-r0.3.8.so  
##   
## locale:  
## [1] LC\_CTYPE=en\_US.UTF-8 LC\_NUMERIC=C   
## [3] LC\_TIME=en\_US.UTF-8 LC\_COLLATE=en\_US.UTF-8   
## [5] LC\_MONETARY=en\_US.UTF-8 LC\_MESSAGES=C   
## [7] LC\_PAPER=en\_US.UTF-8 LC\_NAME=C   
## [9] LC\_ADDRESS=C LC\_TELEPHONE=C   
## [11] LC\_MEASUREMENT=en\_US.UTF-8 LC\_IDENTIFICATION=C   
##   
## attached base packages:  
## [1] stats graphics grDevices utils datasets methods base   
##   
## other attached packages:  
## [1] magrittr\_1.5  
##   
## loaded via a namespace (and not attached):  
## [1] knitr\_1.33 hms\_0.5.3 R6\_2.4.1 rlang\_0.4.10   
## [5] stringr\_1.4.0 highr\_0.8 httr\_1.4.2 tools\_4.0.2   
## [9] webshot\_0.5.2 xfun\_0.26 htmltools\_0.5.0 ellipsis\_0.3.1   
## [13] yaml\_2.2.1 leanbuild\_0.1.2 digest\_0.6.25 tibble\_3.0.3   
## [17] lifecycle\_1.0.0 crayon\_1.3.4 bookdown\_0.24 readr\_1.4.0   
## [21] vctrs\_0.3.4 fs\_1.5.0 curl\_4.3 evaluate\_0.14   
## [25] rmarkdown\_2.10 stringi\_1.5.3 compiler\_4.0.2 pillar\_1.4.6   
## [29] pkgconfig\_2.0.3

# About the Authors

These credits are based on our [course contributors table guidelines](https://github.com/jhudsl/DaSL_Course_Template_Bookdown/wiki/How-to-give-credits).

| Credits | Names |
| --- | --- |
| **Pedagogy** |  |
| Lead Content Instructor(s) | [FirstName LastName](link%20to%20personal%20website) |
| Lecturer(s) (include chapter name/link in parentheses if only for specific chapters) - make new line if more than one chapter involved | Delivered the course in some way - video or audio |
| Content Author(s) (include chapter name/link in parentheses if only for specific chapters) - make new line if more than one chapter involved | If any other authors besides lead instructor |
| Content Contributor(s) (include section name/link in parentheses) - make new line if more than one section involved | Wrote less than a chapter |
| Content Editor(s)/Reviewer(s) | Checked your content |
| Content Director(s) | Helped guide the content direction |
| Content Consultants (include chapter name/link in parentheses or word “General”) - make new line if more than one chapter involved | Gave high level advice on content |
| Acknowledgments | Gave small assistance to content but not to the level of consulting |
| **Production** |  |
| Content Publisher(s) | Helped with publishing platform |
| Content Publishing Reviewer(s) | Reviewed overall content and aesthetics on publishing platform |
| **Technical** |  |
| Course Publishing Engineer(s) | Helped with the code for the technical aspects related to the specific course generation |
| Template Publishing Engineers | [Candace Savonen](https://www.cansavvy.com/), [Carrie Wright](https://carriewright11.github.io/) |
| Publishing Maintenance Engineer | [Candace Savonen](https://www.cansavvy.com/) |
| Technical Publishing Stylists | [Carrie Wright](https://carriewright11.github.io/), [Candace Savonen](https://www.cansavvy.com/) |
| Package Developers ([Leanbuild](https://github.com/jhudsl/leanbuild)) | [John Muschelli](https://johnmuschelli.com/), [Candace Savonen](https://www.cansavvy.com/), [Carrie Wright](https://carriewright11.github.io/) |
| **Art and Design** |  |
| Illustrator(s) | Created graphics for the course |
| Figure Artist(s) | Created figures/plots for course |
| Videographer(s) | Filmed videos |
| Videography Editor(s) | Edited film |
| Audiographer(s) | Recorded audio |
| Audiography Editor(s) | Edited audio recordings |
| **Funding** |  |
| Funder(s) | Institution/individual who funded course including grant number |
| Funding Staff | Staff members who help with funding |

## ─ Session info ───────────────────────────────────────────────────────────────  
## setting value   
## version R version 4.0.2 (2020-06-22)  
## os Ubuntu 20.04.3 LTS   
## system x86\_64, linux-gnu   
## ui X11   
## language (EN)   
## collate en\_US.UTF-8   
## ctype en\_US.UTF-8   
## tz Etc/UTC   
## date 2022-01-10   
##   
## ─ Packages ───────────────────────────────────────────────────────────────────  
## package \* version date lib source   
## assertthat 0.2.1 2019-03-21 [1] RSPM (R 4.0.3)   
## backports 1.1.10 2020-09-15 [1] RSPM (R 4.0.2)   
## bookdown 0.24 2021-12-20 [1] Github (rstudio/bookdown@88bc4ea)   
## callr 3.4.4 2020-09-07 [1] RSPM (R 4.0.2)   
## cli 2.0.2 2020-02-28 [1] RSPM (R 4.0.0)   
## crayon 1.3.4 2017-09-16 [1] RSPM (R 4.0.0)   
## desc 1.2.0 2018-05-01 [1] RSPM (R 4.0.3)   
## devtools 2.3.2 2020-09-18 [1] RSPM (R 4.0.3)   
## digest 0.6.25 2020-02-23 [1] RSPM (R 4.0.0)   
## ellipsis 0.3.1 2020-05-15 [1] RSPM (R 4.0.3)   
## evaluate 0.14 2019-05-28 [1] RSPM (R 4.0.3)   
## fansi 0.4.1 2020-01-08 [1] RSPM (R 4.0.0)   
## fs 1.5.0 2020-07-31 [1] RSPM (R 4.0.3)   
## glue 1.6.0 2021-12-17 [1] CRAN (R 4.0.2)   
## htmltools 0.5.0 2020-06-16 [1] RSPM (R 4.0.1)   
## knitr 1.33 2021-12-20 [1] Github (yihui/knitr@a1052d1)   
## lifecycle 1.0.0 2021-02-15 [1] CRAN (R 4.0.2)   
## magrittr 1.5 2014-11-22 [1] RSPM (R 4.0.0)   
## memoise 1.1.0 2017-04-21 [1] RSPM (R 4.0.0)   
## pkgbuild 1.1.0 2020-07-13 [1] RSPM (R 4.0.2)   
## pkgload 1.1.0 2020-05-29 [1] RSPM (R 4.0.3)   
## prettyunits 1.1.1 2020-01-24 [1] RSPM (R 4.0.3)   
## processx 3.4.4 2020-09-03 [1] RSPM (R 4.0.2)   
## ps 1.3.4 2020-08-11 [1] RSPM (R 4.0.2)   
## purrr 0.3.4 2020-04-17 [1] RSPM (R 4.0.3)   
## R6 2.4.1 2019-11-12 [1] RSPM (R 4.0.0)   
## remotes 2.2.0 2020-07-21 [1] RSPM (R 4.0.3)   
## rlang 0.4.10 2021-12-20 [1] Github (r-lib/rlang@f0c9be5)   
## rmarkdown 2.10 2021-12-20 [1] Github (rstudio/rmarkdown@02d3c25)  
## rprojroot 1.3-2 2018-01-03 [1] RSPM (R 4.0.0)   
## sessioninfo 1.1.1 2018-11-05 [1] RSPM (R 4.0.3)   
## stringi 1.5.3 2020-09-09 [1] RSPM (R 4.0.3)   
## stringr 1.4.0 2019-02-10 [1] RSPM (R 4.0.3)   
## testthat 3.0.1 2021-12-20 [1] Github (R-lib/testthat@e99155a)   
## usethis 2.1.5.9000 2021-12-20 [1] Github (r-lib/usethis@6c2e204)   
## withr 2.3.0 2020-09-22 [1] RSPM (R 4.0.2)   
## xfun 0.26 2021-12-20 [1] Github (yihui/xfun@74c2a66)   
## yaml 2.2.1 2020-02-01 [1] RSPM (R 4.0.3)   
##   
## [1] /usr/local/lib/R/site-library  
## [2] /usr/local/lib/R/library

# References

Allaire, JJ, Yihui Xie, Jonathan McPherson, Javier Luraschi, Kevin Ushey, Aron Atkins, Hadley Wickham, Joe Cheng, Winston Chang, and Richard Iannone. 2021. *Rmarkdown: Dynamic Documents for r*. <https://github.com/rstudio/rmarkdown>.

Xie, Yihui, J. J. Allaire, and Garrett Grolemund. 2018. *R Markdown: The Definitive Guide*. Boca Raton, Florida: Chapman; Hall/CRC. <https://bookdown.org/yihui/rmarkdown>.