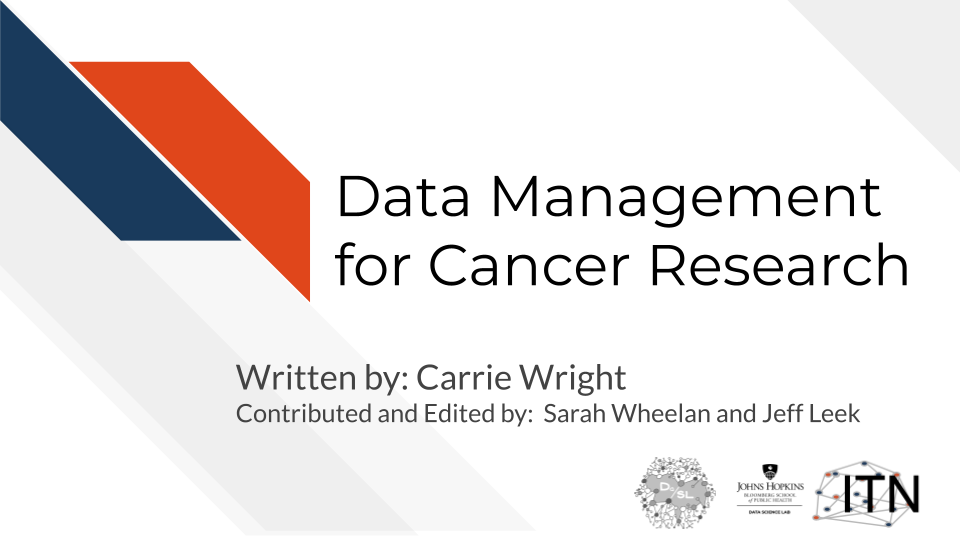
Course Name

December, 2021

Table of Contents

# About this Course

# 1 Introduction



## 1.1 Motivation

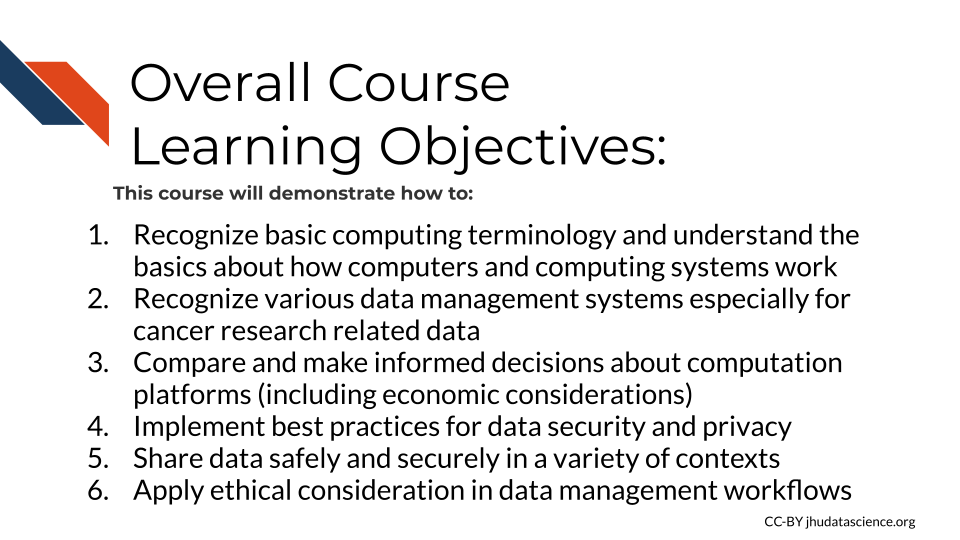
One of the key cancer informatics challenges is dealing with and managing the explosion of data from multiple sources. This course is designed to help researchers and investigators to understand the key principles of data management from an economic, privacy, security, usability and discoverability perspective.

## 1.2 Target Audience

This course is intended for researchers (including postdocs and students) with limited to intermediate experience with informatics research. The conceptual material will also be useful for those in management roles who are collecting data and using informatics pipelines.

## 1.3 Curriculum

The course will cover the key underlying principles and concepts in data management. It will also cover data security, data privacy, IRB and data access requests, and the ethics of good data management. The course will highlight concrete workflows for managing genomic, imaging, and clinical data.



\*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 2021-12-02   
##   
## ─ 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 2021-12-01 [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 1.5.1 2021-11-30 [1] CRAN (R 4.0.2)   
## htmltools 0.5.0 2020-06-16 [1] RSPM (R 4.0.1)   
## knitr 1.33 2021-12-01 [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 2021-12-01 [1] Github (r-lib/rlang@f0c9be5)   
## rmarkdown 2.10 2021-12-01 [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 2021-12-01 [1] Github (R-lib/testthat@e99155a)   
## usethis 2.1.3.9000 2021-12-01 [1] Github (r-lib/usethis@9cf3ebc)   
## withr 2.3.0 2020-09-22 [1] RSPM (R 4.0.2)   
## xfun 0.26 2021-12-01 [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>.