[INSERT TITLE OF DOCTORAL DISSERTATION]

By

[INSERT AUTHOR'S NAME]

A Dissertation submitted to the

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Rutgers, the State University of New Jersey

In partial fulfillment of the requirements

For the degree of

Doctor of Philosophy

Graduate Program in [insert your graduate program's official name]

Written under the direction of

[insert Dissertation Director's name]

And approved by

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New Brunswick, New Jersey

[Month] [Year]

ABSTRACT OF THE DISSERTATION

[INSERT TITLE OF DOCTORAL DISSERTATION]

by

[INSERT AUTHOR'S NAME]

Dissertation Director:

[insert Dissertation Director's name]

This is where the body of your abstract goes. The abstract should summarize your work. The abstract for a dissertation or document may be longer than one page; word count is more important than page length in this section.

ACKNOWLEDGEMENTS

Insert your acknowledgements here.

DEDICATION

Insert your dedication here (optional).

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Chapter 1: Introduction - Markdown and LaTeX

This is Rmarkdown template for writing a dissertation at Rutgers University. It uses the `ruthesis` class, which is based off the University of Arizona `uathesis` class. It is fully compatibly with `Rmarkdown`.

The majority of the heavy lifting was already done by colleagues in the Department of Planetary Sciences at the U of A (see the `uathesis.cls` file for more information). In essence all I have done is update the `uathesis` class I previously modified so that it would play nicely with `knitr`. As of now (Mon Oct 4 13:09:14 2021), knitr and R are fully functional. That said, some other format issues still remain.

1.1 Issues

- There are currently no (known) issues (what!?)

1.2 Basic structure

The basic structure of the thesis package has been cleaned up significantly. There are now two folders inside the main directory: **includes** and **sections**. The `includes` folder contains most of the under the hood files that you will generally edit one time to set up the project metadata (i.e. the title, committee members, etc.), but also includes .bib files and figures.

The `sections` folder is where the chapters of the dissertation live. Each chapter is its own .Rmd file. You will write you chapters in these files and compile the master document. This folder is home to the other less important (but required) sections (i.e. acknowledgments, dedications, abstracts and appendices).[1] The underlying engine

[1] All of these files are imported into the final pdf in the `master.Rmd` file via `knitr` or specific commands written for the `uathesis` class.

is LaTeX. To generate the dissertation pdf, compile the `master.Rmd` file in your favorite text editor.

1.3 Sections

You can use either markdown or LaTeX to create sections in the document (see general markdown syntax for more information). In both cases, cross-referencing figure, tables, sections, chapters, etc. can only be done if a `label{}` is created. For example, this is section 1.3. I generated that number by first labeling the section...

```
# Sections\label{ex-sections}
```

and then by typing...

```
\ref{ex-sections}
```

It is helpful to use this with figures and tables. Like, for Figure 1.1 and Table 2.3 below.

1.3.1 Subsections

You can use hashtags or the `\subsection{}` command to create a subsection.

1.3.1.1 Subsubsections

You can use `\subsubsection{}` or 3 hashtags.

1.3.1.1.1 Subsubsubsections

If you really need to go this deep, I suggest using the `\paragraph{}` command.

1.3.2 Paragraph formatting

By default the first paragraph of a new chapter, section, subsection, etc. will not be indented, but every new paragraph thereafter will be.

Like this paragraph, for examle. If for some reason you need to override the automatic indenting, be sure to use the LaTeX command `\noindent`.

1.4 Math Example

Equations can be rendered beautifully by using the `equation` environment.

$$y = mx + b \tag{1.1}$$

But, old school math works too!

$$y = \beta_0 + \beta_1 + x_1 + \epsilon$$

But putting it inside the `equation` environment will number it (as in the first example), and has the added advantage of centering automatically as well.

$$y = \beta_0 + \beta_1 + x_1 + \epsilon \tag{1.2}$$

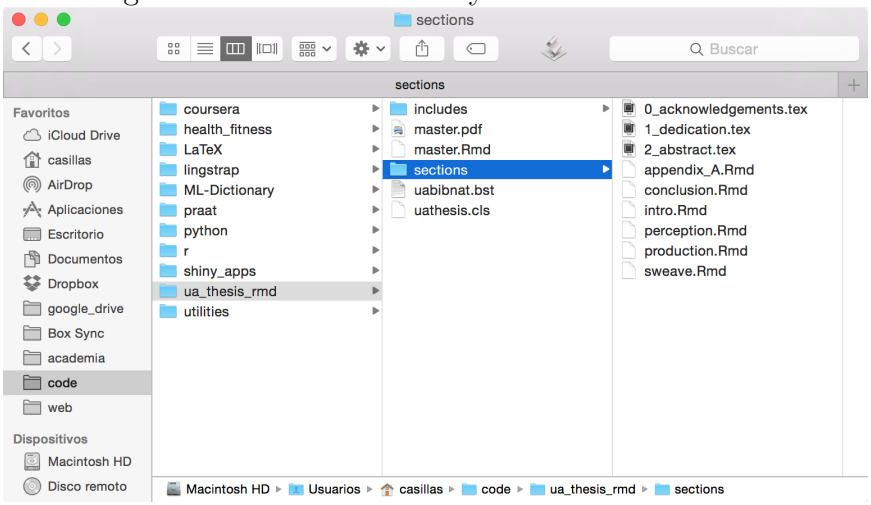
1.5 How to cite your references

One relevant difference from the previous iteration of this package is that it now uses `Rmarkdown/pandoc` to render citations. This is a work is progress, but for now you can reference by using the standard `[@citekey]` method. For example, citations are cool (Author, Author, & Author, 2002, 2015). For inline citations, remove the brackets (i.e. `@articletwo`). As in Author, Author, & Author (2015) said many things.

1.6 Graphics

Figures are automatically included in the list of figures and you can use the brackets in the caption to establish a different LOF caption (separate from the one you see below). Below is an example of how you can include a figure using LaTeX. If you prefer to use R or markdown instead see the examples in the subsequent chapters.

Figure 1.1: Here is a screeny of the sections folder.



One thing to remember is that when including images the home directory is always that of the `master.Rmd` document. Therefore, it is necessary to establish the path to the img file from there. Here is the code used to produce the above figure:

```
\begin{figure}[h]
  \centering
  \includegraphics[width=.75\textwidth]{./includes/figures/ex.png}
  \caption[Example figure]{Here is a screeny of the sections folder.}
  \label{fig:firstfig}
\end{figure}
```

Chapter 2: More LaTeX

2.1 Tables

Tables work the same way as before...

Table 2.1: Another table caption (to appear with the actual table).

Col A	Col B	Col C
1	2	3
4	5	6

They can be rendered in markdown now as well (and can include r code), but I don't recommend this combination (for now)...

Col 1	Col 2	col 3
4	plus	8
equals	12	nice!

On the next page is a sample table, placed on the page by itself. Sometimes tables can be wider than they are tall, and you may need to rotate the table by 90° to make it fit better on a page by itself. To do that you can use the lscape package. To use it, wrap the table commands in a begin and end landscape command and that table will be properly rotated.

Table 2.3: Sample table caption (to appear with the actual table).

Col A	Col B	Col C
1	2	3
4	5	6

Note that the `\caption` command can have a short and a long version inside a table environment, just like inside a figure environment (see 1.6).

2.2 TIPA

You can include IPA characters via the `TIPA` package. Here is an example:

[ʃip]-[ʃɪp] - Looks good.

Chapter 3: Using R

3.1 Basic math

Here are some simple math examples

```
24 - 23
```

```
## [1] 1
```

```
2345 * 23
```

```
## [1] 53935
```

3.2 Inline expressions

You can use inline r expressions like 2 plus 2 = 0

3.3 Run models

```
library("dplyr")
library("broom")

# Fit a model
mod <- glm(vs ~ mpg, data = mtcars, family = "binomial")

# make a table
mod %>%
  broom::tidy() %>%
  knitr::kable(., format = "pandoc")
```

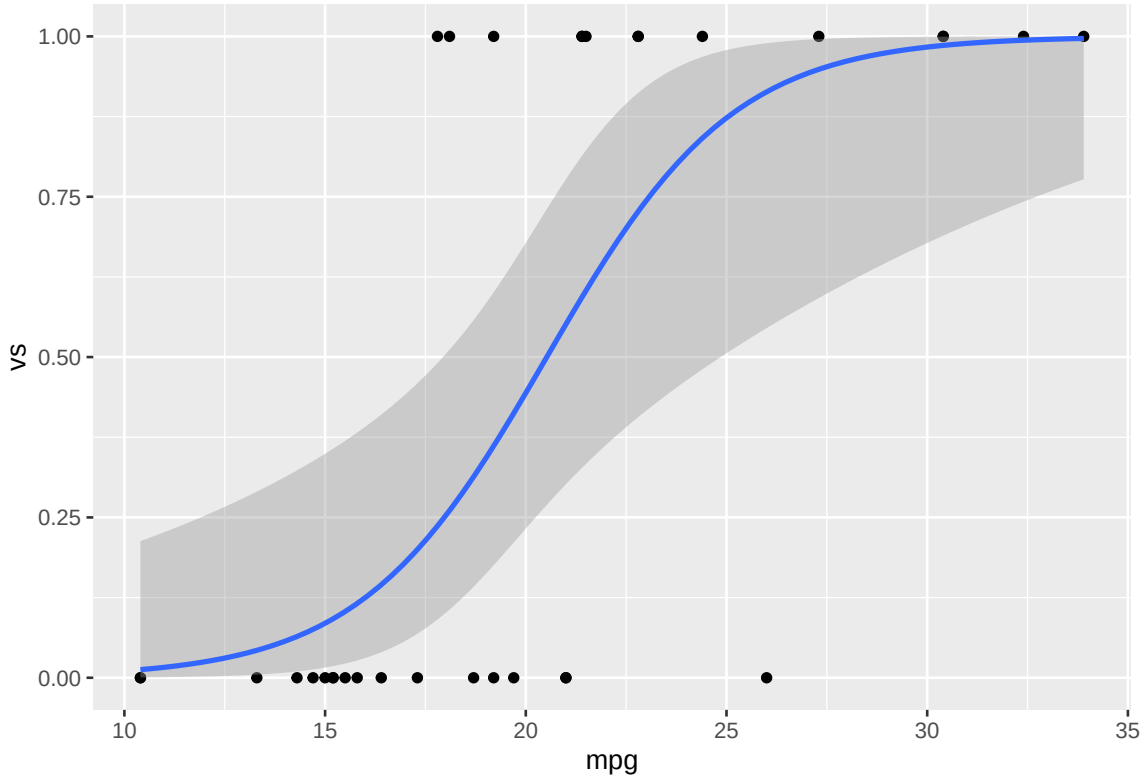
term	estimate	std.error	statistic	p.value
(Intercept)	-8.8330726	3.162274	-2.793266	0.0052179
mpg	0.4304135	0.158422	2.716880	0.0065900

3.4 Plots

And you can generate plots directly from this file as well.

```
library("ggplot2")


ggplot(mtcars, aes(x = mpg, y = vs)) +
  geom_point() +
  geom_smooth(method = "glm", method.args = list(family = "binomial"),
  formula = "y ~ x")
```


1.00
0.75
0.50
0.25
0.00
vs
10
15
20
25
30
35
mpg

Chapter 4: Sourcing .R files

4.1 Import scripts

We can use the following command to import an r script:

```
library("knitr")
read_chunk('../includes/scripts/test.R')
```

Notice that the `read_chunk()` command takes **this** file as the reference for specifying the path (this is different with regard to inserting graphics).

4.2 Call chunks

We can directly call knitr chunks from the `test.R` script. First let's load the libraries we will need.

```
library("dplyr")
```

Now we will generate some data.

```
# Generate data
set.seed(1)
vot  <- rnorm(20, 15, 5)
vot  <- sort(vot)
phon <- c(0,1,0,0,0,0,0,1,0,1,0,1,0,1,1,1,1,1,1,1)
df   <- as.data.frame(cbind(vot, phon))
```

Let's fit a model.

```
# Fit model
glm <- glm(phon ~ vot, data = df, family = "binomial")
```

What is the phoneme boundary?

```
# Get crossover point by hand
co_point <- as.numeric(coef(glm)[1] / (coef(glm)[2] * -1))
co_point
```

```
## [1] 15.53595
```

It looks like the boundary is at 15.5359483. Good. Let's plot it to see what it looks like:

```
# Plot regression with crossover point
plot(df$vot, df$phon, xlab = "vot", ylab = "phon",
     pch = 16, col = rgb(0, 0, 204, 102, maxColorValue = 255))
curve(predict(glm, data.frame(vot = x), type = "resp"), add = TRUE)
points(vot, fitted(glm), pch = 20)
abline(v = co_point, lty = 2, lwd = 0.75)
abline(h = 0.5, v = 0)
```

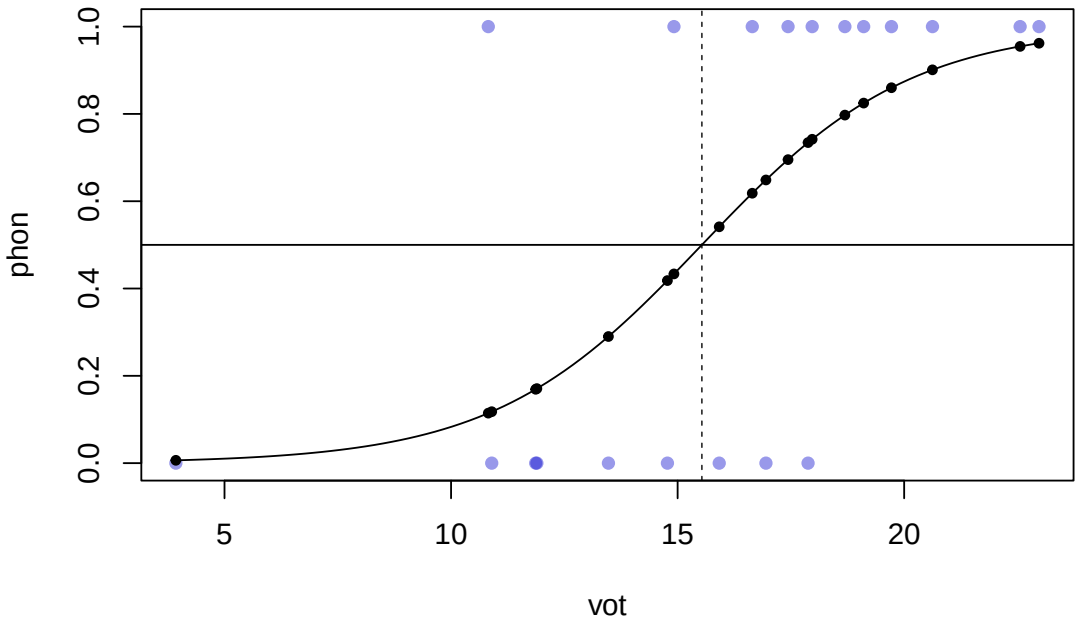


Figure 4.1: This is the caption

Appendix A: Sample Appendix

A.1 Bookdown style captions

A.1.1 Figure captions

Figure A.1 is an example of how we can use bookdown style figure captions.

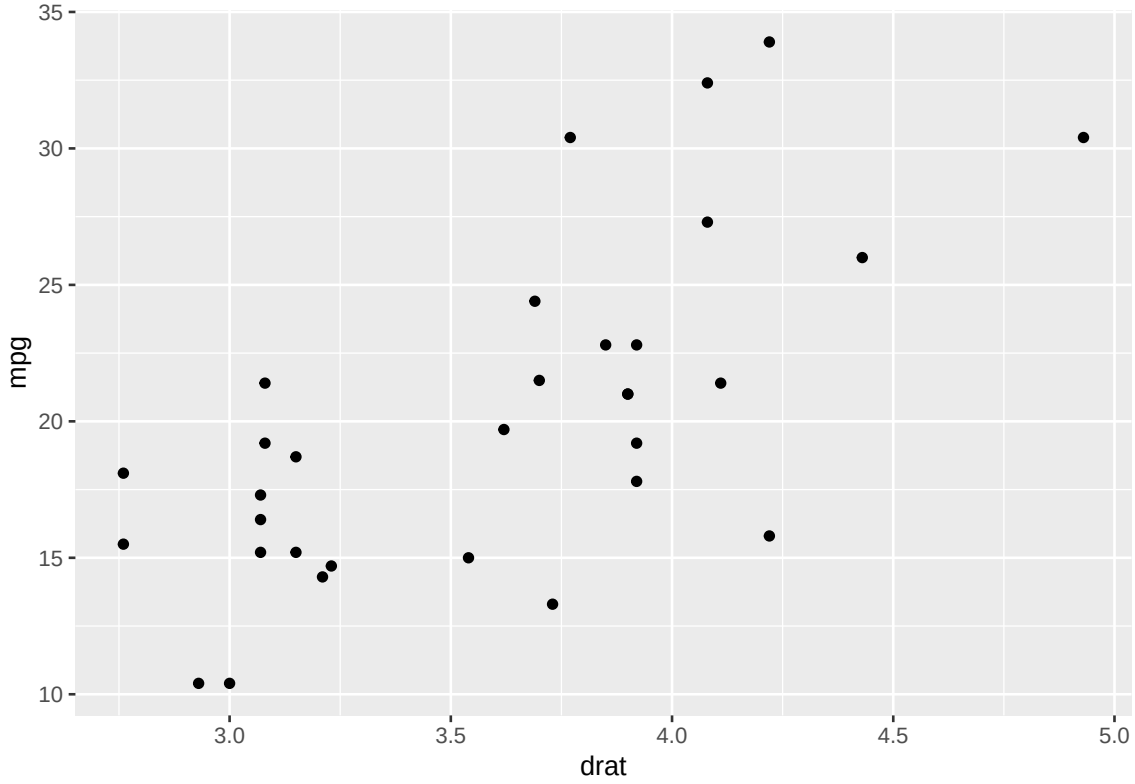


Figure A.1: This is an awesome figure caption.

A.1.2 Table captions

Table A.1 of the supplementary materials provides a numeric summary of the posterior distribution.

Table A.1: This is the table caption.

mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4

Appendix B: Another Appendix

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[2] Check footnote spacing.

dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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Author, F., Author, S., & Author, T. (2002). Random article about some stuff. *Random Journal*, *666*, 1–20.

Author, F., Author, S., & Author, T. (2015). Some more random stuff. *Random Journal*, *675*, 1–20.