CALTECH LIBRARY

BOOK TEMPLATE

Contents

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Introduction

Welcome to a demo of using bookdown to create an electronic textbook.

1.1 Markdown syntax

Markdown is a simple text-based way of formatting documents. There are many flavors of markdown, we'll start with standard markdown and then add some specific rmarkdown information. Let's look at some other basics:

- You can put text into *italics* and **bold** using * or **
- To create headings, put one or more # symbols at the beginning of a line, followed by a space. One # is for a level one header, ## for a level two header, etc.
- To make bullet lists (such as this one), just start lines with a -; you can get additional levels by starting a line a couple of spaces or a tab in. Numbered lists work the same way using 1. 2. 3.

  ```
  - Topic 1
  - Topic 2
  - Topic 3
    - Topic 3a
  ```

- To cite code (including markdown syntax as above) use ‘ on both sides for short bits and “‘ in a separate line above and below larger codeblocks.

- Quote text using > at the beginning of the line (maybe you remember this from old e-mail programs?)

  ```
  > This is a Quote
  ```

- A link is set putting the text that you want to highlight in square brackets followed by the link in round brackets. Don't forget to include `http://` or `https://` at the beginning of the link

```
[This is a link](http://www.example.com)
```

You can find more markdown formatting options here. Note that markdown comes in different dialects, referred to as “flavors”. The basic elements above are part of a consensus referred to as Common Markdown, though some of the more advanced options we’ll discuss later are specific to Rmarkdown.

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Customization

A lot of customization is conducted in the header of each .Rmd document. The base file, index.Rmd, includes configuration that applies to the entire book. There is also a _output.yml file that has more customization and configuration options.

2.1 Citations and Citation Styles

Bookdown has great support for citations, which are handled with BibTeX files (.bib). BibTeX is a reasonably standard reference citation format that can be produced by most reference managers and online services. This template includes a bibliography file AtlasBibTeX.bib as an example.

References are handled in the bibliography section of the YAML header. You'll see the following in he header of index.rmd:

'"bibliography: AtlasBibTeX.bib"'

Let's open the `AtlasBibTeX.bib` file and see what it looks like. You'll see citation information about each article in groups indicated by a document type tag, e.g., `@article`, followed by a unique citation key (typically the last name of an author and the year of publication, e.g. Young_2015), followed by citation information. We use the @ symbol to indicate a reference, so references in text look like `@Castro_2017`.

The citation style defaults to Chicago. If you want a different citation style, you can download a csl style file from the Zotero style registry. The template includes `springer-socpsych-brackets.csl` sas an example. You add the citation style file by using the csl section of the YAML like:

```
csl: aspringer-socpsych-brackets.csl
```

2.2 Bookdown Specific Features

You can label chapter and section titles using `{#label}` after them, e.g., we can reference Chapter 1. If you do not manually label them, there will be automatic labels anyway, e.g., Chapter 2.

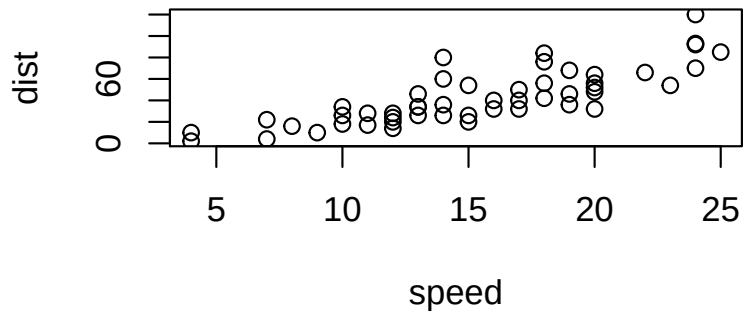
2.3 Including Code and Images

You can include computer code directly in your document, and it will be executed before the document is generated. You indicate that you're including code by using three back ticks "`, and then brackets {r chunk-label, echo = FALSE, fig.cap = 'A figure caption.'}} with the programming language. Next comes a label for the code chunk, and specific options for how the code is displayed. For example, this code chunk with do some basic math and make a simple plot in R.

```
## [1] 2
```

```
##  [1] -0.4068352  0.8035393  0.8947617  1.0465170 -0.7621892 -0.9053776
##  [7]  0.6397582 -0.2249841 -0.4036176  1.6680216
```

Figure 2.1: A figure caption.



The echo option defines whether both the input and output is shown. If we change echo to TRUE we can see all the source code

```
1 + 1
```

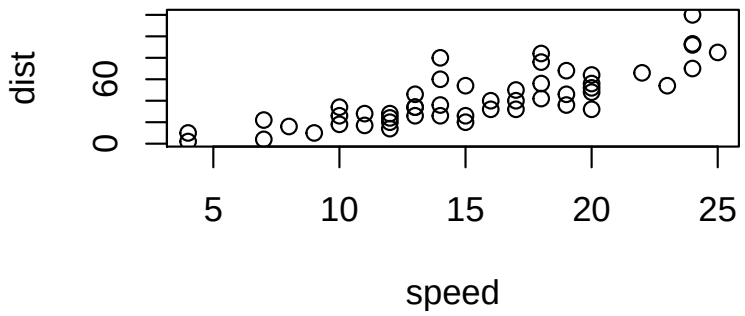
```
## [1] 2
```

```
rnorm(10)  # 10 random numbers
```

```
##  [1]  1.5248046  0.4149213 -0.4818043  0.2320972  0.3520773  0.6223242
##  [7]  1.9725390  0.2378793  0.2086457  0.5912043
```

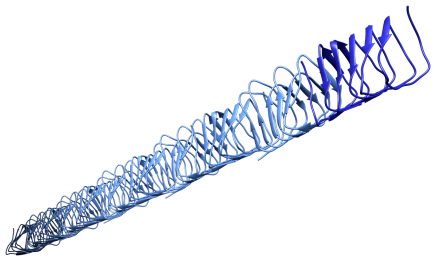
```
plot(dist ~ speed, cars)  # a scatterplot
```

Figure 2.2: A figure caption.



We include images in a directory in the project (say 'img'), and add them into the document using a code chunk and the include_graphics function like `knitr::include_graphics('img/3_6_1.gif')`:

Schematic: Bactofilin



PDB: 6RIB Bactofilins are found in many species of bacteria and archaea, suggesting that they perform diverse (and currently unknown) functions. They polymerize into very stable filaments with a triangular beta-helical structure, like this one from *Thermus thermophilus* [Deng et al., 2019]. Bactofilin filaments lack two hallmarks of actin- and tubulin-based cytoskeletal elements: polarity and dynamic

assembly/disassembly. In this way, they are similar to intermediate filaments in eukaryotic cytoskeletons.

2.4 LaTeX

You can embed any LaTeX directly in the document.

Inline LaTeX equations can be written in a pair of dollar signs using the LaTeX syntax, e.g., $f(k) = \binom{n}{k} p^k (1-p)^{n-k}$

Math expressions of the display style can be written in a pair of double dollar signs, e.g.,

$$f(k) = \binom{n}{k} p^k (1-p)^{n-k}$$

2.5 Caltech Custom Features

If you have a video on CaltechDATA, we can add embed it using just the DOI. This example also shows how you can define a caption using a ref label outside of am element, let Bookdown format it, and them embed it.

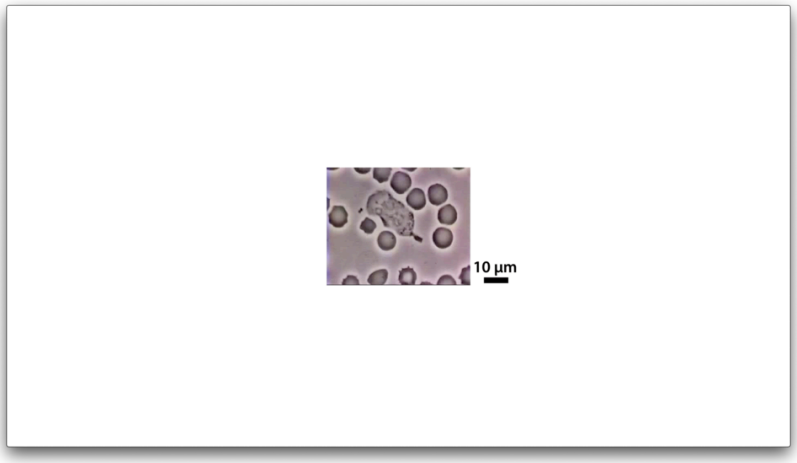


Figure 2.3: Staphylococcus aureus
Collected by: David Rogers Movie
DOI: 10.22002/D1.1463

We also provide a method for embedding video files locally, if you want the book to work offline.

Further Reading

Errington (2013). *L-form bacteria, cell walls and the origins of life* [Errington, 2013].

Ptacin and Shapiro (2013). *Chromosome architecture is a key element of bacterial cellular organization* [Ptacin and Shapiro, 2013].

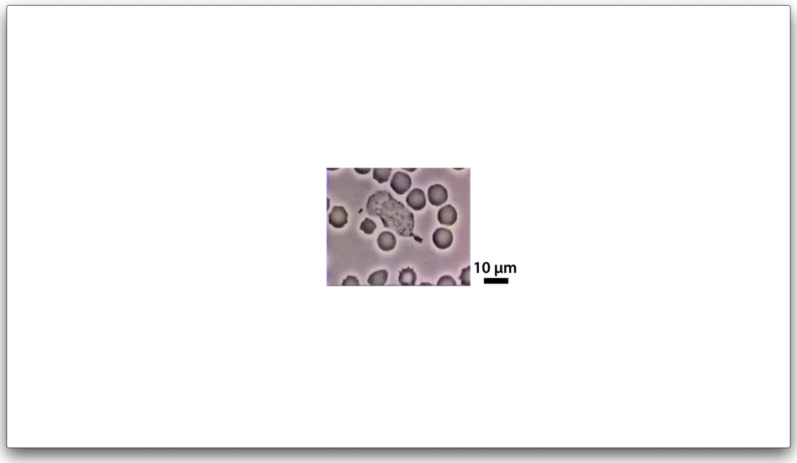


Figure 2.4: Staphylococcus aureus
Collected by: David Rogers Movie
DOI: 10.22002/D1.1463

Sleytr and Beveridge (1999). *Bacterial S-layers* [Sleytr and Beveridge, 1999].

Strahl and Errington (2017). *Bacterial membranes: Structure, domains, and function* [Strahl and Errington, 2017].

3
Bibliography

Xian Deng, Andres Gonzalez Llamazares, James M. Wagstaff, Victoria L. Hale, Giuseppe Cannone, Stephen H. McLaughlin, Danguole Kureisaite-Ciziene, and Jan Löwe. The structure of bactofilin filaments reveals their mode of membrane binding and lack of polarity. *Nat Microbiol*, 4(12):2357–2368, December 2019. ISSN 2058-5276. DOI: 10.1038/s41564-019-0544-0.

J. Errington. L-form bacteria, cell walls and the origins of life. *Open Biol*, 3(1):120143, January 2013. ISSN 2046-2441 (Electronic) 2046-2441 (Linking). DOI: 10.1098/rsob.120143.

J. L. Ptacin and L. Shapiro. Chromosome architecture is a key element of bacterial cellular organization. *Cell Microbiol*, 15(1):45–52, January 2013. ISSN 1462-5822 (Electronic) 1462-5814 (Linking). DOI: 10.1111/cmi.12049.

U. B. Sleytr and T. J. Beveridge. Bacterial S-layers. *Trends Microbiol*, 7(6):253–60, June 1999. ISSN 0966-842X (Print) 0966-842X (Linking). DOI: 10.1016/s0966-842x(99)01513-9.

H. Strahl and J. Errington. Bacterial membranes: Structure, domains, and function. *Annu Rev Microbiol*, July 2017. ISSN 1545-3251 (Electronic) 0066-4227 (Linking). DOI: 10.1146/annurev-micro-102215-095630.