Looking Beyond *Castor canadensis* as Nature's Best Engineer

by

Eager Beaver
B.S.E. 2015, Mechanical Engineering, Muddy Charles University

Submitted to the Joint Program in Oceanography and Applied Ocean Science & Engineering in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Mechanical & Oceanographic Engineering

at the

Massachusetts Institute of Technology

and the

Woods Hole Oceanographic Institution

Author . . . . . .
Department of Mechanical Engineering, MIT
Applied Ocean Science & Engineering, WHOI
March 14th, 1592

Certified by . . . . . .
Advisor Name
Professor of Mechanical and Ocean Engineering, MIT
Thesis Supervisor

Accepted by . . . . . .
Dept Chair Name
Professor of Mechanical Engineering, MIT
Chair, Department Committee on Graduate Students

Accepted by . . . . . .
Dept Chair Name
Associate Scientist with Tenure, Applied Ocean Physics & Engineering, WHOI
Chair, Joint Committee for Applied Ocean Science & Engineering

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Abstract

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Thesis Supervisor: Thesis Supervisor
Title: Thesis Supervisor Title

Acknowledgments

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1 Introduction

> In which the reasons for creating this package are laid bare for the whole world to see and we encounter some usage guidelines.

This package contains a minimal, modern template for writing your thesis. While originally meant to be used for a Ph. D. thesis, you can equally well use it for your honour thesis, bachelor thesis, and so on—some adjustments may be necessary, though.

1.1 Why?

I was not satisfied with the available templates for LaTeX and wanted to heed the style advice given by people such as Robert Bringhurst[1] or Edward R. Tufte.[2] While there *are* some packages out there that attempt to emulate these styles, I found them to be either too bloated, too playful, or too constraining. This template attempts to produce a beautiful look without having to resort to any sort of hacks. I hope you like it.

1.2 How?

The package tries to be easy to use. If you are satisfied with the default settings, just add

```
\documentclass{mimosis}
```

at the beginning of your document. This is sufficient to use the class. It is possible to build your document using either LaTeX|, XeLaTeX, or LuaLaTeX. I personally prefer one of the latter two because they make it easier to select proper fonts.

Package	Purpose
`amsmath`	Basic mathematical typography
`amsthm`	Basic mathematical environments for proofs etc.
`booktabs`	Typographically light rules for tables
`bookmarks`	Bookmarks in the resulting PDF
`dsfont`	Double-stroke font for mathematical concepts
`graphicx`	Graphics
`hyperref`	Hyperlinks
`multirow`	Permits table content to span multiple rows or columns
`paralist`	Paragraph ('in-line') lists and compact enumerations
`scrlayer-scrpage`	Page headings
`setspace`	Line spacing
`siunitx`	Proper typesetting of units
`subcaption`	Proper sub-captions for figures

Table 1.1: A list of the most relevant packages required (and automatically imported) by this template.

1.3 Features

The template automatically imports numerous convenience packages that aid in your typesetting process. Table 1.1 lists the most important ones. Let's briefly discuss some examples below. Please refer to the source code for more .

1.3.1 Typesetting mathematics

This template uses `amsmath` and `amssymb`, which are the de-facto standard for typesetting mathematics. Use numbered equations using the `equation` environment. If you want to show multiple equations and align them, use the `align` environment:

$$V := \{1, 2, \dots\} \tag{1.1}$$

$$E := \left\{(u, v) \mid \operatorname{dist}(p_u, p_v) \leq \epsilon\right\} \tag{1.2}$$

Define new mathematical operators using `\DeclareMathOperator`. Some operators are already pre-defined by the template, such as the distance between two objects. Please see the tem-

[1] Bringhurst, *The Elements of Typographic Style*.
[2] Tufte, *Envisioning information*, *The visual display of quantitative information*.

plate for some examples. Moreover, this template contains a correct differential operator. Use `\diff` to typeset the differential of :

$$f(u) := \int_{v \in \mathbb{D}} \operatorname{dist}(u, v) \, \mathrm{d}v \tag{1.3}$$

You can see that, as a courtesy towards most mathematicians, this template gives you the possibility to refer to the real numbers $\mathbb{R}$ and the domain $\mathbb{D}$ of some function. Take a look at the source for more examples. By the way, the template comes with spacing fixes for the automated placement of brackets.

1.3.2 Typesetting text

Along with the standard environments, this template offers `paralist` for lists within paragraphs. Here's a quick example: The American constitution speaks, among others, of (i) life (ii) liberty (iii) the pursuit of happiness. These should be added in equal measure to your own conduct. To typeset units correctly, use the `siunitx` package. For example, you might want to restrict your daily intake of liberty to 750 mg.

Likewise, as a small pet peeve of mine, I offer specific operators for *ordinals*. Use `\th` to typeset things like July 4th correctly. Or, if you are referring to the 2nd edition of a book, please use `\nd`. Likewise, if you came in 3rd in a marathon, use `\rd`. This is my 1st rule.

1.4 Changing things

Since this class heavily relies on the `scrbook` class, you can use *their* styling commands in order to change the look of things. For example, if you want to change the text in sections to **bold** you can just use

```
\setkomafont{sectioning}{\normalfont\bfseries}
```

at the end of the document preamble—you don't have to modify the class file for this. Please consult the source code for more information.

Acronyms

PCA	Principal component analysis
TDA	Topological data analysis

Glossary

LaTeX	A document preparation system
$\mathbb{R}$	The set of real numbers

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Bibliography

1. Bringhurst, R. *The Elements of Typographic Style* 4th ed. Hartley & Marks Publishers, Vancouver, British Columbia, Canada, 2012.
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3. Tufte, E. R. *The visual display of quantitative information* 2nd ed. Graphics Press, Cheshire, CT, USA, 2001.