

# **The Greatest Thing Since Sliced Bread**

by

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## **The Greatest Thing Since Sliced Bread**

### **Abstract**

Here is the abstract of your thesis. Make sure it properly reflects what you're doing, and gives a good summary that a reasonably general audience can appreciate.

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# Acknowledgments

I would like to begin by thanking my advisor, my committee, my parents, my significant other, and all the people who have supported me along the way.

*This thesis is dedicated to somebody special. You know who you are.*





# Chapter 1

## A Chapter Title

These notes are by John Anderson, based on things I commonly tell my own students.

Before going any further, note that this template is provided *as a convenience to you*. No warrantee or responsibility is offered or implied. The faculty of graduate studies publishes guidelines for theses, and I made some alterations to meet these and my own particular preferences as well. If yours or your supervisor's preferences are different, feel free to start from scratch or write your own template. If you are a student frantically having last minute problems with this template as you try to meet a deadline, the fault is yours. Using this template does not absolve you of the responsibility of checking that you are indeed meeting FGS guidelines for submitting your thesis: do not be surprised if they have changed since the last time this template was updated. Again, the responsibility of this all comes down to you.

This thesis template is based on the Harvard thesis template. More accurately, it *is* the Harvard thesis template, with changes made by others, and a few made by me

to fix particular problems I had over the years. I have also adapted some small things (e.g. the bibliography style) to my preferences. Everything here is acceptable to the University of Manitoba as of the date of this writing, but so are many other styles you might prefer to those used here. I make no argument for using these formatting choices over others, I simply provide them for convenience. Use what works for you, and make sure you get and read a copy of the current thesis guidelines from the Faculty of Graduate Studies.

The way this template is organized is with each chapter or appendix as a separate LaTeX file, with a master LaTeX file that gathers them all up. This is nice as your thesis gets longer, so that you don't have to wait for the processing of many other chapters just to see what the current chapter you're working on looks like. Simply alter the lines in the master file to include or exclude particular chapters as you go. You do have to remember that it is the **master file** on which you need to run LaTeX commands (i.e. *thesis.tex* in this template) because the master file defines the type of document and much of the formatting information. You'll only get errors if you try to directly run LaTeX on the individual chapter files, since they don't have enough information to define a complete document. You also, of course, need to fill in the front matter with details correct for your particular thesis. The template is set for proper double-sided printing. You can edit the document type in the master LaTeX file to make it single sided for the single-sided copy that is required by the Faculty of Graduate Studies. The template defaults to double-sided, both to save paper when submitting it to your committee and because you probably want double-sided for binding up your final document.

## 1.1 Your First Section

Good section organization is important. It's also important that you define LaTeX labels for all your sections and subsections, as well as chapters, figures, and tables. That way you can properly refer to them in the text, as you would if you were referring back to this (Section 1.1).

I prefer students to use a bibliographic format that orders the bibliography by name and shows the authors' names in a citation, to reduce the frequency of having to flip back to the bibliography. The natbib format is nice for this, and allows you to cite with full citations, like this [Anderson and Papanikolopoulos, 2007], or citations where the author's name is already used in the sentence, such as when referring to the work of Burgard et al. [2000]. Thus, one can avoid repeating names in a citation that are already given appropriate context in the text itself. You can even get the bib format to look up the author from a citation and have his or her name appear appropriately in your text as you write it, but without a full citation: Birk and Carpin's domain, from the work [Birk and Carpin, 2006]. If you turn to the bibliography in this sample document, however, you'll see that all the names are abbreviated - this keeps things consistent-looking even if you have sloppy BibTeX data (e.g. having some entries with full names and some with initials is pretty notorious and results in a very sloppy-looking bibliography). The bibliography style used here is easily changed if your advisor prefers something different (for example, use *plainnat* if you want the names verbatim just as they are in your BibTeX). There are also other bibliographic templates that have been created for natbib (for example, I have included the IEEE Transactions version for natbib, which can be used by setting the

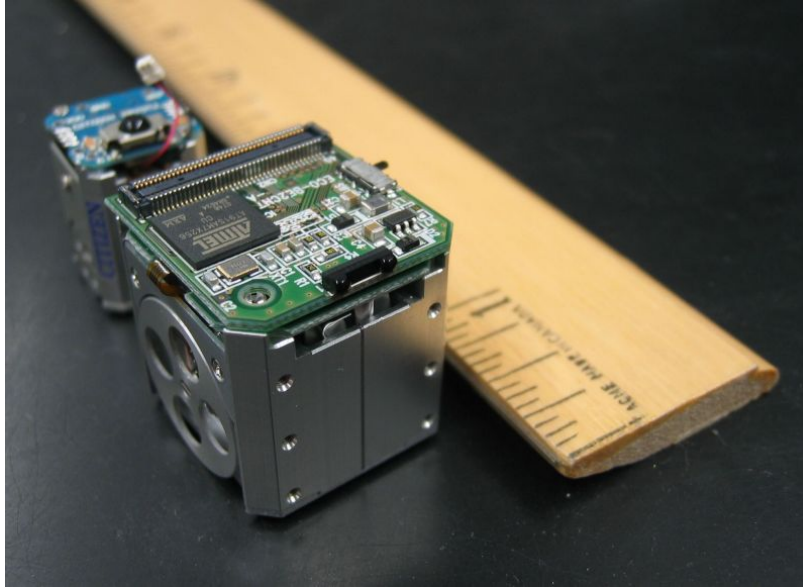


Figure 1.1: A Sample Figure. These robots might have been used by Burgard et al. [2000], but are in fact from my lab. Remember to cite in figures where necessary as well as in your main text.

bibliography type to *IEEEtranN*). The included natbib documentation also describes how to make up your own styles. Further, there is no requirement to use natbib at all - the normal styles (e.g. ACM, IEEE) most associated with work in computer science could just be used directly, but without the text formatting advantages of natbib.

Good use of figures and tables is also important. Figure 1.1 shows a figure created using a .jpg graphic. EPS graphics or postscript graphics are also possible. This template places figures in a folder called *images*, and you are strongly encouraged to organize your figures in further subdirectories within this, since you will likely have a lot of them. If you have many, it's advisable to put them in a directory (or subdirectories within each chapter). Tables can be in your main thesis too, and are also often used in appendices (such as Appendix A) to show data that may not be of immediate interest to those reading the body of your thesis.

LaTeX takes a bit of getting used to, but there are some nice editors out there for it that make your job easier. LaTeX is most commonly associated with a UNIX environment, but Windows tools exist as well (I like WinEDT and use it often).

# Appendix A

## Supporting Data

Appendices are typically used in theses to present supplemental information - for example, the data that goes into the summaries described in your thesis. They may also be used to present supplemental information (e.g. proofs) whose inclusion in the main text might be distracting from the main point of your thesis.

Whatever you use them for, you will typically have tables in it such as Table A.1. Summaries such as this table are more normally included directly in your thesis, but you could use a table in same general format as this one to present raw data as well. There are lots of good web pages and other forms of documentation on LaTeX's tabular environment, which is not trivial to use. There is also a reasonable Excel macro available (Excel2LaTeX) that you can use to convert an Excel spreadsheet to a LaTeX table while preserving much of the formatting information. This can save yourself a lot of formatting work. I have included that macro in same package as the rest of this template.

Writing your thesis is a significant challenge if you have never written a large

Table A.1: Summary of Results

Method	Average Time	Average Space	Goodness
None	592.35	79822.88	2161
case1	463.67	43917.58	1278
case2	533.48	52135.00	3224
case3	567.02	51697.60	1305
case4	467.67	24068.98	2323
case5	462.19	45043.30	1828
case6	508.15	46896.00	2253
case7	525.3	30869.03	3817
case8	490.11	24814.38	3856
case9	118.06	25125.75	3857

This table just contains random meaningless data. Each case represents 500 trials.

document before, but the result should be something you can take a great deal of pride in. A good tool like LaTeX can help make the writing process a lot easier by taking care of the details for you.

# Bibliography

- M. Anderson and N. Papanikolopoulos. Improving multirobot, cooperative search via local target queues. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 2590–2595, San Diego, CA, USA, 2007.
- A. Birk and S. Carpin. Merging occupancy grid maps from multiple robots. *Proceedings of the IEEE*, 94(7):1384–1397, July 2006.
- W. Burgard, D. Fox, M. Moors, R. Simmons, and S. Thrun. Collaborative multi-robot exploration. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 476–481, San Francisco, 2000.