

# L<sup>A</sup>T<sub>E</sub>X Thesis Template

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## **Abstract**

This document is a short template that will start you off in your quest to write your thesis using L<sup>A</sup>T<sub>E</sub>X. It is not a guide on how to use L<sup>A</sup>T<sub>E</sub>X (there are plenty of those on the web), but it does include some handy hints to get you going. The formatting styles (including the style of references in your bibliography) are suitable for PhD theses submitted from members of the School of Electrical and Electronic Engineering at the University of Nottingham. It is based on my own thesis, entitled “All-Optical Scanning Acoustic Microscope,” which is available from the University of Nottingham’s eThesis archive if you want to have a look.

Normally, here, you would write an abstract, usually a page or two in length.

### **Acknowledgements**

This is where you would thank your supervisor, and friends and colleagues who helped you in the course of your work and your write-up.

# Chapter 1

## Introduction

This document, and the others that accompany it, serve as a template and an example to how you can write your thesis using L<sup>A</sup>T<sub>E</sub>X. Note that this is *not* a guide on how to install L<sup>A</sup>T<sub>E</sub>X on your PC, nor is it a tutorial on how to use it. Nevertheless, this template provides information on how to include references, images and equations. Several books and countless web-pages have been written on the subject; this template should get you going for the specific job of writing your thesis.

Here is the opening paragraph of my thesis, I've left it as-is because it contains several references:

The work presented in this thesis is concerned with the realisation of a totally non-contact method of acquiring images of the interaction between surface acoustic waves (SAWs) and a solid material. The system uses lasers to generate and detect the SAWs, and has been developed from an accurate non-contacting laser based system for surface wave velocity measurement [1]. The system shall be termed the *O-SAM*—an acronym of *optical scanning acoustic microscope*— for the duration of this thesis. Immediately prior to the work described in this thesis, the SAW excitation method used in the system had begun to evolve, to incorporate custom computer generated holographic zone plates [2] to increase the SAW amplitude, and thus to pave the way for SAW imaging [3] and methods of SAW frequency control [4]. Much of this work is covered in the PhD thesis of F. Linnane [5].

You can see from chapter1.tex how to cite references. You put the references into a '.bib' file in a standard format (see 'example.bib'). You then use a utility called 'bibtex' to convert this information into beautifully-formatted text. So, in Linux, to create your document (in PDF format), you would enter the following commands:

```
pdflatex thesis
bibtex thesis
```

```
pdflatex thesis
```

```
pdflatex thesis
```

You need to run `pdflatex` several times, so that it can work out all the cross-references. This is a quirk of  $\text{\LaTeX}$  that you will soon get used to.

## 1.1 Main section heading

This is where you'd introduce this main section

### 1.1.1 This is a subsection

This is where you'd go into a bit more detail. Notice in the `.tex` file we have stuck a label on this section. If you want to refer to a section you would say, 'see section 1.1.1' ( $\text{\LaTeX}$  fills in the gaps for you).

#### **This is a subsubsection**

Notice it doesn't get its own number (well technically it does, it's just not displayed).

### 1.1.2 Example of including a figure

Now it's time for some graphics.

First you'd want to introduce a figure, then include it. You would label the figure, and so  $\text{\LaTeX}$  would be able to insert the correct figure number when you refer to it. So, here's a snippet from my thesis:

In terms of inspection of flaws in the interior of materials, the techniques can be broadly split into two areas: the *reflection* or *pulse-echo* technique, and the *transmission* or *pitch-catch* technique [6]. These two broad areas can be further split into *normal beam* and *angle beam* techniques. Figure 1.1 illustrates schematically the different techniques. The insets show how the received signals relate to the defects present.

We can then refer back to figure 1.1 at a later date.

If you use 'latex' to generate your thesis, then you need to provide graphics in the EPS format. If you use 'pdflatex' (and many Mac and Windows versions do) then you can use JPEG, PNG, PDF formats. In either case, just remove the suffix of the filename when you refer to it in the 'includegraphics' line.

Note that you can have a short caption (that appears in the list of figures) and a long caption that appears under your figure.

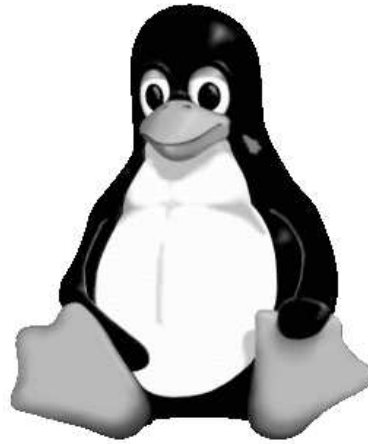


Figure 1.1: This is the long version of the caption, and this is the version that will appear underneath your figure. You should describe the figure in detail here.

### 1.1.3 Example of including an equation

Here's a simple equation and a text snippet copied from my thesis:

Consider a signal, such that its voltage  $V$  is described by:

$$V = A \cos(2\pi ft + \phi) \tag{1.1}$$

where  $A$  is the amplitude,  $f$  is the frequency and  $\phi$  is the phase. Given these three pieces of information, we can calculate  $V$  at any time  $t$ .

Of course we labelled the equation, so we can refer back to it: see equation 1.1.

## 1.2 Further information

The L<sup>A</sup>T<sub>E</sub>X Project webpage can be found at <http://www.latex-project.org/> and from here you can find links on how to download latex for your operating system of choice.

For help and assistance in writing L<sup>A</sup>T<sub>E</sub>X documents, see the list of guides at <http://www.latex-project.org/guides/> (or use Google). At a quick glance, the most useful one is Andrew Roberts' 'Getting to Grip with L<sup>A</sup>T<sub>E</sub>X', at <http://www.andy-roberts.net/misc/latex/>. The section on bibliographies is definitely worth a read.

The best reference book is Leslie Lamport's *Latex: A Document Preparation System* [7]. I believe there is a copy in the University Library.

Good luck with your write-up!



## Appendix A

# Your first appendix ‘chapter’

### A.1 This is the first section

Some text.

### A.2 This is the second section

Some more text.

## Appendix B

# Your second appendix ‘chapter’

### B.1 First section

Yet more text.

# Bibliography

- [1] M. G. Somekh, M. Liu, H. P. Ho, and C. W. See, “An accurate non-contacting laser based system for surface wave velocity measurement,” *Measurement Science and Technology*, vol. 6, pp. 1329–1337, 1995.
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- [4] M. Clark, F. Linnane, S. D. Sharples, and M. G. Somekh, “Frequency control in laser ultrasound with computer generated holography,” *Applied Physics Letters*, vol. 72, no. 16, pp. 1963–1965, 1998.
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