How to use the CMU-thesis LaTeX style

CMU-thesis Manual, v1.0, May 27, 2014

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1 Introduction

LaTeX provides the user with a mature professional typesetting system that can be used to produce nice-looking documents while at the same time removing some of the tediousness of dealing with citations, renumbering things while moving figures around, and so on. In this document, we will assume that the reader has at least some familiarity with LaTeX[1] so that basic document typesetting is not a big mystery.

Since typesetting requires running the TeX program, we will also assume that a fully functional LaTeX implementation is installed on the user's computer. There are many good implementations available on the web; for Mac OS X, we recommend TeXLive-2013 along with the TeXShop editor. For the PC platform, the MiKTeX implementation is quite good. Obviously, other editors will work as well (vim, emacs, etc), since the input files are simple text files. Dealing with citations is much easier if you use one of the freely available programs: on the Mac OS X platform, BiBDesk is really good, while on the PC you might want to use JabRef. Note that EndNote can export bibliography files for use with LaTeX, so if you already have an extensive citation database in EndNote, it would be trivial to convert it to the BiBTeX format.

In the following sections, we describe in some detail how to use the CMU-thesis style. Briefly, you can use this style to produce a complete overview document or a final thesis document, as well as all the announcements sheets.

2 Obtaining the CMU-thesis package

All the files needed to use the CMU-thesis package are maintained on the department's source code repository, gitorious.materials.cmu.edu. Simply look for the origin/LaTeX branch and fetch the entire archive or individual files. Note that this branch is read only; you can fork the branch into your own account, using the regular pull command. The files will be maintained by MDG; any problems, changes, requests for additions, etc., should be addressed to degraef@cmu.edu.

3 The CMU-thesis package

The CMU thesis style is defined in a series of files:

- cmu-thesis.cls is the main class file, and defines all the necessary formatting commands; it is loosely based on a similar file from the University of Michigan, but has since (2007) been modified extensively for local use. There is no need to ever edit (or even open) this file, unless you're really curious to know how things work.

- preamble.ins is a file that is called (inserted) by the main class file and contains a number of user-definable commands; see section 3.1 for details.

- sample-thesis.tex is an example file that uses the cmu-thesis.cls class file; details are described in section 3.3.

- frontmatter.tex contains all the code for dealing with overview/thesis announcements, title page, abstract, etc. See section 4.

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[1]There are many good resources and examples available on the web and in several books; the most useful reference book would be "The LaTeX Companion" (2nd edition) by Frank Mittelbach and Michel Goossens, Addison Wesley, 2004.

- references.tex is a file that can be included in the main document; as explained in section 3.4, it provides a path to your BiBTeX bibliography files.

- README.tex is the LaTeX source for this manual;[2] the corresponding pdf file is also provided.

3.1 User-definable commands in preamble.ins

The preamble.ins file is used to define a number of commands that are specific to your overview or thesis document. They are placed in a separate file to keep the main.tex file uncluttered. The default preamble file looks as follows:

```
1  %%%%
2  % define the general variables for the title page and the public oral announcement page
3  %%%%
4  \degree{Doctor of Materials Science and Engineering}
5  \department{Materials Science and Engineering}
6  \chairperson{Prof.\ First M. Last (MSE, Advisor)} % your advisor is also the committee chair
7  \advisor{Prof.\ First M. Last}
8  \committee{%
9  Prof.\ First1 Last1 (MSE)\\
10 Prof.\ First2 Last2 (MSE)\\
11 Prof.\ First3 Last3 (somewhere else)
12 }%
13 \title{This the complete thesis title}
14 \author{Yourfirst M. Yourlast}
15 \date{Someday, Somemonth 14} % overview or defense date
16 \degreedate{Somemonth, 2014}
17 \time{Someday, Somemonth 14\\ % same thing, but here we also enter the time
18 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ 9:00 AM}
19 \place{WEH 2327 (Mehl Room)}
20 \newcommand{\shortthesistitle}{A short title for headers}
21 \newcommand{\shortauthor}{Y.M. Yourlast}
22 \previousdegrees{B.S., Materials Science and Engineering, Carnegie Mellon University\\
23 M.S., Materials Science and Engineering, Carnegie Mellon University}
24 %%%%
25 % define your own special commands, e.g., abbreviations for things you use frequently
26 %%%%
27 \input{mycommands.ins}
28
29 %%%%%%%%%%%%%%
30 %%%%%%%%%%%%%%
31 % The entries below should not be changed by the user...
32 %%%%%%%%%%%%%%
33
34 % define a number of toggles for the frontmatter
35 \newtoggle{overviewannouncement}
36 \newtoggle{defenseannouncement}
37 \newtoggle{titlepage}
38 \newtoggle{dedication}
39 \newtoggle{abstract}
40 \newtoggle{acknowledgements}
41 \newtoggle{publist}
```

---

[2]Note that this manual is formatted using the scrartcl class which may or may not be installed in your LaTeX distribution. This class is typically useful for documents that are formatted on the European A4 paper format; given that the author of this document has his roots in Europe, it shows that old habits die hard …. If you can not typeset this manual on your system, no worries, simply read the pdf file.

```
42  \newtoggle{ToC}
43  \newtoggle{figuretablelist}
44  \newtoggle{symbollist}
45  % and set all toggles to false by default
46  \togglefalse{overviewannouncement}
47  \togglefalse{defenseannouncement}
48  \togglefalse{titlepage}
49  \togglefalse{dedication}
50  \togglefalse{abstract}
51  \togglefalse{acknowledgements}
52  \togglefalse{publist}
53  \togglefalse{ToC}
54  \togglefalse{figuretablelist}
55  \togglefalse{symbollist}
56
57  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
58  %
59  % format the special page headings, using the fancyheadings package
60  %
61  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
62  \pagestyle{fancy}
63  \renewcommand{\chaptermark}[1]
64    {\markboth{\uppercase{\thechapter.\ #1}}{}}
65  \renewcommand{\sectionmark}[1]
66    {\markright{\uppercase{\thesection.\ #1}}}
67  \lhead[\itshape \thepage]{\itshape \rightmark}
68  \rhead[\itshape \leftmark]{\itshape \thepage}
69  \chead{}
70  \lfoot[\small\itshape\shortauthor]{\small\itshape\shortthesistitle }
71  \rfoot[\small\itshape\shortthesistitle]{\small\itshape\shortauthor}
72  \cfoot{}
73
74  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
75  %
76  %  STUFF RELATED TO FIGURES
77  %
78  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
79  \iftoggle{oldpreamble}{% this is only for backwards compatibility with the older preamble file
80  % declare the locations for the figures
81   \newcommand{\FigFolder}{./figures/}
82  % labels for figures and tables, to simplify changes in the order
83  % of the chapters.  Five of them need to be renewcommand-ed
84  % at the beginning of each chapter.
85  %
86  \newcommand{\FigLabel}{fig01:}
87  \newcommand{\TabLabel}{tb01:}
88  \newcommand{\ChapLabel}{chap01:}
89  \newcommand{\SecLabel}{sec01:}
90  \newcommand{\SsecLabel}{ssec01:}
91  \newcommand{\figref}[1]{Fig.~\ref{\FigLabel #1}}
92  \newcommand{\tabref}[1]{Table~\ref{\TabLabel #1}}
93  % this deals with the figure environment and is called with
94  % 2 arguments:  \insertfigure{filenamebase}{caption}
95  % where filenamebase is identical to the label,
96  % and caption is whatever the caption is
97  \newcommand{\insertfigure}[2]{%
98              \begin{figure}[ht]
99                      \centering
100                     \leavevmode
```

```latex
101                        \epsffile{\FigFolder #1}
102                        \caption{#2}
103                        \label{\FigLabel #1}
104                \end{figure}
105    }
106    % the following command allows for the setting of the figure width (3rd parameter)
107    \newcommand{\insertfigurew}[3]{%
108                \begin{figure}[ht]
109                        \centering
110                        \leavevmode
111                        \epsfxsize=#3\epsffile{\FigFolder #1}
112                        \caption{#2}
113                        \label{\FigLabel #1}
114                \end{figure}
115    }}{% use the new preamble commands
116    \newcommand{\figref}[1]{Fig.~\ref{#1}}
117    \newcommand{\tabref}[1]{Table~\ref{#1}}
118    %
119    % \insertfigure{filenamebase}{caption}
120    \newcommand{\insertfigure}[2]{%
121                \begin{figure}[!tb]
122                        \centering
123                        \leavevmode
124                        \epsffile{#1}
125                        \caption{#2}
126                        \label{#1}
127                \end{figure}
128    }
129    % the following command allows for the setting of the figure width (3rd parameter)
130    \newcommand{\insertfigurew}[3]{%
131                \begin{figure}[!tb]
132                        \centering
133                        \leavevmode
134                        \epsfxsize=#3\epsffile{#1}
135                        \caption{#2}
136                        \label{#1}
137                \end{figure}
138    }}
139
140    \hyphenpenalty=10
141
142    %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
143    %
144    % and list all files used at the end of the run
145    %
146    %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
147    \listfiles
```

Before you start using the cmu-thesis class, you must edit this file and change the arguments of the commands on lines 6-20 to appropriate arguments. The command name should be clear enough for you to know what is needed as argument.

On line 25, an extra file is read in using the \input{} command. This file can be used to store all the user defined commands. The file is separate from the preamble file so that a new version of the preamble will not overwrite the already existing user-defined commands. The mycommands.ins file is not part of the cmu-thesis distribution.

In the mycommands.ins file, you can define your own commands for things that you will need frequently, such as complex chemical formulae, a long word or word sequence that you don't want

to retype each time, etc... Here is how to define a short hand notation for the chemical composition of the mineral beryl:

```
\newcommand{\beryl}{\Be$_3$\Al$_2$\Si$_6$\O$_{18}$}
```

To use this command in a sentence, you would simply type \beryl\ to obtain $Be_3Al_2Si_6O_{18}$ in the middle of the sentence. Note that the command is terminated by a backslash; the reason for this backslash is to force the typesetting engine to leave a space between the symbol and the following word. In other words, without the end backslash we would read $Be_3Al_2Si_6O_{18}$and the next word (and) would be right up against the symbol; in case you didn't notice it, on the previous line, there is no space between the subscript $_{18}$ and the word "and."

Here is how to define a shorthand notation for the "degrees centigrade" symbol:

```
\newcommand{\Cdg}{C$^\circ$}
```

which can be used in a sentence by typing \Cdg\ to get 100 C° or between parenthesis as (C°); in this latter case, there is no need for the ending backslash because the closing parenthesis takes on that role.

New commands can also have one or more arguments, as in the next example:

```
\newcommand{\bv}[1]{\mathbf{#1}}
```

This is a shorthand notation for bold-faced vector symbols, as in $\bv{q}$ to get the vector **q**, which would normally require $\mathbf{q}$. Note that the dollar signs are not part of the definition of \bv{}, so that the same command can also be called from inside displayed equations. If more than one argument is needed, the same command declaration format can be used:

```
\newcommand{\Css}[2]{C^{#1}_{#2}}
```

This command contains math symbols for subscript and superscript, so it must be used inside a math environment; typing

```
\begin{equation}
   \Css{\alpha}{\beta} = \sum_{k=1}^{3}\Css{\alpha}{k}\Css{k}{\beta}.\nonumber
\end{equation}
```

yields:

$$C_\beta^\alpha = \sum_{k=1}^{3} C_k^\alpha C_\beta^k.$$

There are many other commands that the user might want to define; for instance, instead of having to type Transmission Electron Microscopy each time, we can simply use the command \TEM, defined as:

```
\newcommand{\TEM}{Transmission Electron Microscopy}
```

and use it as \TEM\ to obtain Transmission Electron Microscopy in a sentence.

3.2 Other things defined in preamble.ins

The remaining entries in the preamble.ins file deal with a variety of pre-defined commands that should not be modified by the user (although you can always define modifications of these commands by using a different command name).

Lines 33-51 define a number of true-false toggles that allow you to generate certain items in the final output. Each toggle is defined here, and set to false by default. You can use the \toggletrue{} switches in the main source file to turn individual items on.

Lines 58-68 define the layout of the page headers and footers; this uses the fancyheadings package, which should be part of a complete LaTeX installation. This is where the \shortthesistitle{} and \shortauthor{} commands are used.

Lines 75-134 define a particular way to deal with figure and table labels, and provide a shorthand notation to insert a figure into a document. There are two sets of command definitions; the value of the oldpreamble toggle determines which block will be active.[3]

Lines 112-113 define shorthand commands to cite figures and tables. If figure 15 has label microstructure1, then you can refer to this figure by typing \figref{microstructure1} which produces Fig. 15 in the text.

If you decide to use the epsfig package for figures,[4] then the two commands defined on lines 116 and 126 provide convenient ways to do so. Let's assume that you have a figure that was created in Adobe Illustrator, and named micro1.eps; the figure is located in the folder set by the \graphicspath{} command in the main file (see next section). You can include this figure in your text by using the command:

```
\insertfigure{micro1}{This is the figure caption}
```

The \insertfigure{}{} command will use the first argument both as the file name, and as the figure label; you can then use \figref{micro1} to refer to the figure. The second command, \insertfigurew, has an extra argument that allows you to specify the width of the figure:

```
\insertfigurew{micro1}{This is the figure caption}{4.5in}
```

which will force the width of the figure to be 4.5 inches, regardless of the size specified in the eps file.

This is just one way to deal with figures. As you gain more confidence with LaTeX typesetting, you can try to define new commands that deal with your specific needs, e.g., putting two figures next to each other, putting a figure in the margin, etc. There are also many examples on the web, so you won't have to reinvent the wheel for anything that you will likely need for your thesis document.

3.3 Sample master file

Before we discuss the layout of a typical thesis document, we should explain the difference between the LaTeX \input{} and \include{} commands. When you typeset a document, starting from a given .tex file, the TeX program will generate a series of additional files. Among those files there is a file with the same name as the source file, and extension .aux (auxiliary). This is a text file that contains information about citations, figures, tables, section labels, index entries, and so on; the .aux file is how LaTeX keeps track of the overall structure of your document. When you run the

---

[3]If you used a version of the cmu-thesis.cls package prior to May 19, 2014, then you may have used commands that are no longer supported in the new version of the preamble.ins file. This does not mean that you need to rework all your source files. You can simply set the oldpreamble toggle to true in the main source file to continue to use the older commands. If you are new to this package, we suggest that you set oldpreamble to false (the default value).

[4]You could also use the includegraphics package.

program a second time, the first thing that will happen (after loading packages) is that the .aux file is read. If your source consists of multiple files (for instance, a main.tex file and several chapter#.tex files), then you can typeset only a portion of the entire document (we'll show below how to do this), but you want the program to still "know" all the labels and such from the other portions; this is done by reading all the .aux files.

The difference between \input{} and \include{} is easy to understand:

- \input{name.ext} inserts a text file name.ext at the current position in the document. This could be useful to define special commands that are all collected in a single file. In the current case, this is how the preamble.ins file is read.

- \include{name.tex} expects a LaTeX source file as its argument. This command will also force the typesetting engine to read the corresponding name.aux file, if it exists. The \includeonly{} command can be used to control which files will actually be included in the document. As an example, let us assume that there is a main.tex source as well as three chapter files, chapter01.tex, chapter02.tex, and chapter03.tex. In the main.tex file, you will want to have three \include{} commands as follows:

  ```
  \include{chapter01}
  \include{chapter02}
  \include{chapter03}
  ```

  Note that the extension .tex is not needed. If the source is then typeset, all three chapter files and their corresponding .aux files will be read and typeset. If you want to typeset only chapter02.tex, then you must tell the typesetting engine to \includeonly{chapter02}; note that this command must be located in the document preamble, i.e., before the \begin{document} command. In that case, only chapter 2 will be typeset in your output file (typically a PDF file), but the .aux files from the other two chapters will still be read. This allows you to refer to a figure or equation in another chapter (one that was typeset at some earlier time, so that its .aux file exists) without actually needing to have that chapter in your output.

Next, let's take a look at the sample-thesis.tex file. Here is an abbreviated version of this file:

```
1   \documentclass{cmu-thesis}
2
3   % load package files
4
5   \usepackage{helvet} % load Helvetica font type
6   \usepackage{epsfig} % commands for dealing with Encapsulated Postscript files
7   \usepackage{fancyheadings} % replaces standard page headers/footers by nicer looking ones
8
9   % many more packages are loaded in the real sample-thesis file
10
11  \usepackage{longtable} % allows for multi-page tables
12  \usepackage{pdflscape} % allows for figures in landscape mode
13
14  % comment the following line for the final version
15  \usepackage{showkeys} % highlights all label definitions, citations, etc
16
17  % the hyperref package should be the last one in the list
18  \usepackage[plainpages=true,pdfpagelabels]{hyperref} % creates hyperlinks for section headers etc.
19
20  % setup the format for hyperlinks (you can change the colors below)
```

```
21  \hypersetup{%
22   colorlinks=true,
23   linkcolor=black,
24   anchorcolor=black,
25   citecolor=black,
26   urlcolor=blue,
27   breaklinks,
28   pdfborder=0 0 0}
29
30  % define where you keep your figures
31  \graphicspath{ {./figures/} }
32
33  %
34  \newtoggle{oldpreamble}
35  \togglefalse{oldpreamble}
36  % if you already used the cmu-thesis style to generate
37  % a document, then that means that you used the "old"
38  % preamble.ins file (version from before May 19, 2014).
39  % In that case you should uncomment the following line:
40  %
41  %\toggletrue{oldpreamble}
42
43
44  % read the preamble
45  \input{preamble.ins}
46
47  % define what you want to do by uncommenting the following lines
48  %\toggletrue{overviewannouncement}
49  %\toggletrue{defenseannouncement}
50  %\toggletrue{titlepage}
51  %\toggletrue{dedication}
52  %\toggletrue{abstract}
53  %\toggletrue{acknowledgements}
54  %\toggletrue{publist}
55  %\toggletrue{ToC}
56  %\toggletrue{figuretablelist}
57  %\toggletrue{symbollist}
58
59  %declare which files to include
60  \includeonly{frontmatter,introduction,experiments,background,appendixa,appendixc}
61
62  % start document
63  \begin{document}
64
65  % front matter
66  \pagenumbering{roman}
67  \include{frontmatter}
68
69  % main matter
70  \pagenumbering{arabic}
71  \mainmatter
72  \setcounter{page}{1}
73  \include{introduction}
74  \include{background}
75  \include{experiments}
76  \include{conclusions}
77
78  % back matter
79  \backmatter
```

```
80   \appendix
81   \include{appendixa}
82   \include{appendixb}
83   \include{appendixc}
84   \include{appendixd}
85   \include{references}
86
87   \end{document}
```

Note that comments in LaTeX source files start with the percent character %; it improves the readability of a source file if you intersperse meaningful comments throughout the file.

Line 1 in the document loads the document class file **cmu-thesis**; this line must be the first one in your file, apart from comment lines. This is followed by the loading of **package** files; packages are collections of predefined LaTeX commands that accomplish a particular typesetting goal. Line 5 loads a package that replaces the default font (Computer Modern) by Helvetica, line 6 loads a package that contains commands for using Encapsulated Postscript files, and so on. The **sample-thesis.tex** file loads many more packages. You can browse the **ctan.org** web site to get an idea of all available packages, along with manuals for all the commands in each package.

Line 15 loads a package called **showkeys**, which, when loaded, will print all labels and citations in the margins of the document; this is useful when editing a lengthy document, to make sure that correct labels and references are used, but it should be turned off in the final version of the document by commenting out this line.

Line 18 loads the **hyperref** package, which is used to make the entries in the Table of Contents clickable links inside the final PDF output file. In addition, citations and references to equations and sections are also turned into hyperlinks. Lines 21-28 define the appearance of such links; the user can set the color of links, anchors, urls and so on. As with most packages, there are many additional settings and commands; the user should consult the manual pages for this and other packages to learn how to use them.

Line 31 declares the path for figure files; as discussed in section 5, it is a good idea to keep all your figures separate from the LaTeX source files, and this command tells the typesetting engine where the figures can be found.

On line 41, you can uncomment the **toggletrue**{oldpreamble} command to use the older version of the preamble file; this is only provided for backwards compatibility for those students who have already created an overview or thesis document, but wish to use the new preamble file.

In line 45, the engine is told to load the **preamble.ins** file, which was discussed in detail in section 3.1.

In lines 48-56, you can uncomment any line to include the corresponding item in your output file; so, if you want a title page, then simply uncomment the line that says %**toggletrue**{titlepage}.

Line 59 declares which source files should be typeset in the output file; in this example, five source files will be included. To include all source files (which you would need to do for the final typesetting run of your thesis document) you can simply comment out this line.

The actual document begins at line 62; everything preceding line 62 is known as the *preamble*. Every **begin**{} statement must have a corresponding **end**{} statement, which is found on the last line of the file. The contents of the document are subdivided into three regions:

- *front matter*: this includes the title page, dedication page, preface, table of contents, list of figures, list of tables, list of symbols, etc. Typically, the page numbering of this section uses roman numerals, as defined in line 65.

- *main matter*: the main portion of the document consists of multiple chapters, and uses arabic

numerals for page numbers. The actual page number must be reset to 1 (line 71) before
including any chapter files.

- *back matter*: this includes the appendices, if any, citations, and index (if one is required; typically, for a thesis document, there is no need for an index). The \appendix{} command must be issued before including any appendix files, to make sure that equation numbers and such are properly formatted (i.e., A-1 instead of 1).

The example file shows how to deal with a large document that consists of many sections. It is good practice to keep each chapter in its own source file, and to list all chapters, in the correct order, as \include{} commands in the document section of the main.tex file. Once everything is properly set up, then you will only need to modify the argument of the \includeonly{} command to typeset individual sections (chapters) of your document. You can have many versions of this command commented out, with only the one you currently need uncommented, as in this example:

```
%\includeonly{chapter01}
%\includeonly{chapter02}
\includeonly{chapter01,chapter03}
%\includeonly{chapter03}
```

In this example, both chapters 1 and 3 will be typeset, and the .aux file of chapter 2 will be read (provided there is an \include{chapter02} command in the main document section).

3.4 How to deal with citations

The file references.tex is needed to define where your bibtex file(s) is/are located. Open the file with your favorite editor, and modify the last line of the file (no need to change anything else in this file). The repository file will have the entry

```
\bibliography{bibfile}
```

which indicates that there is a file called bibfile.bib in the current folder. It is probably a good idea to create a separate folder to keep your bibliography files. Assuming that you have a folder called citations in your main folder, and you have two bibtex files called bib1.bib and bib2.bib, then you should modify the above line to:

```
\bibliography{citations/bib1,citations/bib2}
```

Obviously, you can specify a full path name, so that your bibtex files can be located anywhere on your drive.

There is no real need to ever directly edit a bibtex file by hand, since the bibliography programs (e.g., BiBDesk) will take care of all the formatting details. Just a few comments that will help you avoid common pitfalls:

1. *citation labels*: each citation needs to be given a label, that can be used to insert the citation in the text using the \cite{} command. Obviously, citation labels need to be unique. It is good practice to make the label something that you can easily generate and recognize. While there are a few different ways of doing this, the following method is quite easy to apply consistently: take the last name of the first author, put it in lower case, add the year of publication, and follow this by a lowercase letter "a", "b" etc., to allow for the fact that an author may have more than one paper in a given year. so, for the following citation:

```
C. Phatak, M. Pan, A.K. Petford-Long, S. Hong and M. De Graef,
"Magnetic interactions and reversal of artificial square spin ices,"
New Journal of Physics, vol. 14, 075028 (2012)
```

you would construct the label as "phatak2012a" and use \cite{phatak2012a} in the text.

2. *entering author names*: it is good practice to always enter author names in the same way, to avoid potential issues with the formatting of initials and such. Experience shows that the following approach causes a minimum of problems. Consider the citation above; the list of authors should be entered in BiBDesk (or equivalent) as follows:

```
\author = {Phatak, C. and Pan, M. and Petford-Long, A.K. and Hong, S. and De Graef, M.}
```

Note the use of a comma after each last name, but not after the initials; also note the use of *and* after each author. Doing things this way will inform the bibtex program, among other things, that *De* and *Graef* need to be kept together.[5] Other ways of entering author names may also work, but the method above should not cause any issues.

3. *how to use capital letters in article/book titles*: the bibtex typesetting program has the annoying habit of automatically lowercasing all uppercase letters in the title of a book or article, except for the first capital. So, if the title were

```
Applications of EBSD to Ni and Al
```

it would be typeset as *Applications of ebsd to ni and al*. To avoid this, it is necessary to enclose the capital letters between curly braces, as in

```
Applications of {EBSD} to {N}i and {A}l
```

4 The front matter

The front matter section contains a series of items that can be turned on or off (default off) by using the toggle switches in the main source file. A typical frontmatter.tex file is provided and reads as follows:

```
1  % for each entry, the comment line states whether it is required or optional,
2  % and also O for Overview and T for Thesis
3
4  %%%% [OPTIONAL, O]
5  \iftoggle{overviewannouncement}{%
6    \makeoverviewannouncement
7  }{} % end \iftoggle
8
9
10 %%%% [OPTIONAL, T]
11 \iftoggle{defenseannouncement}{%
12  \makedefenseannouncement
13 }{} % end \iftoggle
14
```

---

[5] I have, over the years, received regular mail addressed to *Prof. De*; surprisingly, the CMU post office has always managed to get those letters to the right location.

```latex
15
16  %%%% [REQUIRED, O and T]
17  \iftoggle{titlepage}{%
18    \maketitle
19  }{} % end \iftoggle
20

21
22  %%%% [OPTIONAL, T]
23  \iftoggle{dedication}{%
24  \dedication{{\large To my dog, who did not eat my homework\\
25  (and to my cat as well)}}
26  \makededication
27  }{} % end \iftoggle
28

29
30  %%%% [REQUIRED, O and T]
31  \iftoggle{abstract}{%
32  % add this page to the Table of Contents
33  \phantomsection
34  \protect\addcontentsline{toc}{chapter}{Abstract}
35  %
36  \begin{center}\textbf{Abstract}\end{center}
37  \vspace*{0.1in}
38
39  \noindent This is the abstract, as long as it needs to be \ldots
40  }{} % end \iftoggle
41

42
43  %%%% [REQUIRED, T]
44  \iftoggle{acknowledgements}{%
45  \phantomsection
46  \protect\addcontentsline{toc}{chapter}{Acknowledgements}
47  \acknowledgements{
48  \noindent I wish to thank many many people...
49
50  \vspace{0.2in}
51  \singlespacing
52
53  %%%% CHANGE HERE %%%%
54  \emph{\author}
55
56  \emph{check frontmatter.tex file and insert name and date here ... }
57
58  \emph{Pittsburgh, PA}
59
60  \emph{\date}
61  %%%% CHANGE HERE %%%%
62
63  \doublespacing
64  }
65  \makeacknowledgements
66  }{} % end \iftoggle
67

68
69  %%%% [OPTIONAL, T (but strongly suggested)]
70  \iftoggle{publist}{%
71  % add this page to the Table of Contents
72  \phantomsection
73  \protect\addcontentsline{toc}{chapter}{List of Publications Resulting from this Work}
```

```
74   %
75   \begin{center}\textbf{List of Publications Resulting from this Work}\end{center}
76   \vspace*{0.5cm}
77   The following papers related to the work presented in this thesis have been published or submitted:
78   \begin{enumerate}
79          \item \ldots
80   \end{enumerate}
81   }{} % end \iftoggle
82
83
84   %%%% [REQUIRED, O and T]
85   \iftoggle{ToC}{%
86     \tableofcontents
87   }{} % end of \iftoggle
88
89
90   %%%% [OPTIONAL for O, REQUIRED for T]
91   % followed by the List of Tables and List of Figures
92   %%%%
93   \iftoggle{figuretablelist}{%
94     \listoftables\clearpage
95     \listoffigures\clearpage
96   }{} % end of \iftoggle
97
98
99   %%%%%%%%%%
100  % Add list of notation
101  %%%%%%%%%%
102  \iftoggle{symbollist}{%
103  \phantomsection
104  \protect\addcontentsline{toc}{chapter}{List of Symbols}
105  \notationlist{
106  \begin{center}
107  \begin{longtable}{lp{0.1in}p{3.75in} }
108     $\alpha$ & & the first letter of the Greek alphabet \\
109     $x$  & & the typical symbol for an unknown quantity
110  \end{longtable}
111  \end{center}
112
113  }
114  \makenotationlist
115  }{} % end of \iftoggle
116
117
118  %%%%
119  % that's it for the frontmatter
120  %%%%
```

Note that there is one place in the frontmatter file where you will need to change two entries! Look for the word "CHANGE" to find that location.[6] Then enter your full name and the date at the appropriate locations and save the file. Make sure to leave the empty lines between the three commands!

By default, none of the entries in your frontmatter file will appear in the output; you must explicitly turn on those items that you wish to typeset.

---

[6]Due to some intricacies of LaTeX, it appears to be difficult to pass the author and date variables from the preamble file to the frontmatter file, so for now we'll have to do this manually.

- *Overview Announcement*: this option produces a properly formatted announcement page for your overview.

- *Defense Announcement*: this option produces a properly formatted announcement page for your defense.

- *Title Page*: produces a properly formatted title page for your overview/thesis document.

- *Dedication*: add a separate dedication page after the title page.

- *Abstract*: an abstract will appear after the dedication page and can be of arbitrary length.

- *Acknowledgements*: this is where you thank everyone for whatever help or support they provided; can be of arbitrary length.

- *Publication List*: here is where you list all of the publications that were produced during your research period.

- *Table of Contents*: includes a hyperlinked Table of Contents in the document.

- *List of Figures and Tables*: include separate lists of Figures and Tables.

- *List of Symbols*: add your own list of symbols.

5 Useful tips

Here are a few potentially useful tips as you start preparing your overview/thesis document:

1. Create a folder called Thesis (or Overview) somewhere on your hard drive, and in it, a sub-folder called figures. This will allow you to keep figures and LaTeX source separate and clearly organized. Place all the class files and this README.pdf file inside this top folder, so that you can easily locate it later.

2. Make sure that all new commands are collected in the mycommands.ins file, so that they are easily maintained. Create this file first, before you do anything else.

3. Use a simple name for your master source file, such as main.tex or overview.tex/thesis.tex. This is the only file that you need to typeset, since it inputs/includes all other required files. To get started, copy the contents of the sample-thesis.tex file into your new master file, so that it does not get overwritten with a new release in the future.

4. Avoid using figure file names of the type Chap5Fig3.eps; this will only cause problems if you later decide to insert a new figure between figures 2 and 3 in chapter 5, or you decide to move this figure to a different chapter. The same goes for chapter source files. If you are 100% certain that the order of your chapters will not ever need to be changed,[7] then you can use filenames of the type chapter01.tex, chapter02.tex, etc. It is generally easier to give each chapter file a meaningful name, e.g., introduction.tex, literature.tex, results.tex; changing the order of chapters in your thesis then simply requires changing the order of the corresponding \include{} commands in the main source file. Everything else will be automatically renumbered by the typesetting engine.

---

[7]Even if you think that the order of your chapters is correct, don't underestimate the ability of your pesky advisor to decide two weeks before your defense that you should change the order.

5. Avoid using the underscore symbol and spaces in file names; some LaTeX commands may not function properly when you have an underscore or a space in a file name.

6. Make sure you have at least one back-up of all your files. Better yet, if you know how to use a source code repository, use it to store your LaTeX source code files, so that you can always return to earlier versions. You could consider your overview document to be the first release of your project, and the thesis document the second release. It is not advisable to store binary files in the repository, so you should put the figures folder in your .gitignore file (or equivalent, if you are using a different type of repository).

7. To resolve all references, labels, and citations, you need to run the typesetting engine three times for the final production run of your document: the first time, all .aux files are properly created; then you run the bibtex program to generate the bibliography files; then you run the typesetting engine two more times to make sure that all references are resolved. If you are using the TeXShop program, then you can simply typeset using the *pdflatexmk* engine, which does all this automatically.