# Scientific writing in LaTeX

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# Introduction

Its pronounced ‘lay-tek’

# Introduction

I made this presentation in LaTeX!

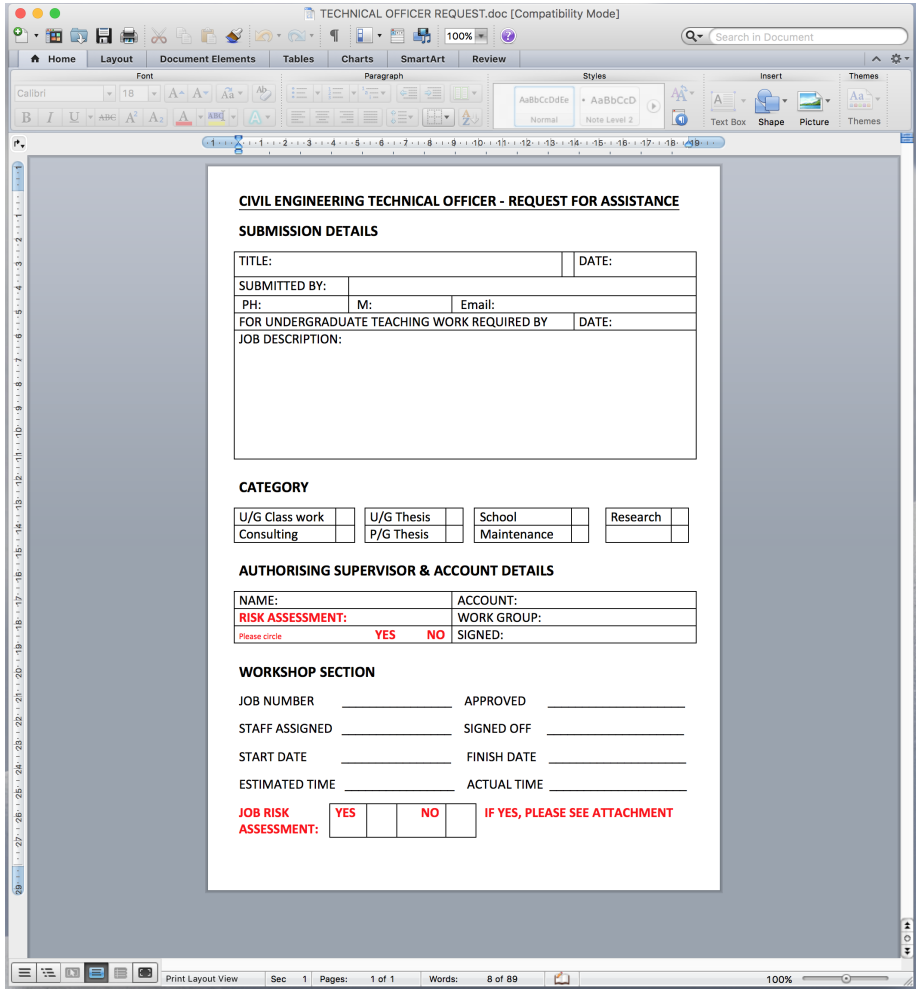
A dissertation template is available for civil engineering here:
`www.benjymarks.com/phd-template`
Please email me for new features.

# Introduction
## The plan

Today's plan:

- Brief intro
- Make a document with some figures, a table and some citations
- Make a slide presentation

# Introduction
## WYSIWYG



# Introduction
## WYSIWYM

```
\begin{frame}{Introduction}{WYSIWYM}
This text
\end{frame}
```

# Introduction
## WYSIWYM

Some popular choices:

- LaTeX
- RTF
- Markdown
- HTML
- XML

# Introduction

Things I recommend doing in LaTeX:

- Dissertations
- Papers
- Reports
- Slides (kind of)
- Laying out images
- Referencing

# Introduction

Things that can be done in LaTeXbut I don't recommend:

- Slides
- Annotating figures
- Complex layout

# Installation

| | | |
|---|---|---|
| Windows | : | http://miktex.org/ |
| Mac | : | https://tug.org/mactex/ |
| Linux | : | apt-get install texlive-latex |

# Installation
## Choosing a text editor

Barebones:

Windows : Notepad++

Mac : TextWrangler

Linux : gedit/vim/emacs

Full featured:

- TeXworks
- TeXstudio
- TeXShop (Mac only)
- ...

# Your first document

```
\documentclass{article}

\begin{document}
Hello world!
\end{document}
```

# Spaces don't matter

Type this:

```
H e l l o. My      name       is
Benjy.
```

Get this:
H e l l o. My name is Benjy.

# An empty line starts a new paragraph

Type this:

```
H e l l o. My      name       is

Benjy.
```

Get this:
H e l l o. My name is

Benjy.

# Special characters

These all have a special meaning:

```
# $ % ^ & _ { } ~ \
```

# Curly brackets

```
{\bf My} name is Benjy.
```

**My** name is Benjy.

# Commands

Commands begin with a '\'. The argument goes inside curly brackets. Use commands to do things like bold and emphasis

```
\textbf{text}
```

```
\emph{text}
```

which give: **text** and *text*

# Environments

Environments are containers to put things in:

```
\begin{environmentname}
text to be influenced
\end{environmentname}
```

# Environments

Environments are containers to put things in:

```
\begin{center}
    Some text
\end{center}
```

Some text

# Organisation

Start a new section with:

```
\section{Main topic}
```

And a new subsection with:

```
\subsection{Smaller topic}
```

...

```
\subsubsection{A tiny topic}
```

```
\paragraph{Just one thought}
```

# Equations

There are two main types of equations. Inline and displayed. This is inline: $y = mx + b$ and this is displayed:

$$y = mx + b$$

# Equations
## Inline

Inline notation is easy. Just put the equation between two dollar symbols,

```
$y=mx+b$
```

# Equations
## Displayed

Displayed math has a few more options:

```
$$ y=mx+b $$
```

$$ y=mx+b $$

```
\[ y=mx+b \]
```

$$ y=mx+b $$

```
\begin{equation*} y=mx+b \end{equation*}
```

$$y=mx+b$$

```
\begin{equation} y=mx+b \end{equation}
```

$$y=mx+b \tag{1}$$

# Equations

## Notation

```
$a_{b}^{cd}$
$\int_a^b y dx$
$\frac{a}{b}$
$\sum_{n=1}^{\infty} 2^{-n} = 1$
$\lim_{x\to\infty} f(x)$
$y=mx+b$
```

$a_b^{cd}$

$\int_a^b y dx$

$\frac{a}{b}$

$\sum_{n=1}^{\infty} 2^{-n} = 1$

$\lim_{x\to\infty} f(x)$

$y=mx+b$

# Equations
## Special characters

`http://detexify.kirelabs.org/classify.html`

# Figures

```
\begin{figure}
        \includegraphics[width=4cm]{exercise/1A.png}
        \caption{Please write your figure caption here}
\end{figure}
```

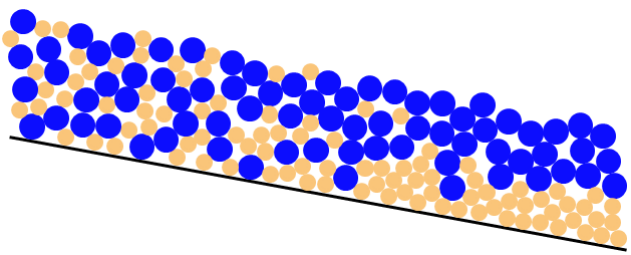


Figure : Please write your figure caption here

# Tables

```
\begin{tabular}{|l|cr|}
    \hline
    text & b & c \\ \hline
    d & other text & f \\
    g & h & some long text \\ \hline
\end{tabular}
```

| text | b | c |
|---|---|---|
| d | other text | f |
| g | h | some long text |

# Labelling things

```
\label{slide_about_referencing}
This is Slide \ref{slide_about_referencing}.
```

This is slide number 29.

# Referencing

```
\cite{AFantasticPaperYouShouldRead}
```

Benjy Marks and Itai Einav. A mixture of crushing and segregation: The complexity of grainsize in natural granular flows, *Geophysical Research Letters*, **42**, 2, 2015.

# Referencing

That worked because in another file I have:

```
@article{AFantasticPaperYouShouldRead,
    author = {Marks, Benjy and Einav, Itai},
    title = {A mixture of crushing and segregation: The
complexity of grainsize in natural granular flows},
    journal = {Geophysical Research Letters},
    volume = {42},
    number = {2},
    year = {2015},
    }
```

# Compiling

At the command line, type:

```
pdflatex filename.tex
```

If you change the references, you need to run all of this:

```
pdflatex filename.tex
bibtex filename.aux
pdflatex filename.tex
pdflatex filename.tex
```

# Examples

Time for an example...