

Introduction to L^AT_EX

John Fink

McMaster University

March 13, 2024

Who am I?

What can you do with \LaTeX ?

What can you do with L^AT_EX?

- Scholarly articles
- Books and book chapters
- (bibliography support through BibT_EX)
- Presentations (like this one!)
- Resumes/CVs

What is the difference between *word processing* and *typesetting*?

Why choose typesetting over (most) word processing?

- The source is *portable* and *versionable*. Anything that can edit text can edit \LaTeX .
- It is *way* easier to do things like inline formulas ($E = mc^2$), images, and tables.
- Easy to generate indices, bibliographies, cross references
- It allows you to *write* without worrying what the writing *looks like*.
- \LaTeX can produce some *beautiful* output. Even the stock PDF output is pleasant!
- The documentation for \LaTeX is **vast** (and beautiful, of course) and there's a StackExchange answer for just about anything you'd think to ask.
- You can generate many document types – PDFs, ePubs, Markdown, HTML, yes, even Word format – from \LaTeX source.

And perhaps most importantly...

Most STEM specific journals can accept submissions in \LaTeX , and some will **only** accept submissions in \LaTeX .


Worry about **content**, not (or not as much) about **form**.

Why choose word processing *over* typesetting?

- Everybody everywhere uses Word.
- \LaTeX is a *programming language*
- \LaTeX final documents have to be compiled (this presentation takes about 10 seconds on first compile)
- Word is *much better* than it used to be re: generating ToCs, using templates, etc.

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The BEAM
User Guide for ver

What is \LaTeX ?

What is... T_EX?

- Invented by Donald Knuth in 1978.
- Intended as a replacement for the Unix *troff* command, which by 1978 was apparently a very patchy mess.
- So rather than make more patches, Knuth developed T_EX.

So what is \LaTeX ? It's \TeX with added sauce:

- Optimized for publishing
- Numbering, cross-referencing
- Tables and figures
- Page layout
- Bibliographies

The **structure** of a \LaTeX document.

```
%\documentclass{beamer}
\documentclass[handout]{beamer} % set [handout] as an option to remove
/pause breaks
\beamertemplatenavigationsymbolseempty % for eliminating the nav buttons.
Handy!

%\setbeameroption{show notes on second screen=right} % Make sure slide
position is set to "right" in pympress also, or if using pdfpc, with
--notes=right
% Also, comment out the notes to produce slides for archiving, etc.
\usetheme{McMaster}
% There's no McMaster specific template and *THERE SHOULD BE*
% ... so I made one!
% use pympress on the rendered pdf to have things like second screen, notes,
etc! Cool!
% EXTREMELY IMPORTANT: if you are *sharing this content over Teams on your
Linux laptop*, for instance, do the following:
% Boot Ubuntu
% Select Xorg from login menu (sigh)
% use CHROME to access teams: e.g. google-chrome teams.microsoft.com
% Share the pympress main presentation window using the share tray.
\usepackage{verbatim}
\usepackage{fancyvrb}
\usepackage{tikz}
\usepackage{chemfig}
%\usepackage{mathtools}
\usepackage[version=4]{mhchem}
\usepackage[export]{adjustbox} % for left/right justifying images

%title page details:
\title{Introduction to \LaTeX{}}
\author{John Fink}
\institute{McMaster University}
\date{March 13, 2024}

\begin{document}
```



```
\documentclass{beamer}
\usetheme{McMaster}
\usepackage{verbatim}
\usepackage{fancyvrb}
%comments start with a % sign.
```

```
%title page details:  
\title{Introduction to \LaTeX{}}  
\author{John Fink}  
\institute{McMaster University}  
\date{March 13, 2024}
```

So just about any \LaTeX specific markup will look like:

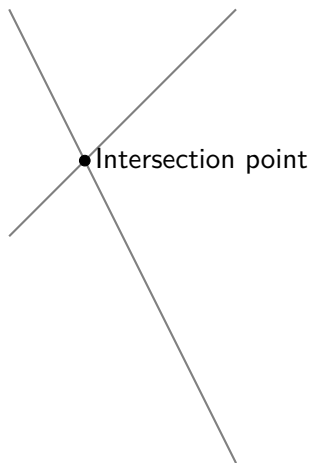
- A `\` character
- A **command**, like *includegraphics*
- **options** passed to the command, in `[],` like `[height=8cm]`
- The information fed to the command, in `{},` like `{imagenam}`
- So, the command `\includegraphics[height=8cm]{imagenam}` will display the image titled *imagenam*, scaled to 8cm height.

Drawing in \LaTeX with the tikz package

Drawing in L^AT_EX with the tikz package

```
\begin{tikzpicture}
\draw[gray, thick] (-1,2) -- (2,-4);
\draw[gray, thick] (-1,-1) -- (2,2);
\filldraw[black] (0,0) circle (2pt) node[anchor=west]{Intersection point};
\end{tikzpicture}
```

Drawing in \LaTeX with the tikz package



Doing Math Stuff in L^AT_EX

- Inline formulas are done with `$. . $` or `\. . \` or `\begin{math}.. \end{math}`
- (these are all, as far as I know, identical in use)
- e.g. the universal law of gravitation: $F = \frac{Gm_1 m_2}{r^2}$.
- In code: `$F=\frac{Gm_1 m_2}{r^2}$`.

- Display mode formulas are done with `\..\
\begin{displaymath}..\end{displaymath},
\begin{equation}..\end{equation}`

$$E = m \tag{1}$$

```
\begin{equation}  
    E=m  
\end{equation}
```

Left	Center	Right	Paragraph
1	1	1	Lorem ipsum dolor sit amet, consectetur adipiscing elit.
12	12	12	Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
123	123	123	Curabitur dictum gravidamauris.

```
\begin{tabular}{|l|c|r|p{6cm}|}|
    Left & Center & Right & Paragraph \\
    1 & 1 & 1 & Lorem ipsum dolor sit amet, consectetur a
    12 & 12 & 12 & Ut purus elit, vestibulum ut, placerat
    123 & 123 & 123 & Curabitur dictum gravidamauris. \\
\end{tabular}
```

Chemical formulae in L^AT_EX

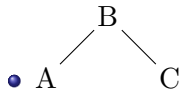
Chemical formulas are written similarly to math formulas, except support for chemical formulas is not built-in but requires a usepackage statement, like `\usepackage{chemfig}`

Chemical formulae in L^AT_EX

- A simple example: O=H
- `\chemfig{O=H}`

Chemical formulae in L^AT_EX

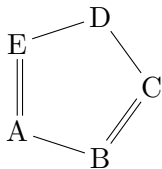
- Angled formulae:



- `\chemfig{A-[1]B-[7]C}`

Chemical formulae in L^AT_EX

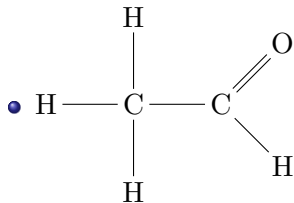
- Regular polygons



- `\chemfig{A*5(-B=C-D-E=)}`

Chemical formulae in L^AT_EX

- Branched molecules



- `\chemfig{H-C(-[2]H)(-[6]H)-C(=[1]O)-[7]H}`

Chemical formulae in L^AT_EX

For *typesetting* chemical formulae, we can use a package like *mhchem* in our preamble: `\usepackage{mhchem}`

Chemical formulae in L^AT_EX

- $3\text{H}_2\text{O}$
- `\ce{3H2O}`
- AgCl_2^-
- `\ce{AgCl2-}`
- $\text{H}_2(\text{aq})$
- `\ce{H2_{(aq)}}`


- Anything that can edit plain text (Emacs, Vim, Notepad etc)
- (but note you need a *compiler* to generate the actual output)
- Compilers: MikT_EX(Windows), MacT_EX(MacOS), T_EXLive (Linux)
- Purpose-built editors: T_EXstudio, T_EXmaker
- (These will come with built-in support for compilers)
- General IDEs: vscode, others
- Online: Overleaf (gdocs-esque)

Signing up for Overleaf

- 1 Go to www.overleaf.com/register
- 2 Sign up for an account by whatever method you prefer
- 3 Create a new blank project.
- 4 Type "done" in the chat.

Any questions?

`jfink@mcmaster.ca`

 <https://glamr.us/@jbfink>