Introduction to LaTeX

CCRC Fun Seminar Series
25th March 2024

slides based on those of
Byungwon Woo & Andrei Gurtov

What is LaTeX?

- document preparation system for high-quality typesetting

- produce technical or scientific documents, but it can be used for almost any form of publishing

    - CV, lecture/book summaries, lab reports, …
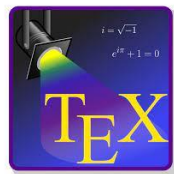
Why Use LaTeX?

- designed by academics and easily accommodates academic use
- predefined layout makes it look like it's done professionally

"No need to reinvent the wheel."

- Mathematical symbols and equations are easily integrated
- Footnotes, references, table of content & bibliography too!

Installing LaTeX

- MiKTeX
  - MiKTeX is a typesetting system for Windows
  - download from www.miktex.org for free
  - install MiKTeX first, then any editor

- Texstudio as editor

full license through UNSW

UNSW SYDNEY

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Files:
- agujournal2019.cls
- Fun_introduction.tex
- references_all.bib
- trackchanges.sty
- writing_thesis.jpg

File outline:
- Plain language summary
- Introduction
- Methods
  - Subsection
    - Subsubsection
- Results
- Discussion and Conclusions
- Open Research
- Acknowledgments
- Competing Interests

```latex
1  \documentclass{agujournal2019}
2  \usepackage{ragged2e} \justifying \linenumbers % justify text & line numbers
3  \usepackage{url} \usepackage{tcolorbox} % fix any errors with URLs in refs & fit box around text
4  \usepackage{bm} \usepackage{lipsum} \usepackage{lineno} \usepackage{soul} \usepackage{amsmath} % bold math symbols, dummy text, 2 line spacing, line numbers and math symbols
5  \usepackage[utf8]{inputenc} % for \nocite{} references
6
7  \journalname{Geophysical Research Letters}
8  \begin{document}
9  \title{My first paper in LaTeX}
10 %  Authors and affiliations ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ %
11 \authors{Maurice F. Huguenin\affil{1,2}}
12 \affiliation{1}{Centre for Marine Science and Innovation, University of New South Wales, Sydney, NSW, Australia}
13 \affiliation{2}{ARC Australian Centre for Excellence in Antarctic Science, University of New South Wales, Sydney, NSW, Australia}
14 \affiliation{3}{Woods Hole Oceanographic Institution, Woods Hole, MA, United States}
15 \correspondingauthor{Maurice F. Huguenin}{m.huguenin-virchaux@unsw.edu.au}
16 \begin{keypoints}
17 \item Key Point Nr. 1
18 \item Key Point Nr. 2
19 \item Key Point Nr. 3
20 \end{keypoints}
21
22
23 % ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ %
24 \begin{abstract}
25 Text here.
26 \end{abstract}
27
28 \section{Plain language summary}
29 Text here.
```

Preview:

My first paper in LaTeX

Maurice F. Huguenin[1,2]

[1]Centre for Marine Science and Innovation, University of New South Wales, Sydney, NSW, Australia
[2]ARC Australian Centre for Excellence in Antarctic Science, University of New South Wales, Sydney, NSW, Australia
[3]Woods Hole Oceanographic Institution, Woods Hole, MA, United States

Key Points:
- Key Point Nr. 1
- Key Point Nr. 2
- Key Point Nr. 3

Corresponding author: Maurice F. Huguenin, m.huguenin-virchaux@unsw.edu.au

Abstract
Text here.

5

Basic document structure

- The format of a document is pretty simple
  - preamble
    - documentclass
    - packages
  - front matter
    - title/author
  - body
    - contents
  - end
    - bibliography

In the front matter

- \begin{document}
- \title{}
- \author{}
- \maketitle
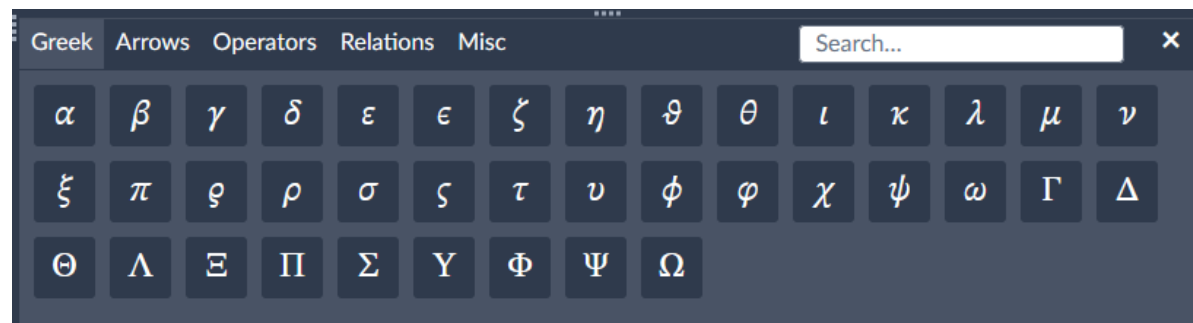- \begin{abstract}

  …
- \end{abstract}
- \pagebreak

In the body

- To begin a new section
- \section{}
  - Similarly, \subsection{}, \subsubsection{}, \subsubsubsection{}
  - LaTeX does automatic numbering. If you don't like it, use section*{}
- **\emph{}, \textbf{}**
- \singlespacing, \doublespacing, \onehalfspacing
- \centering or \begin{centering} & \end{centering}

Footnotes, quotes & equations

- \footnote{}
- \begin{quote} & \end{quote}
- ` ', `` '' for quotations
- Mathematical Equations
  - Math always in between $ & $
    - Alternatively, \begin{equation} & \end{equation}
  - $ 1+4=5 $
  - \frac{x}{y}, \sqrt{x}, \sum_{k=1}^{n}
  - ^{}, _{}
  - \greek letters (e.g. \alpha or \Alpha)

  - Overleaf has click and type functions
    for symbols too

$$\frac{x}{y}, \sqrt{x}, \sum_{k=1}^{n}$$

Greek	Arrows	Operators	Relations	Misc		Search...	×

α	β	γ	δ	ε	ϵ	ζ	η	ϑ	θ	ι	κ	λ	μ	ν
ξ	π	ϱ	ρ	σ	ς	τ	υ	ϕ	φ	χ	ψ	ω	Γ	Δ
Θ	Λ	Ξ	Π	Σ	Υ	Φ	Ψ	Ω						

Citations

- \cite{bibtexkey}   Pitman et al. (2022)
- \citeA{bibtexkey}   (Pitman et al., 2022)

- for convenience, create a bibliography file, called bibtex file (.bib) and use it as needed
- Mendeley
- Zotero

The .bib file

```
1  @article{huguenin2020frequency,
2      author = {Huguenin, Maurice F. and Fischer, Erich M. and Kotlarski, Sven and Scherrer, Simon C.
           and Schwierz, Cornelia and Knutti, Reto},
3      title = {{Lack of Change in the Projected Frequency and Persistence of Atmospheric Circulation
           Types Over Central Europe}},
4      journal = {Geophysical Research Letters},
5      doi = {https://doi.org/10.1029/2019GL086132},
6      year = {2020a}
7  }
```

Common mistakes

– "end" doesn't follow "begin"

– $ doesn't follow $

– using commands from packages not defined in the preamble

– do not forget "\"s

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Author — AGU

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https://github.com/mauricehuguenin/introduction_latex