Introduction to LaTeX using Overleaf

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Slides & Exercises: https://github.com/EPS-Libraries-Berkeley/LaTeX
Overleaf: overleaf.com

Outline

Logistics for Learning

- Enter your questions in chat!

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- Librarians are here to answer questions.

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- Share your Overleaf exercise document "view-only" link with the

  librarians.

Introduction

LaTeX is a typesetting system that allows you to focus on your content instead of formatting - formatting is done separately from entry.

You tell LaTeX "what it is" not "how it looks."

Overleaf for LaTeX

- Create documents via a cloud-based account
- Source code or rich text format
- Collaborating and sharing documents
- Versioning and track changes
- Templates for a variety of documents and publishers
- Link with other tools in your research workflow
- Pro account with your berkeley.edu address

```latex
\documentclass[fleqn,10pt]{wlscirep}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}

\title{Scientific Reports Title to see here}

\author[1,*]{Alice Author}
\author[2]{Bob Author}
\author[1,2,+]{Christine Author}
\author[2,+]{Derek Author}
\affil[1]{Affiliation, department, city, postcode, country}
\affil[2]{Affiliation, department, city, postcode, country}

\affil[*]{corresponding.author@email.example}

\affil[+]{these authors contributed equally to this work}

%\keywords{Keyword1, Keyword2, Keyword3}

\begin{abstract}
Example Abstract. Abstract must not include subheadings or citations. Example
Abstract. Abstract must not include subheadings or citations. Example Abstract.
\end{abstract}
\begin{document}

\flushbottom
\maketitle
% * <john.hammersley@gmail.com> 2015-02-09T12:07:31.197Z:
%
%  Click the title above to edit the author information and abstract
%
\thispagestyle{empty}

\noindent Please note: Abbreviations should be introduced at the first mention in
the main text – no abbreviations lists. Suggested structure of main text (not
enforced) is provided below.

\section*{Introduction}

The Introduction section, of referenced text \cite{Stark2018BeforePreproducibility}
expands on the background of the work (some overlap with the Abstract is
```

Scientific Reports Title to see here

Alice Author[1,*], **Bob Author**[2], **Christine Author**[1,2,*], and **Derek Author**[2,+]

[1]Affiliation, department, city, postcode, country
[2]Affiliation, department, city, postcode, country
*corresponding.author@email.example
+these authors contributed equally to this work

ABSTRACT

Example Abstract. Abstract must not include subheadings or citations. Example Abstract. Abstract must not include subheadings or citations. Example Abstract.

Please note: Abbreviations should be introduced at the first mention in the main text – no abbreviations lists. Suggested structure of main text (not enforced) is provided below.

Introduction

The Introduction section, of referenced text[1] expands on the background of the work (some overlap with the Abstract is acceptable). The introduction should not include subheadings.[2]

Results

Up to three levels of **subheading** are permitted. Subheadings should not be numbered.

Subsection

Example text under a subsection. Bulleted lists may be used where appropriate, e.g.

- First item
- Second item

Third-level section
Topical subheadings are allowed.

New Section

Discussion

The Discussion should be succinct and must not contain subheadings.

Methods

Topical subheadings are allowed.[3] Authors must ensure that their Methods section includes adequate experimental and characterization data necessary for others in the field to reproduce their work.

References

1. Stark, P. B. Before reproducibility must come preproducibility. *Nature* **557**, 613–613, DOI: 10.1038/d41586-018-05256-0 (2018).
2. Bao, N., Bousso, R., Jordan, S. & Lackey, B. Fast optimization algorithms and the cosmological constant. *Phys. Rev. D* **96**, 103512, DOI: 10.1103/PhysRevD.96.103512 (2017).
3. Fujii, K. *et al.* The role of positron polarization for the inital 250 GeV stage of the International Linear Collider. (2018).

Structure of a Document

Command: a control sequence which performs an action, such as
`\newpage`

Preamble: block of commands that define the type of document you are writing, the language you are writing in, the *packages* you would like to use. Comes before `\begin{document}`

```
\documentclass[12pt, letterpaper]{article}
\usepackage{amsmath}
```

Package:
Packages enable you to do more, like create bibliographies, insert images, and write formulas and figures.

Structure of a Document

Environment: A block of code with specific behavior depending on its type. Requires
```
\begin{}...\end{}
```

Body: the content of document enclosed inside an environment:
```
\begin{document}
\end{document}
```

Note:

Comments:

Use % to create a comment. Nothing on the line after the % will be typeset.

Restricted Characters:

Certain symbols require a backslash to appear, like $, &, #, and %.

Basic Commands

Bold: \textbf{example}

Italics: \textit{example}

Underline: \underline{example}

Font typefaces: Change in preamble. More information:

https://v2.overleaf.com/learn/Font_typefaces

Make Title

1. The simplest option is to use the **\maketitle** command which draws from the following declarations within the preamble:
   a. \author
   b. \date
   c. \thanks
   d. \title

Basic Math

To display math inline with text, place formula or symbol in between $:

   $x + y = z$

Display mode, using \[x + y = z \]   OR $$x + y = z$$
will center the equation on its own line:

$$x + y = z$$

EXERCISE 1

Objective:

Practice several basic LaTeX commands in a new project.

https://github.com/EPS-Libraries-Berkeley/LaTeX
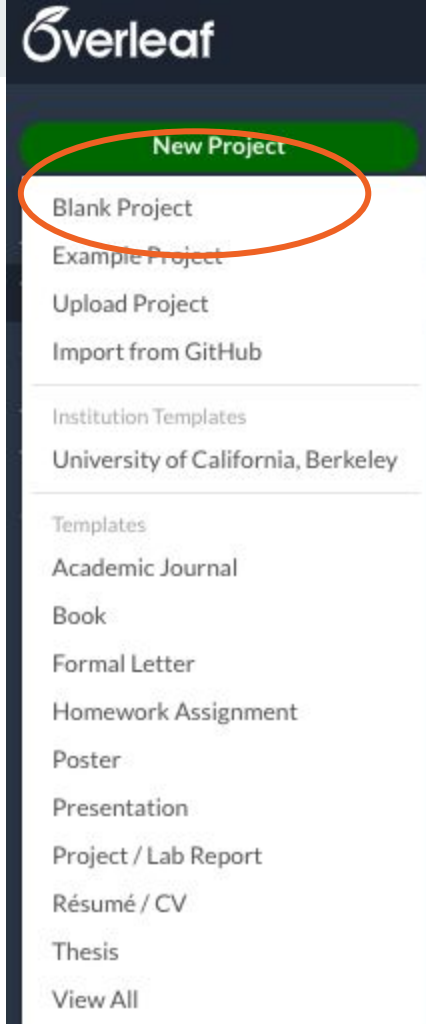
Share a link to your project

Mathematics & Equations

Operators and More

Operators & Relations: +, - , = , > , <   work as expected

\times = x   \geq = ≥   \neq = ≠

\div = ÷   \leq = ≤   \pm = ±

Fractions: \frac{1}{x} gives ¹⁄x

Greek Letters

Examples:

$$\text{\textbackslash alpha} = \alpha \qquad\qquad \text{\textbackslash mu} = \mu$$

$$\text{\textbackslash beta} = \beta \qquad\qquad \text{\textbackslash pi} = \pi$$

$$\text{\textbackslash Gamma} = \gamma \qquad\qquad \text{\textbackslash rho} = \varrho$$

$$\text{\textbackslash delta} = \delta \qquad\qquad \text{\textbackslash sigma} = \sigma$$

$$\text{\textbackslash Delta} = \Delta \qquad\qquad \text{\textbackslash psi} = \psi$$

$$\text{\textbackslash lambda} = \lambda \qquad\qquad \text{\textbackslash omega} = \omega$$

$$\text{\textbackslash Lambda} = \Lambda \qquad\qquad \text{\textbackslash Omega} = \Omega$$

But A = A (Alpha), B = B (Beta), Z = Z (Zeta), etc.

Limits & Integrals

Limit:

```
\[
\lim_ {x \to \infty} f(x)
\]
```

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

Integral:

```
\[
\int_{a}^{b} x^2 dx
\]
```

$$\int_{a}^{b} x^2 dx$$

amsmath & amssymb packages

These packages provide you with additional mathematical symbols and commands for structuring equations.

To include, add to your preamble:

```
\usepackage{amsmath}
```

```
\usepackage{amssymb}
```

amsmath equation environment

```
\begin{equation}
\frac{\partial Q}{\partial t} = \frac{\partial s}{\partial t}
\end{equation}
```

gives

$$\frac{\partial Q}{\partial t} = \frac{\partial s}{\partial t} \tag{1}$$

Note: use `{equation*}` for unnumbered equations

EXERCISE 2

Objective: Experiment with mathematical notations in LaTeX.

https://github.com/EPS-Libraries-Berkeley/LaTeX

Bibliographies

Bibliographies & Terminology

- **.bib** = file that stores your references

- Package/Backend options:

bibtex

natbib

biber
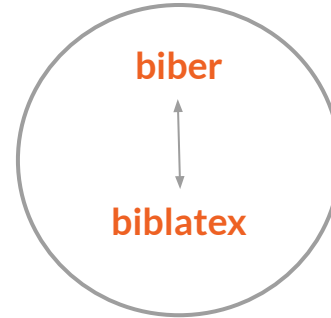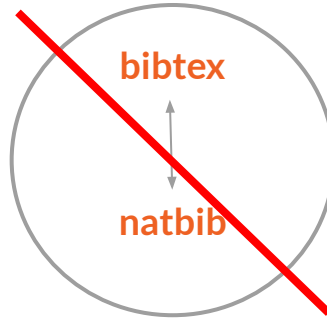
biblatex

We'll focus on **biblatex** today. Learn more about citation and bibliography styles using biblatex:

https://www.overleaf.com/learn/latex/Biblatex_citation_styles

What does a .bib entry look like?

@article{drachen2016sharing,
 title={Sharing data increases citations},
 author={Drachen, Thea and Ellegaard, Ole and Larsen, Asger and Dorch, S{\o}ren},
 journal={Liber Quarterly},
 volume={26},
 number={2},
 year={2016}
}

Key: the syntax used in the cite command to call in an in-text citation

Step 1: Connect your project to a bibliography

- Create or upload your own .bib file
- enter a URL
- connect your Mendeley or Zotero account with Overleaf

Bibliography Example:

- Create new file within project and name it references.bib

- Search for three listed articles in Google Scholar

- Paste associated BibTeX entry into references.bib file

Step 2: Add packages and commands

\usepackage[backend=biber, style=authoryear]{biblatex}

\addbibresource{references. bib}

.....

\printbibliography

\nocite{*}

BibLaTeX is one package that processes bibliographic information and helps set the style.

Sets bibliography style.

Calls in .bib file

Displays bibliography

Displays entire bibliography, including uncited items

Syntax and Output

\cite{robinson_science_2019}　　　　　Robinson et al. (2019)

\citeauthor{jon90}　　　　　Textual: ...in Jones et al. (1990)

EXERCISE 3

Objective:

Learn to sync or upload a .bib file, use basic citation commands, and add a bibliography.

https://github.com/EPS-Libraries-Berkeley/LaTeX

Tables & Figures

Tables

`\usepackage{tabularx}`

Basic Commands:

- **l, r, c** column alignment
- **s** column alignment for SI units
- **&** ampersand separates columns
- **** double backslash begins new row
- **\hline** horizontal line
- **|** vertical line

Basic Two Column Table

```
\usepackage{tabularx}
.....
\begin{table}
\begin{tabular}{lc}
Item & Qty \\ \hline
Widget & 1 \\
Gadget & 2 \\
Cable & 3 \\
\end{tabular}
\end{table}
```
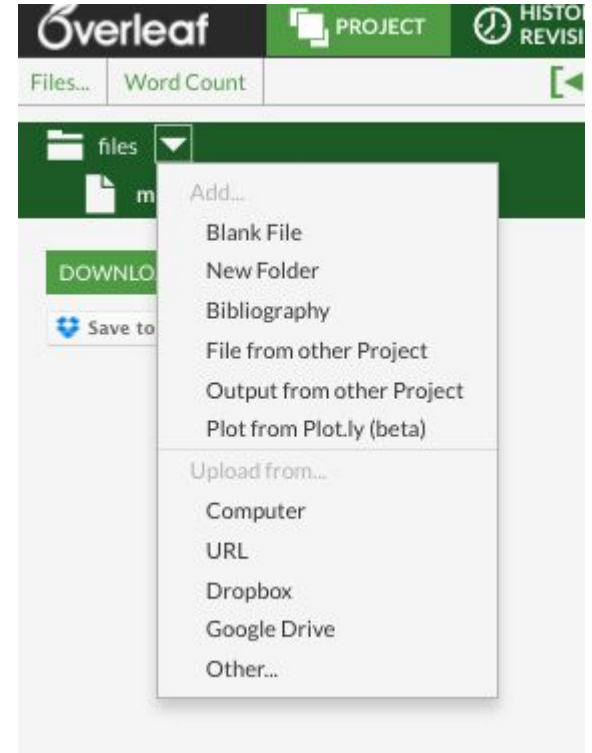
Item	Qty
Widget	1
Gadget	2
Cable	3

Uploading figures

Find files at:

https://github.com/EPS-Libraries-Berkeley/LaTeX

Download keyboard_cat.png, and upload file to Overleaf project

Uploading figures (simplest)

```
\usepackage{graphicx}

...

\includegraphics[width=0.4\textwidth]{keyboard_cat}
```

Figure & Table Placement

Specifier	Permission
h	Place the float here: approximately, not exactly, at the same point it occurs in the source text.
t	Position at the top of the page.
b	Position at the bottom of the page.
p	Put on a special page for floats only.
!	Override internal parameters LaTeX uses for determining "good" float positions.
H	Places the float at precisely the location in the LaTeX code. Requires \usepackage{float}. This is somewhat equivalent to h!

EXERCISE 4

Objectives:

Learn the basic commands to create and edit tables.

Upload and place a figure.

https://github.com/EPS-Libraries-Berkeley/LaTeX

Questions?

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EXTRA SLIDES FOLLOW

Syncing & uploading figures hosted elsewhere

Google Drive:

https://www.overleaf.com/help/247-how-can-i-upload-files-from-google-drive#.W4WtwhPwZE5

GitHub/Dropbox:

https://www.overleaf.com/help/343#.W4WtgxPwZE4