



# Introduction to LaTeX using Overleaf

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Slides & Exercises: <https://github.com/EPS-Libraries-Berkeley/LaTeX>

Overleaf: [overleaf.com](https://overleaf.com)



# Outline

1. Introduction: What is LaTeX?
2. Overleaf
3. Structure of a Document
4. Basic Commands
5. Math & Equations
6. Bibliographies
7. Tables & Figures (if time allows)



# Logistics for Learning

- Enter your questions in chat!



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# Logistics for Learning

- Enter your questions in chat!
- Two librarians are ready to answer questions.
- During exercises, you might be sent to a breakout room in small groups.
- 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



```

1 \documentclass[fleqn,10pt]{wlscirep}
2 \usepackage[utf8]{inputenc}
3 \usepackage[T1]{fontenc}
4
5 \title{Scientific Reports Title to see here}
6
7 \author[1,*]{Alice Author}
8 \author[2]{Bob Author}
9 \author[1,2,+]{Christine Author}
10 \author[2,+]{Derek Author}
11 \affil[1]{Affiliation, department, city, postcode, country}
12 \affil[2]{Affiliation, department, city, postcode, country}
13
14 \affil[*]{corresponding.author@email.example}
15
16 \affil[+]{these authors contributed equally to this work}
17
18 %\keywords{Keyword1, Keyword2, Keyword3}
19
20 = \begin{abstract}
21 Example Abstract. Abstract must not include subheadings or citations. Example
Abstract. Abstract must not include subheadings or citations. Example Abstract.
22 \end{abstract}
23 = \begin{document}
24
25 \flushbottom
26 \maketitle
27 % * <john.hammersley@gmail.com> 2015-02-09T12:07:31.197Z:
28 %
29 % Click the title above to edit the author information and abstract
30 %
31 \thispagestyle{empty}
32
33 \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.
34
35 = \section*{Introduction}
36
37 The Introduction section, of referenced text \cite{Stark2018BeforePreproducibility}
expands on the background of the work (some overlap with the Abstract is
acceptable). The introduction should not include subheadings.2

```

## Scientific Reports Title to see here

Alice Author<sup>1,\*</sup>, Bob Author<sup>2</sup>, Christine Author<sup>1,2,\*</sup>, and Derek Author<sup>2,4</sup>

<sup>1</sup>Affiliation, department, city, postcode, country

<sup>2</sup>Affiliation, department, city, postcode, country

\*corresponding.author@email.example

<sup>4</sup>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<sup>1</sup> expands on the background of the work (some overlap with the Abstract is acceptable). The introduction should not include subheadings.<sup>2</sup>

### 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.<sup>3</sup> 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](https://doi.org/10.1038/d41586-018-05256-0) (2018).
2. Bao, N., Bousoo, R., Jordan, S. & Lackey, B. Fast optimization algorithms and the cosmological constant. *Phys. Rev. D* **96**, 103512, DOI: [10.1103/PhysRevD.96.103512](https://doi.org/10.1103/PhysRevD.96.103512) (2017).
3. Fujii, K. *et al.* The role of positron polarization for the initial \$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](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`
2. OR use the `\begin{titlepage} ... \end{titlepage}` environment:
  - a. The titlepage environment creates a title page, i.e. a page with no printed page number or heading. It also causes the following page to be numbered page one.
  - b. Formatting is left to you, but commands like `\centering`, `\vspace`, and `\vfill` are helpful.



## Basic Math

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

$$\text{\$}x + y = z\text{\$}$$

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

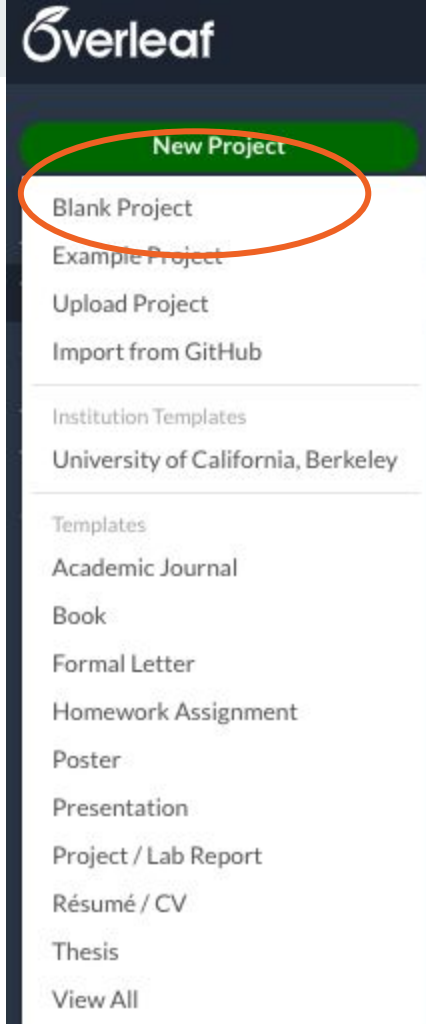
$$x + y = z$$

## 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

Menu ↑ Fall 2020 Exercises Ab Review Share Submit History

Source Rich Text Recompile

### Share Project

Link sharing is off, only invited users can view this project. [Turn on link sharing ?](#)

steplitz@berkeley.edu Owner

Share with your collaborators

joe@example.com, sue@example.com, ...

Can Edit [Share](#)

### Share Project

Link sharing is on. [Turn off link sharing ?](#)

Anyone with this link can edit this project

<https://www.overleaf.com/9442652797pxkhhtfzfkdq>

Anyone with this link can view this project

<https://www.overleaf.com/read/bnwfsxbxmjqt>

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# Mathematics & Equations



# Operators and More

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

$\backslash times = \times$

$\backslash geq = \geq$

$\backslash neq = \neq$

$\backslash div = \div$

$\backslash leq = \leq$

$\backslash pm = \pm$

Fractions:  $\backslash frac{1}{x}$  gives  $\frac{1}{x}$



# Greek Letters

Examples:

`\alpha` =  $\alpha$

`\mu` =  $\mu$

`\beta` =  $\beta$

`\pi` =  $\pi$

`\Gamma` =  $\gamma$

`\rho` =  $\rho$

`\delta` =  $\delta$

`\sigma` =  $\sigma$

`\Delta` =  $\Delta$

`\psi` =  $\psi$

`\lambda` =  $\lambda$

`\omega` =  $\omega$

`\Lambda` =  $\Lambda$

`\Omega` =  $\Omega$

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



# Limits & Integrals

Limit:

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



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

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

$$\frac{\partial Q}{\partial t} = \frac{\partial s}{\partial t} \quad (1)$$

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



## EXERCISE 2

*Objective: Experiment with mathematical notations in LaTeX.*

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

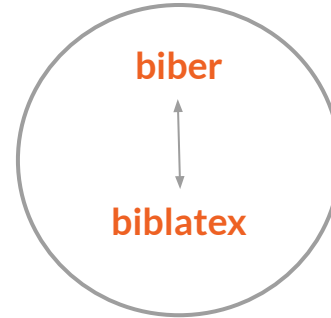
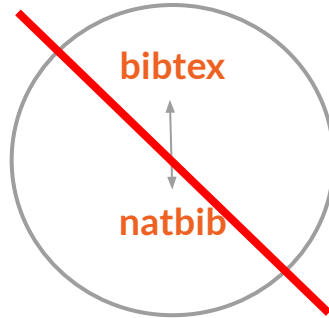


---

# Bibliographies

# Bibliographies & Terminology

- `.bib` = file that stores your references
- Package/Backend options:



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

[https://www.overleaf.com/learn/latex/Biblatex\\_citation\\_styles](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

Ohm's law survives to the atomic scale

[B Weber](#), [S Mahapatra](#), [H Ryu](#), [S Lee](#), [A Fuhrer](#) - 2012 - science.sciencemag.org

... Science 06 Jan 2012: Vol. 335, Iss  
Weber, Centre for Quantum Computa  
University of New South Wales, Sydn

☆  Cited by 284 Related article

Probing Johnson noise and the  
qubit

[S Kolkowitz](#), [A Safira](#), [AA High](#), [RC D](#)

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show here that an H-terminated and the

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Single phosphorus donors in silicon and  
we present low temperature scanning  
individual phosphorus dopants deliberately

☆  Cited by 16 Related article

Single-charge detection by a

[PDF]

Cite	
MLA	Weber, Bent, et al. "Ohm's law survives to the atomic scale." <i>Science</i> 335.6064 (2012): 64-67.
APA	Weber, B., Mahapatra, S., Ryu, H., Lee, S., Fuhrer, A., Reusch, T. C. G., ... & Simmons, M. Y. (2012). Ohm's law survives to the atomic scale. <i>Science</i> , 335(6064), 64-67.
Chicago	Weber, Bent, Suddhasatta Mahapatra, Hoon Ryu, Sunhee Lee, A. Fuhrer, T. C. G. Reusch, D. L. Thompson et al. "Ohm's law survives to the atomic scale." <i>Science</i> 335, no. 6064 (2012): 64-67.
Harvard	Weber, B., Mahapatra, S., Ryu, H., Lee, S., Fuhrer, A., Reusch, T.C.G., Thompson, D.L., Lee, W.C.T., Klimeck, G., Hollenberg, L.C. and Simmons, M.Y., 2012. Ohm's law survives to the atomic scale. <i>Science</i> , 335(6064), pp.64-67.
Vancouver	Weber B, Mahapatra S, Ryu H, Lee S, Fuhrer A, Reusch TC, Thompson DL, Lee WC, Klimeck G, Hollenberg LC, Simmons MY. Ohm's law survives to the atomic scale. <i>Science</i> . 2012 Jan 6;335(6064):64-7.
 BibTeX  EndNote  RefMan  RefWorks	



## 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>



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# 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}
```

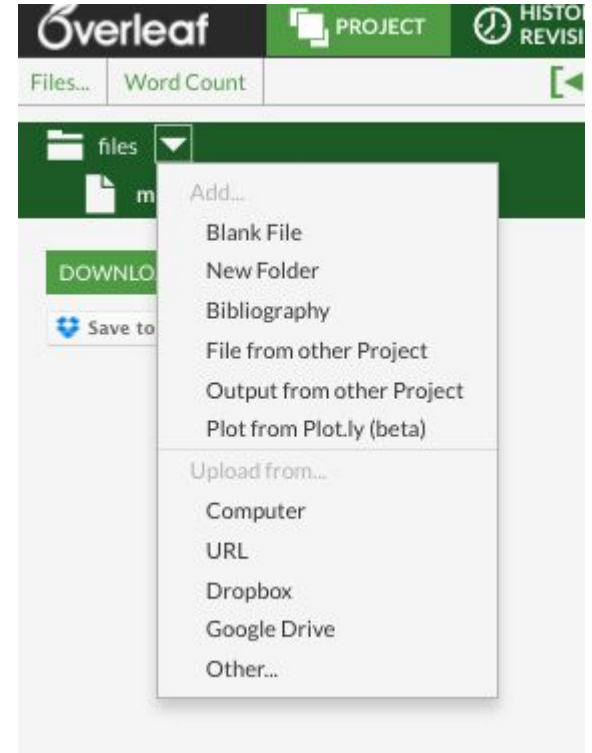
Item	Qty
Widget	1
Gadget	2
Cable	3

# 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 the float package. 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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asackmann@berkeley.edu  
bquigley@berkeley.edu

Slides and Exercises:

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



**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>