

Summer Particle Astrophysics Workshop (EIEIOO) 2024

General Research Skills and LaTeX

Outline

- Reading papers
- Group presentations / meetings
- Readability of plots
- Seeking help on problems
- Note taking

Reading Papers

Reading Papers

- Not enough time to read entire papers every time
- General order for reading a paper is as follows:
 1. Read abstract
 2. Read introduction
 3. Read Conclusion
 4. Look for sections that contain relevant information to your problem
- **Notes about arXiv:** arXiv is a great resource, but remember most of those papers are in pre-print only. That means there might still be issues with that paper that haven't been addressed yet by reviewers.

Group Presentations / Meetings

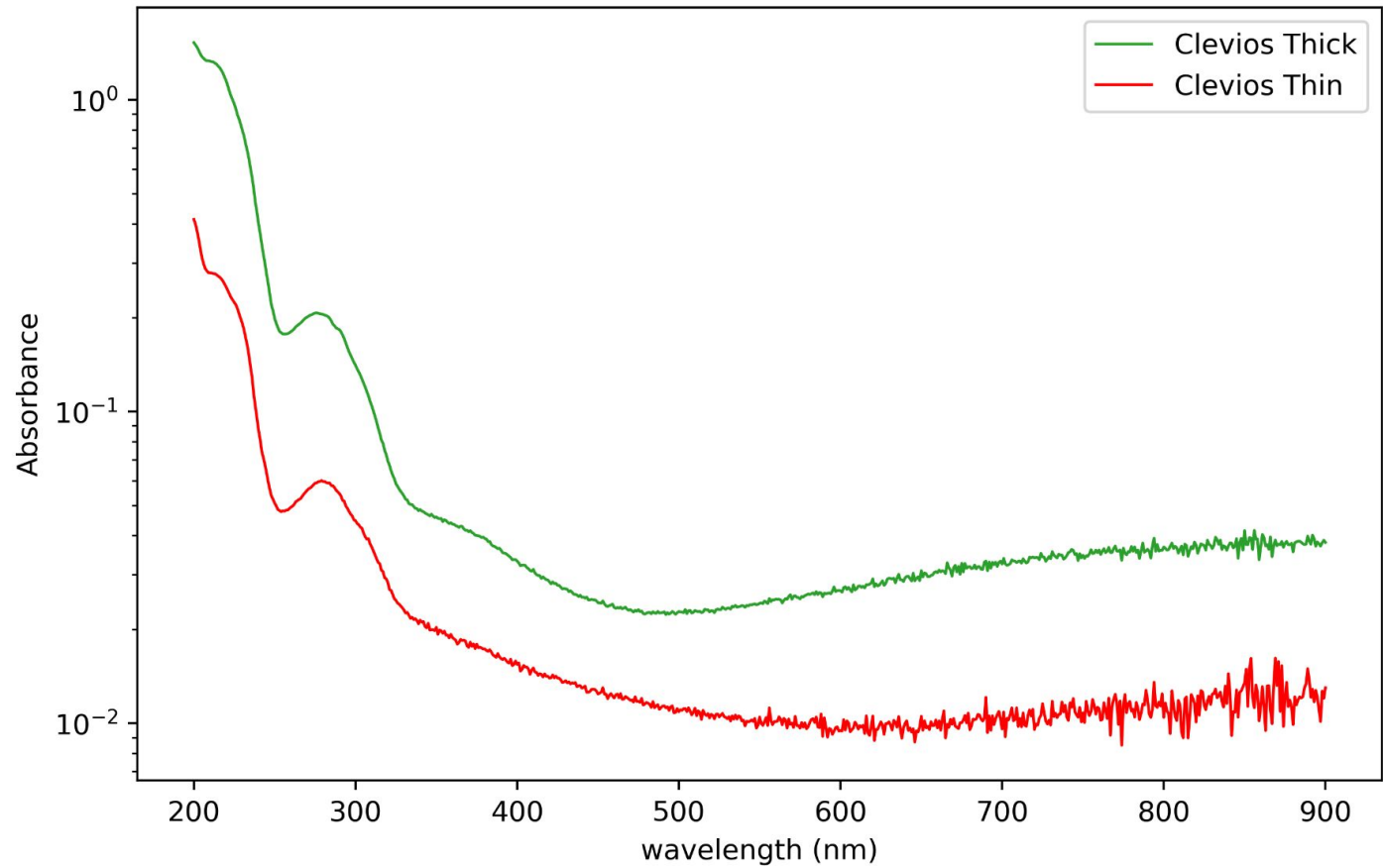
Group Presentations / Meetings

- Often groups meet every week to discuss the work that has been done.
- A lot of different research is going on in every group.
- Start off your update by reminding everyone of the work that you are doing.
 - Ex: I am currently working on testing different geometries for a Compton scattering experiment that I am conducting to characterize liquid scintillators.
- Briefly describe the main result/difficulty you are currently dealing with.
- Show figures whenever possible.

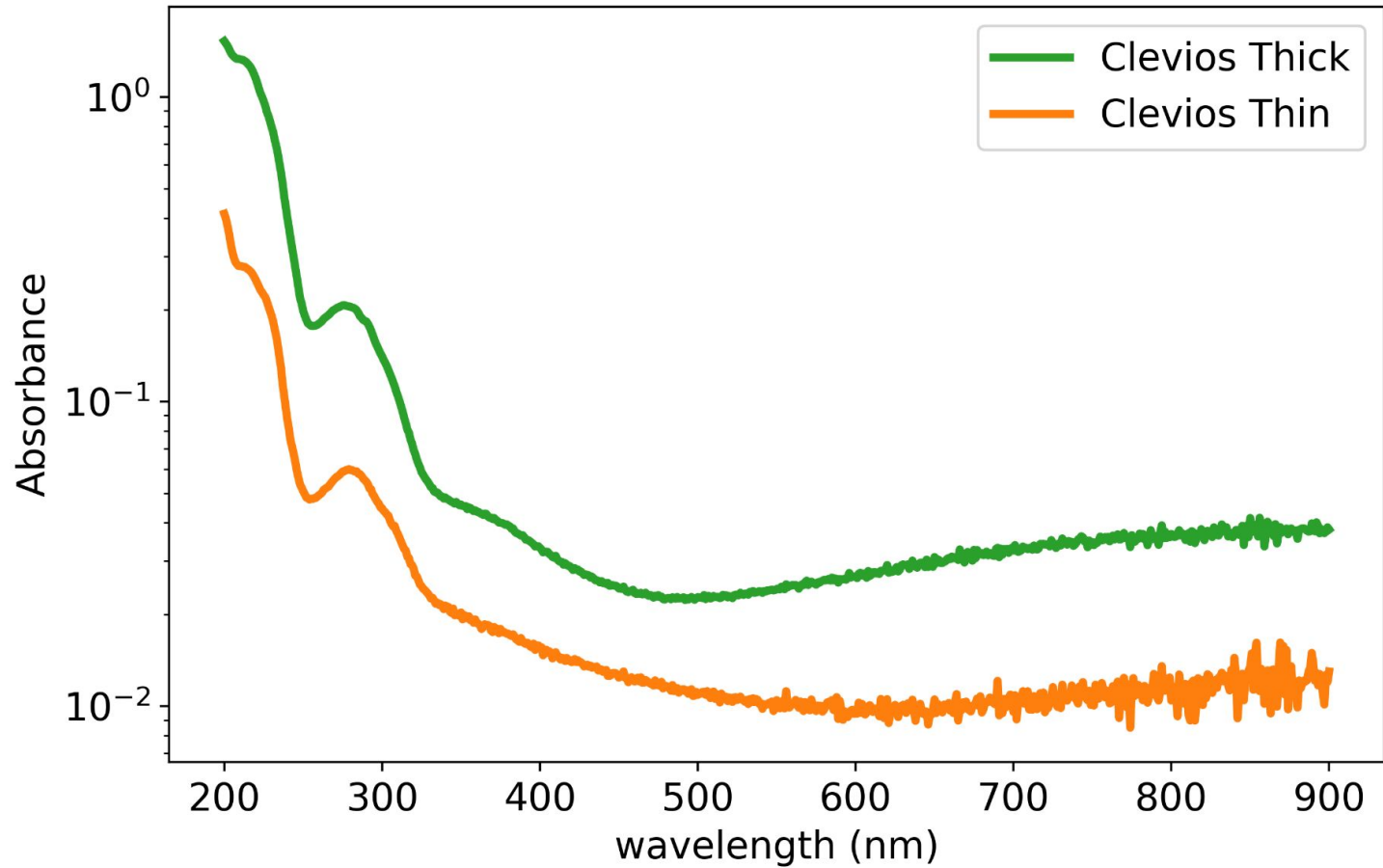
Plots

Plots

- Readability of plots is just as important as the data.
- Things to keep in mind:
 - Is the text large enough to read? (Axis labels, legend, etc.)
 - Are my data points visible?
 - Are my data points differentiable?
 - Avoiding similar colours for colour blindness.
 - Differentiating shapes.
 - marker/line size is large enough.
 - Type of document this plot will be in.



Default matplotlib settings



Getting Help

Seeking Help

- Ask questions when you are confused.
- Grad students are there to provide assistance and are answer questions.
- Regarding ChatGPT...
 - Useful tool **IF** used properly.
 - Understand what it is giving back to you. If you don't it becomes a black box where you aren't really sure if you understand what comes out.

Notes

Notes

- It is important to keep good notes of what you do in your research.
 - Helps you in the future, for CV's, or final term reports.
 - Helps others if they need to continue your work
- Notes should be detailed but easy to read and follow.
- Notes should include:
 - What problem you are trying to solve.
 - **EVERY** solution that has been attempted by you.
 - How to re-do the tests that you have done.
 - Results.
 - Where data is stored.

Questions?

LaTeX

LaTeX

- LaTeX is a typesetting language that is used often in Physics and Mathematics.
- LaTeX is written in a .tex document, which is put through a compiler to produce a PDF
- Many different options for writing in LaTeX:
 - TeXstudio
 - TeXmaker
 - VSCode
 - Overleaf

LaTeX

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- Many different options for writing in LaTeX:
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 - TeXmaker
 - VSCode
 - Overleaf

We will use this!



New Project

All Projects

Your Projects

Shared with you

Archived Projects

Trashed Projects

ORGANIZE PROJECTS

+ New Tag

Analysis_I (4)

Classical_mech_II (1)

cont_phys (7)

Documents (5)

ENPH211/PHYS212_TA (3)

MSC (11)

Number_theory (5)

Phys_3650_optics (6)

Phys_3925 (3)

Phys_870 (2)

Phys_891 (1)

Presentations (12)

Quantum_II (2)

Summer_2021_Bishop's (6)





































































































Theoretical_physics_II (4)

Thermal_Phys (2)

All Projects

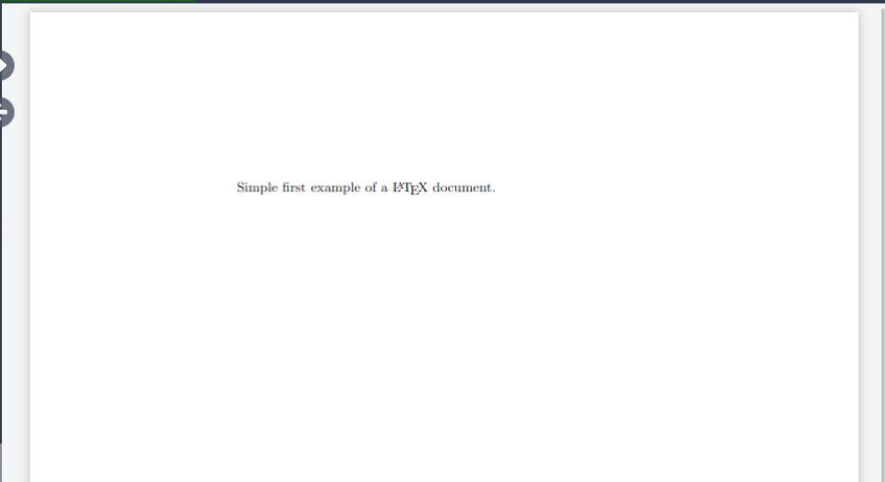
You're using Overleaf Premium 1

Q Search in all projects...

<input type="checkbox"/>	Title	Owner	Last Modified ▾	Actions
<input type="checkbox"/>	EIEIOO_2024_sample_document	You	a day ago by You	    
<input type="checkbox"/>	CZC_final MSC x	You	2 days ago by Jonathan Hucker	    
<input type="checkbox"/>	MSc_Thesis	You	6 days ago by You	    
<input type="checkbox"/>	Clevios_paper	You	8 days ago by You	    
<input type="checkbox"/>	April_19_astroparticle_meeting	You	10 days ago by You	    
<input type="checkbox"/>	ENPH 211 Exercises ENPH211/PHYS21... x	mmakster	23 days ago by Felix Thiel	    
<input type="checkbox"/>	2023_08_11_group_update	You	a month ago by You	    
<input type="checkbox"/>	test	You	a month ago by Minya Bai	    
<input type="checkbox"/>	OGS_research statement	You	3 months ago by You	    
<input type="checkbox"/>	OGS_accomplishments	You	3 months ago by You	    
<input type="checkbox"/>	Clevios_discussion_comments	You	3 months ago by You	    
<input type="checkbox"/>	CGS-D_Outline_of_proposed_research	You	3 months ago by You	    
<input type="checkbox"/>	CAP_abstract_2024	You	3 months ago by You	    
<input type="checkbox"/>	MSc Thesis	You	3 months ago by You	    
<input type="checkbox"/>	Clevios_paper_testing	You	4 months ago by You	    
<input type="checkbox"/>	IDEAS_response	You	6 months ago by You	    
<input type="checkbox"/>	CGS-D_Contributions_and_statements	You	7 months ago by You	    
<input type="checkbox"/>	Astroparticle_meeting_presentation_October_6_2023	You	7 months ago by You	    
<input type="checkbox"/>	SNOLAB_Meeting_DAQ	You	7 months ago by You	    
<input type="checkbox"/>	DEAP_collaboration_presentation	You	7 months ago by You	    

main.tex

```
1 \documentclass{article}
2 \begin{document}
3   Simple first example of a \LaTeX{} document.
4 \end{document}
```



File outline

We can't find any sections or subsections in this file.
[Find out more about the file outline](#)

main.tex

```
Code Editor Visual Editor Normal text B I ... Recompile  
1 \documentclass{article}  
2 \begin{document}  
3   Simple first example of a \LaTeX{} document.  
4 \end{document}
```

Simple first example of a \LaTeX document.

1

← Main text editor

File outline
We can't find any sections or subsections in this file.
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main.tex

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File outline

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PDF Viewer →

Simple first example of a \LaTeX document.

1

Code Editor Visual Editor

main.tex

```
1 \documentclass{article}
2 \begin{document}
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4 \end{document}
```

Recompile



Recompiles the output PDF
Can use ctrl + enter to recompile

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

main.tex

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Recompile

Simple first example of a \LaTeX document.

1

Document contents and file outline

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

Preamble

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx}
3 \begin{document}
4     Simple first example of a \LaTeX{} document.
5 \end{document}
6
```

Document Class:

- Defines the type of document
 - 12pt - font size
 - Letter paper - paper size

Alternate paper sizes:

- a4paper, a5paper, etc.
- legalpaper

Fonts:

- 10pt is default size
- Default font - Computer Modern

Preamble - Cont.

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx}
3 \begin{document}
4     Simple first example of a \LaTeX{} document.
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```

Packages that add features to LaTeX.

- **graphicx** - Adds in functionality for figures
- **geometry** - Adjustable margins and paper size
- **amsmath** - Expands math typesetting
- **float** - More figure placement options
- **multicol** - Enables multi-columns
- **hyperref** - Hyperlinks for document
- **todonotes** - Add notes to the document

*Most packages have examples on overleaf

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx}
3 \begin{document}
4     Simple first example of a \LaTeX{} document.
5 \end{document}
6
```

General structure for environments is:

```
\begin{environment}
...
\end{environment}
```

Document environment contains everything that will be included in the output PDF

Other environments:

- Figure
- Equation
- Itemize
- enumerate

Making a title

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx}
3
4 \title{EIEI00 \LaTeX{} Introduction}
5 \author{Nick Swidinsky}
6 \date{\today}
7
8 \begin{document}
9
10 \maketitle
11 Simple first example of a \LaTeX{} document.
12
13 \end{document}
14
```

Making a title

```
1 \documentclass[12pt, letterpaper]{article}
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11 Simple first example of a \LaTeX{} document.
12
13 \end{document}
14
```



`\title{}` - Title of the Document

`\author{}` - author(s) of the document

`\date{}` - Prints the date for the document.

- `\today` prints today's date

Making a title

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx}
3
4 \title{EIEI00 \LaTeX{} Introduction}
5 \author{Nick Swidinsky}
6 \date{\today}
7
8 \begin{document}
9
10 \maketitle
11 Simple first example of a \LaTeX{} document.
12
13 \end{document}
14
```

This command
creates the title on the
document.

EIEIOO L^AT_EX Introduction

Nick Swidinsky

May 13, 2024

Simple first example of a L^AT_EX document.

Comments

```
1 \documentclass[12pt, letterpaper]{article}
2 \usepackage{graphicx} %Used for graphics
3 \usepackage{amsmath} %Used for math typesetting
4 \usepackage{amssymb}
5 \usepackage{hyperref} %Adds hyperlinks
6 \usepackage{todonotes} %Used to create notes in the document
7
8 \title{EIEI00 \LaTeX{} Introduction} %Title of the document
9 \author{Nick Swidinsky} %Author(s) of the document
10 \date{\today} %Todays date
11
12 \begin{document}
13
14 \maketitle %Create the title for the document
15 Simple first example of a \LaTeX{} document.
16
17 \end{document}
18
```


Comments

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14 \maketitle %Create the title for the document
15 Simple first example of a \LaTeX{} document.
16
17 \end{document}
18
```

Comments are done by using %

Note: If you want to have % in your document use \%

Comments are good for organizing your LaTeX and noting what packages do.

Bold, Italics, and Underline

```
14 ▾ \begin{document}
15
16 \maketitle %Create the title for the document
17 Simple first example of a \LaTeX{} document.
18
19 Adding an enter to the document creates a new paragraph. \textbf{This
    is bold text.} \textit{This is italicized text.} \underline{This is
    underlined text}.
20
21 \end{document}
22
```

Bold, Italics, and Underline

```
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21 \end{document}
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```

Bold

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21 \end{document}
22
```

Bold

Italics

Bold, Italics, and Underline

```
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16 \maketitle %Create the title for the document
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19 Adding an enter to the document creates a new paragraph. \textbf{This
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underlined text}.
20
21 \end{document}
22
```

Bold

Italics

Underline

Itemize

Itemize creates a un-numbered list in LaTeX

```
21 ▾ \begin{itemize}
22     \item Item
23     \item Item
24 ▾   \begin{itemize}
25       \item Sub Item
26       \item Sub Item
27     \end{itemize}
28 \end{itemize}
```

Itemize

```
21 ▾ \begin{itemize}
22     \item Item
23     \item Item
24 ▾   \begin{itemize}
25       \item Sub Item
26       \item Sub Item
27     \end{itemize}
28 \end{itemize}
```

Itemize creates a un-numbered list in LaTeX

- Begins the itemize environment

Itemize

```
21 ▾ \begin{itemize}
22     \item Item
23     \item Item
24 ▾   \begin{itemize}
25       \item Sub Item
26       \item Sub Item
27     \end{itemize}
28 \end{itemize}
```

Itemize creates a un-numbered list in LaTeX

- Begins the itemize environment
- Items in the first itemize environment.

Itemize

```
21 ▾ \begin{itemize}
22     \item Item
23     \item Item
24 ▾   \begin{itemize}
25       \item Sub Item
26       \item Sub Item
27     \end{itemize}
28 \end{itemize}
```

Itemize creates a un-numbered list in LaTeX

- Begins the itemize environment
- Items in the first itemize environment.
- Creates sub itemize environment

EIEIOO L^AT_EX Introduction

Nick Swidinsky

May 13, 2024

Simple first example of a L^AT_EX document.

Adding an enter to the document creates a new paragraph. **This is bold text.** *This is italicized text.* This is underlined text.

- Item 1
- Item 2
 - a) Item a
 - b) Item b

Enumerate

```
32 ▾ \begin{enumerate}
33     \item Item 1
34     \item Item 2
35 ▾   \begin{enumerate}
36     \item Sub Item a
37     \item Sub Item b
38   \end{enumerate}
39 \end{enumerate}
```

Enumerate creates a numbered list in LaTeX

Enumerate

```
32 ▾ \begin{enumerate}
33     \item Item 1
34     \item Item 2
35 ▾   \begin{enumerate}
36     \item Sub Item a
37     \item Sub Item b
38   \end{enumerate}
39 \end{enumerate}
```

Enumerate creates a numbered list in LaTeX

- Begin enumerate environment

Enumerate

```
32 ▾ \begin{enumerate}
33     \item Item 1
34     \item Item 2
35 ▾   \begin{enumerate}
36       \item Sub Item a
37       \item Sub Item b
38     \end{enumerate}
39 \end{enumerate}
```

Enumerate creates a numbered list in LaTeX

- Begin enumerate environment
- Numerated list of entries

Enumerate

```
32 ▾ \begin{enumerate}
33     \item Item 1
34     \item Item 2
35 ▾ \begin{enumerate}
36     \item Sub Item a
37     \item Sub Item b
38 \end{enumerate}
39 \end{enumerate}
```

Enumerate creates a numbered list in LaTeX

- Begin enumerate environment
- Numerated list of entries
- Sub enumerate and entries

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Nick Swidinsky

May 13, 2024

Simple first example of a L^AT_EX document.

Adding an enter to the document creates a new paragraph. **This is bold text.** *This is italicized text.* This is underlined text.

- Item
- Item
 - Sub Item
 - Sub Item
- 1. Item 1
- 2. Item 2
 - (a) Sub Item a
 - (b) Sub Item b

Figures

```
42 ▾ \begin{figure}[h] %Starts figure environment. [h] is a placement request
43     \centering %Centers the figure on the page horizontally
44     \includegraphics[width = 0.8\linewidth]{figures/Globie.png} %Includes the graphics with its size 0.8 * linewidth
45     \caption{Picture of NEWS-G beloved mascot, \sout{and omnipotent being}, Globie!} %Caption of the figure
46     \label{fig:Globie} %Label to reference later
47 \end{figure} %End figure environment
```


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```

- Begins the figure
- Centers the figure in the environment

Figures

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```

- Begins the figure
- Centers the figure in the environment
- Adds image to PDF
 - Note: `width = 0.8\linewidth` sets the size of the figure to 80% of the line width

Figures

```
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- Begins the figure
- Centers the figure in the environment
- Adds image to PDF
 - Note: `width = 0.8\linewidth` sets the size of the figure to 80% of the line width
- Caption for the figure
 - Note: Numbering is automatic in LaTeX
- Adds a label to the figure for calling later.

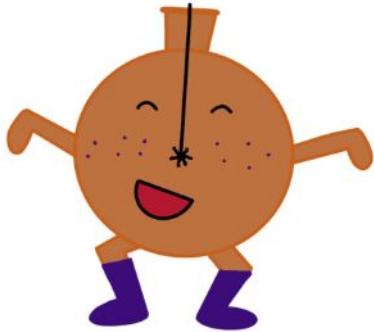


Figure 1: Picture of NEWS-G beloved mascot ~~and omnipotent being~~ Globie!

2

- Latex places figures based on the command given.
 - [H] - Place exactly at spot in source
 - [h] - Place approximately at spot
 - [t] - Place at top of page
 - [b] - Place at bottom of page
 - [htbp] - sets the order of priority. It will first try [h], then [t], [b], and last [p]
 - [!] - Overrides LaTeX parameters

- Placement is to reduce the amount of white space

Inline mathematics

50

51 Writing math is one of the main uses of `\LaTeX{}` and can be done in two ways. Inline math lets you place equations directly inline such as the following: `$c^2 = a^2 + b^2$`. Inline equations are denoted by `\$` on either side of the equation. Inline math mode is also how you can place Greek letters inline. To write Greek letters, open a math environment the type `$_backslash$` then the letter name. Note capital letters are made by capitalizing the first letter. lower case delta: `$_delta$`, capital delta: `$_Delta$`.

52

Inline mathematics

50

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52

- Inline math mode showing the Pythagorean theorem

Inline mathematics

50

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52

- Inline math mode showing the Pythagorean theorem
- Greek letters are easily written in math mode.
 - Capital letters are made by capitalizing the first letter.

Inline mathematics

Writing math is one of the main uses of L^AT_EX and can be done in two ways. Inline math lets you place equations directly inline such as the following: $c^2 = a^2 + b^2$ Inline equations are denoted by \$ on either side of the equation. Inline math mode is also how you can place Greek letters inline. To write Greek letters, open a math environment the type \ then the letter name. Note capital letters are made by capitalizing the first letter. lower case delta: δ , capital delta: Δ .

Equation Environment

```
55 ▾ \begin{equation} %Begins the equation environment
56     \hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
57     \label{eq:Fourier_transform} %labe for the equation
58 \end{equation} %End the equation environment
```

Equation Environment

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- Begins math environment

Equation Environment

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```

- Begins math environment
- Equation written in LaTeX

Equation Environment

```
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58 \end{equation} %End the equation environment
```

- Begins math environment
- Equation written in LaTeX
- Label for referencing the equation
 - Note, like figure equations are automatically numbered

Equation Environment

Larger math environments are created using equation.

$$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x)e^{-i2\pi\xi x} dx \quad (1)$$

1

Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```


Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```

- Adds a hat to f

Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```

- Adds a hat to f
- Prints the integral sign

Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```

- Adds a hat to f
- Prints the integral sign
- Prints - infinity as a subscript
 - Note: LaTeX only puts the first term in the subscript. If you want more they need to be included in {}

Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```

- Adds a hat to f
- Prints the integral sign
- Prints - infinity as a subscript
 - Note: LaTeX only puts the first term in the subscript. If you want more they need to be included in {}
- Prints infinity as a superscript

Equation Environment

```
\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-i2\pi \xi x} dx %fourier transform equation
```

- Adds a hat to f
- Prints the integral sign
- Prints - infinity as a subscript
 - Note: LaTeX only puts the first term in the subscript. If you want more they need to be included in {}
- Prints infinity as a superscript
- Prints the exponent following the same rules as super and subscripts

Other useful math notes

62 Fraction:

```
63 ▾ \begin{equation}
64     \frac{d}{dx}
65     \label{eq:fractions}
66 \end{equation}
```

67

68 Align:

```
69 ▾ \begin{align}
70     f(x) &= x^2 + 1x - 6 \\
71     &= (x-2)(x+3)
72     \label{eq:align}
73 \end{align}
```

74

75 Un-numbered equations:

```
76 ▾ \begin{equation*}
77     \ddot{x} + \omega^2 x = 0
78     \label{eq:unnumbered}
79 \end{equation*}
```

Other useful math notes

$$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x)e^{-i2\pi\xi x} dx \quad (1)$$

Other useful math notes:

Fraction:

$$\frac{d}{dx} \quad (2)$$

Align:

$$f(x) = x^2 + 1x - 6 \quad (3)$$

$$= (x - 2)(x + 3) \quad (4)$$

Un-numbered equations:

$$\ddot{x} + \omega^2 x = 0$$

References and bibliography

81 references in LaTeX is easy to do using `\backslash$ref` for references to equations, figures,
sections, or tables that have been created in this document. `\backslash$cite` is used to cite using
a .bib file.

82

83 Fourier transforms are given by Eq.~\ref{eq:Fourier_transform}. Globie is shown in
Fig.~\ref{fig:Globie}

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- Referencing figures and equations are done the same way.

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82

83 Fourier transforms are given by `Eq.~\ref{eq:Fourier_transform}`. `Globie` is shown in
`Fig.~\ref{fig:Globie}`

- Referencing figures and equations are done the same way.
 - ~ makes an un-breakable space

Bibliography

```
1 @book{texbook,  
2   author = {Donald E. Knuth},  
3   year = {1986},  
4   title = {The {\TeX} Book},  
5   publisher = {Addison-Wesley Professional}  
6 }  
7  
8 @book{latex:companion,  
9   author = {Frank Mittelbach and Michel Gossens  
10            and Johannes Braams and David Carlisle  
11            and Chris Rowley},  
12   year = {2004},  
13   title = {The {\LaTeX} Companion},  
14   publisher = {Addison-Wesley Professional},  
15   edition = {2}  
16 }  
17  
18 @book{latex2e,  
19   author = {Leslie Lamport},  
20   year = {1994},  
21   title = {{\LaTeX}: a Document Preparation System},  
22   publisher = {Addison Wesley},  
23   address = {Massachusetts},  
24   edition = {2}  
25 }  
26  
27 @article{knuth:1984,  
28   title={Literate Programming},  
29   author={Donald E. Knuth},  
30   journal={The Computer Journal},  
31   volume={27},  
32   number={2},  
33   pages={97--111},  
34   year={1984},  
35   publisher={Oxford University Press}  
36 }  
37  
38 @inproceedings{lesk:1977,  
39   title={Computer Typesetting of Technical Journals on {UNIX}},  
40   author={Michael Lesk and Brian Kernighan},  
41   booktitle={Proceedings of American Federation of  
42             Information Processing Societies: 1977  
43             National Computer Conference},  
44   pages={879--888},  
45   year={1977},  
46   address={Dallas, Texas}  
47 }
```

Bibliography

85 references to a single paper looks like this~\cite{latex:companion}. Using two references looks like
86 this~\cite{knuth:1984,latex2e}.

86

87

88 \bibliographystyle{ieeetr}

89 \bibliography{references.bib}

90

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```
86  
87  
88 \bibliographystyle{ieeetr}  
89 \bibliography{references.bib}
```

- Citation for 1 reference

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- Citation for 1 reference
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```

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```

```
^^
```

- Citation for 1 reference
- Citation for multiple references
- Sets the style for your bibliography and references

Bibliography

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```

```
^^
```

- Citation for 1 reference
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- Creates the bibliography

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```
86
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87
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```

```
89 \bibliography{references.bib}
```

```
^^
```

- Citation for 1 reference
- Citation for multiple references
- Sets the style for your bibliography and references
- Creates the bibliography

Note: There are a few different ways of creating bibliographies depending on the paper.

Sections

```
92 ▾ \section{Introduction to Sections}\label{sec:section_intro}
```

```
93
```

```
94 This is a new section.
```

```
95
```

```
96 ▾ \subsection{Intro to Subsections}\label{sec:subsection}
```

```
97
```

```
98 This is a subsection
```

```
99
```

```
100 ▾ \subsubsection{Intro to subsubsections}\label{sec:subsubsection}
```

```
101
```

```
102 This is a subsubsection
```

Sections

2 Introduction to Sections

This is a new section.

2.1 Intro to Subsections

This is a subsection

2.1.1 Intro to subsubsections

This is a subsubsection

Compile often!

Recompile Show in code

No PDF

This compile didn't produce a PDF. This can happen if:

- There is an unrecoverable LaTeX error. If there are LaTeX errors shown below or in the raw logs, please try to fix them and compile again.
- The document environment contains no content. If it's empty, please add some content and compile again.
- This project contains a file called `output.pdf`. If that file exists, please rename it and compile again.

Runaway argument?

```
{Intro to subsections\label {sec:subsection} \par This is a sub\ETC.  
! File ended while scanning use of \@dblarg.  
<inserted text>  
      \par  
<-> main.tex
```

I suspect you have forgotten a `}', causing me

Expand

Emergency stop.

```
<-> main.tex  
  
*** (job aborted, no legal \end found)  
  
Here is how much of TeX's memory you used:  
20753 strings out of 475237
```

Expand

`h' float specifier changed to `ht'.

The float specifier 'h' is too strict of a demand for LaTeX to place your float in a nice way here. Try relaxing it by using 'ht', or even 'htbp' if necessary. If you want to try keep the float here anyway, check out the float package.

[Learn more](#)

Citation 'latex:companion' on page 3 undefined on input line 89.

You have cited something which is not included in your bibliography. Make sure that the citation (`\cite{...}`) has a corresponding key in your bibliography, and that both are spelled the same way.

[Learn more](#)

Citation 'knuth:1984' on page 3 undefined on input line 89.

You have cited something which is not included in your bibliography. Make sure that the citation (`\cite{...}`) has a corresponding key in your bibliography, and that both are spelled the same way.

[Learn more](#)

Citation 'latex2e' on page 3 undefined on input line 89.

You have cited something which is not included in your bibliography. Make sure that the citation (`\cite{...}`) has a corresponding key in your bibliography, and that both are spelled the same way.

[Learn more](#)

Other uses of LaTeX

- **Presentations:** Beamer package
- **Flow charts:** tikz
- **Posters:** baposter
- **Thesis:** report

Questions?