# The Future of Engineering

## Challenges and opportunities

Miguel Xochicale (@mxochicale @_mxochicale)

October 21, 2020; 18h00m MEX

Conf

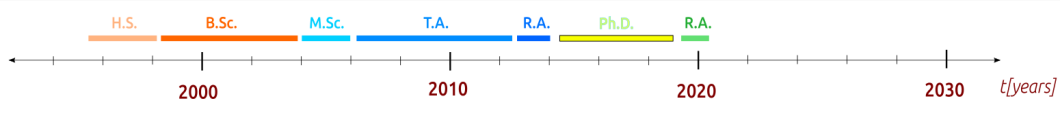
School of Biomedical Engineering and Imaging Sciences
King's College London

# Contents

# Short-bio

# My journey in science

- **(1996-1999)** High School in Electronics
- **(1999-2004)** BSc in Electronics
- **(2004-2006)** MSc in Signal Processing
- **(2006-2012)** Teaching Associate in Mechatronics
- **(2013-2014)** Research Assistant in Robotics at INAOE
- **(2014-2019)** PhD student in Human-Robot Interaction at Uni of Bham
- **(2019-present)** Research Associate in Ultrasound-Guidance Intervention at KCL



# Challenges and Opportunities in Engineering

# Challenges in Engineering

- Advance Personalised learning
- Make Solar Energy Economical
- Enhance Virtual Reality
- Reverse-engineer the brain
- Egineer better medicines
- Advance Health Informatics
- Restore and improve urban infrastructure
- Secure cyberspace
- Provide access to clean water
- Provide energy from fusion
- Develop Carbon Sequestration Methods
- Engineer the tools for science discovery

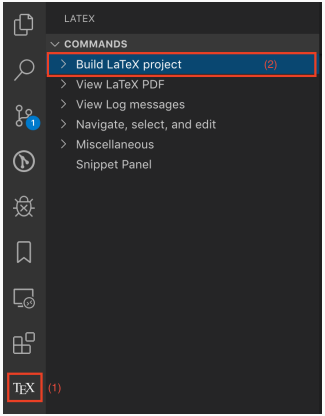
*Compile LaTeX Project in VSCode*

# Hello, LaTeX!

- Create `hello.tex` file with following content.

```
% this is hello.tex
\documentclass{article}
\begin{document}
Hello, \LaTeX!
\end{document}
```

- Compile it
  - Click the build button in your LaTeX editor/IDE
  - OR using command line: `latexmk -pdf hello`
- Open `hello.pdf` to preview the result

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# Example of A Complex Document

- Download the source code from
  `https://github.com/xu-cheng/latex-tutorial/archive/master.zip`
- The example document is located in the `example` folder. It contains:
  - `main.tex` The main tex source
  - `preamble.tex` A subfile to store format definitions
  - `tikz-example.tex` A figure drawn using tikz
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# Comment, Command and Environment

- `%` starts a comment. e.g. `% this is hello.tex`
- `\` starts a command.

```
\command % a command
\command{} % also a command
\command{arg} % a command with an argument
\command{arg1}{arg2} % a command with multiple arguments
\command[opt arg]{arg} % [] is for optional argument
```

- `\begin{} ... \end{}` denotes an environment

```
\begin{envname}
  inside the environment
\end{envname}
% LaTeX environment can take arguments
\begin{envname}{arg} \end{envname}
\begin{envname}[opt arg]{arg} \end{envname}
```

# Source File Structure

- A document starts with `\documentclass{...}` command to specify the template
- Common templates include:
  - `article`
  - `book`
  - `report`
  - `letter`
  - `beamer` (slides)
  - `standalone` (graphics)
  - `acmart` (ACM template)
  - `IEEEtrans` (IEEE template)
- Template class can accept options, e.g. `\documentclass[a4paper,10pt]{article}`

## Class Options for `article`, `report`, `book`, `letter`

| | |
|---|---|
| `10pt`, `11pt`, `12pt` | Set font size. |
| `a4paper`, `letterpaper`, ... | Defines the paper size. |
| `fleqn` | Typesets displayed formulae left-aligned instead of centred. |
| `leqno` | Places the numbering of formulae on the left hand side instead of the right. |
| `titlepage`, `notitlepage` | Specifies whether a new page should be started after the document title or not. |
| `onecolumn`, `twocolumn` | Typeset the document in one column or two columns. |
| `twoside, oneside` | Specifies whether double or single sided output should be generated. |
| `landscape` | Changes the layout of the document to print in landscape mode. |
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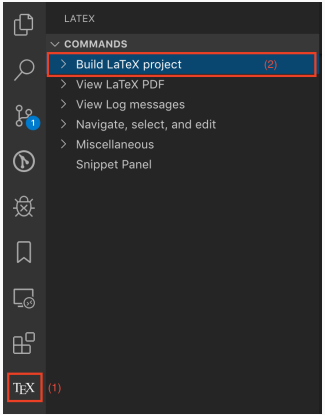


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# Introduction

- LaTeX is a document preparation system and document markup language.
- It can be used to typeset articles, books, slides, posters, even graphics.
- Pros:
  - It separates presentation/format from contents.
  - Since the source codes are plaintext, it works well with version control system such as git.
  - Highly customizable through various of packages.
- Cons:
  - There is no graphic interface to support WYSIWYG style editing.
  - Not suitable to produce unstructured documents.

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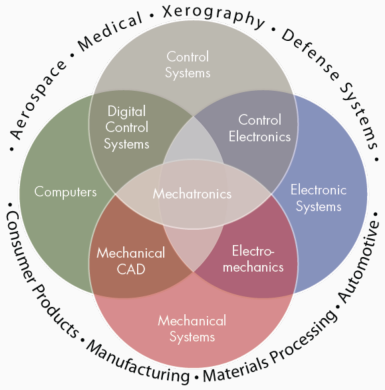


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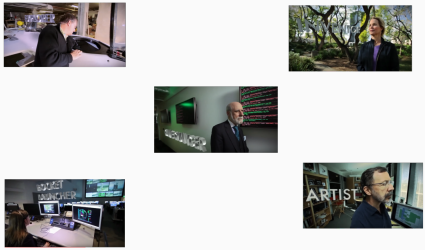


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Thanks
Questions?