



Introduction to Scientific Working

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Outline

1. Organisation
2. LaTeX
3. Research Integrity
4. LaTeX
5. TikZ
6. Homework

Keywords

- acknowledgement
- awards
- beamer
- bibliography
- CORE ranking
- DBLP
- conference
- editorial board
- generative AI
- Google Scholar
- h-index
- impact factor
- journal
- LaTeX
- LIPICs
- LNCS
- open access
- plagiarism
- presentation
- program committee
- rebuttal
- review
- submission
- TikZ
- workshop
- ...

Types of Scientific Works

- ▶ seminar report
- ▶ workshop paper
- ▶ bachelor thesis
- ▶ conference paper
- ▶ master thesis
- ▶ journal article
- ▶ PhD thesis
- ▶ book chapter
- ▶ habilitation thesis
- ▶ book

Typical Structure

- ① title, author(s), affiliation(s)
- ② abstract
- ③ introduction
- ④ preliminaries
- ⑤ main content
- ⑥ conclusion
- ⑦ citations

Outline

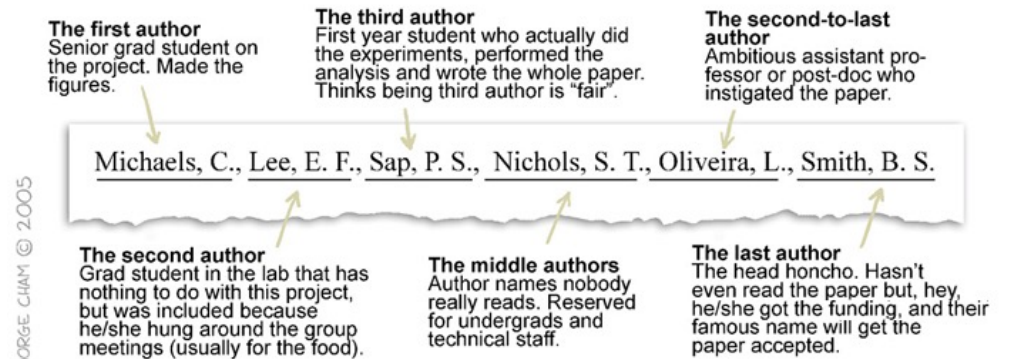
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```
\documentclass{article}
\title{Very Important Title}
\author{Max Mustermann \ \ University of Innsbruck}
\and Hanako Yamada \ \ University of Tokyo}
\date{\today}
\begin{document}
\maketitle
\end{document}
```

- ▶ `\usepackage[options]{authblk}`
offers more flexibility

```
\documentclass{article}
\usepackage{authblk}
\title{Joint Paper}
\author[1,3]{Max Mustermann}
\author[2]{Hanako Yamada}
\author[3]{Kari Nordmann}
\affil[1]{University of Innsbruck}
\affil[2]{University of Tokyo}
\affil[3]{Norwegian University of Sciences and Technology}
\begin{document}
\maketitle
\end{document}
```

THE AUTHOR LIST: GIVING CREDIT WHERE CREDIT IS DUE



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Research Integrity

- ▶ What is a violation of good scientific practice?

The guidelines of the University of Innsbruck define the following offenses as violations of good scientific practice:

Any infringement of intellectual property

- ▶ Plagiarism (use of foreign text passages or data by direct, paraphrased or translated adoption without appropriate citation of the source and the author)
- ▶ Theft of ideas
- ▶ Exclusion of authorized authorship
- ▶ Fraudulent authorship in publications
- ▶ Claiming the (co-)authorship of another person without their permission
- ▶ Unauthorized publication

Research Integrity

- ▶ What is a violation of good scientific practice?

The guidelines of the University of Innsbruck define the following offenses as violations of good scientific practice:

Falsification of research results

- ▶ Any infringement of intellectual property
- ▶ Invention, falsification, manipulation and suppression of data
- ▶ Falsification of results
- ▶ Removal or inadequate documentation of primary data

Research Integrity

- ▶ What is a violation of good scientific practice?

The guidelines of the University of Innsbruck define the following offenses as violations of good scientific practice:

Breach of supervisory duties, lack of cooperation or collegiality

- ▶ Lack of or inadequate academic discussion in working groups
- ▶ Inadequate supervision of junior researchers or authors of (scientific) theses
- ▶ Lack of instruction of those involved in research with regard to good scientific practice
- ▶ Sabotage of research activities
- ▶ Defamation in relation to good scientific practice
- ▶ Breach of trust as a reviewer

YOUR THESIS TITLE

CONDENSING OVER HALF A DECADE OF YOUR LIFE IN ONE SENTENCE.

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the colon
Can't decide what to title your thesis? Use a colon!

a preposition
A good preposition tells your readers "hey, this is not just a futile exercise"

"Witty catchphrase" : Length-enhanced superlative verbiage with prolixity in/of/ for Obscure topic few people care about.

witty catchphrase
Makes people think you're hip and culturally relevant. Only marginally related to the actual thesis? No problem.

the boring stuff
Nothing says "academic rigor" like a long string of dry scientific-sounding terminology and fancy buzzwords.

obscure topic few people care about
Sad, but true.

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```
\documentclass{article}
\usepackage{lipsum}
\title{P = NP}
\author{Jan Janssen \ \ Vrije Universiteit Amsterdam}
\begin{document}
\maketitle
\begin{abstract}
\lipsum[1]
\end{abstract}
\end{document}
```

src

Abstract MadLibs!

This paper presents a _____ method for _____
(synonym for new) (sciencey verb)
the _____ . Using _____, the
(noun few people have heard of) (something you didn't invent)
_____ was measured to be _____ +/- _____
(property) (number) (number)
_____. Results show _____ agreement with
(units) (sexy adjective)
theoretical predictions and significant improvement over
previous efforts by _____, et al. The work presented
(Loser)
here has profound implications for future studies of
_____ and may one day help solve the problem of
(buzzword)

(supreme sociological concern)

Keywords: _____ / _____ / _____
(buzzword) (buzzword) (buzzword)

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Exemplary Bachelor Theses

- ▶ Number Link Benjamin Ruppachter 2009
- ▶ Kurodoko Johannes Koch 2020
- ▶ Five Cells Diana Gründlinger 2023

Common Ingredients

- ▶ **appendices**
- ▶ bibliography
- ▶ **chapters/sections**
- ▶ **figures**
- ▶ footnotes
- ▶ formulas
- ▶ hyper links
- ▶ lists
- ▶ plots
- ▶ program code
- ▶ **screen shots**
- ▶ **table of contents**
- ▶ tables

```
\documentclass{report}
\usepackage{lipsum}
\begin{document}
\tableofcontents
\chapter{First Chapter}
\lipsum[2-3]
\chapter{Second Chapter}
\section{First Section of Second Chapter}
\lipsum[4-6]
\section{Second Section of Second Chapter}
\subsection{Subsection}
\lipsum[7]
\section*{Unnumbered Section}
\lipsum[8-9]
\appendix
\chapter{Chapter in Appendix}
\end{document}
```

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}
\begin{figure}[htb]
\begin{center}
\includegraphics[width=8cm]{ari.png}
\end{center}
\caption{Great illustration.}
\end{figure}
\end{document}
```

- ▶ `\includegraphics[options]{filename}`
supported formats: eps jpeg pdf png
options (key=value): width height angle scale ...

Special Characters

#	\#	~	\~{}	-	_	\	\textbackslash
\$	\\$	&	\&	{	\{		
%	\%	}	\}	~	\~{}	\	\textasciitilde

Font Sizes

\tiny	tiny	\large	large
\scriptsize	very small	\Large	larger
\footnotesize	quite small	\LARGE	larger
\small	small	\huge	huge
\normalize	normal	\Huge	largest

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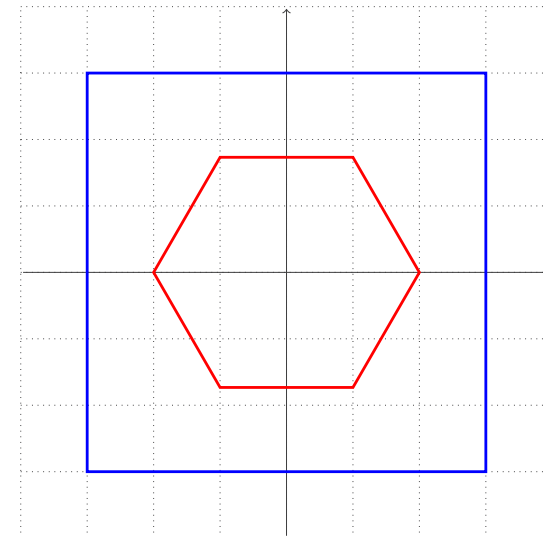
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- ▶ TikZ is powerful modern computer graphics package
- ▶ TikZ ist kein Zeichenprogramm
- ▶ creator: Till Tantau (2007–2013)
- ▶ consistent, high-quality, efficient
- ▶ 1300+ page manual

```
\documentclass[tikz,border=10pt]{standalone}
\begin{document}
\begin{tikzpicture}
\draw[thin,dotted] (-4,-4) grid (4,4);
\draw[->] (-4,0) -- (4,0);
\draw[->] (0,-4) -- (0,4);
\end{tikzpicture}
\end{document}
```

- ▶ `\draw[options] coordinate picture-element coordinate ...`
- ▶ Cartesian coordinates, polar coordinates

```
\documentclass[tikz,border=10pt]{standalone}
\begin{document}
\begin{tikzpicture}
\draw[thin,dotted] (-4,-4) grid (4,4);
\draw[->] (-4,0) -- (4,0);
\draw[->] (0,-4) -- (0,4);
\draw[very thick,blue]
(-2,-2) -- (-2,2) -- (2,2) -- (2,-2) -- cycle;
\draw[very thick,red]
(0:2) -- (60:2) -- (120:2) -- (180:2) -- (240:2) -- (300:2) -- cycle;
\end{tikzpicture}
\end{document}
```



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Homework Exercises for March 19

- ① Read Chapters 1 and 2 of The Not So Short Introduction to $\text{\LaTeX} 2_{\epsilon}$. ①
- ② Give at least five examples of recent scientific misconduct, from different domains. ②
- ③ What are the legal consequences of plagiarism for UIBK students? ①
- ④ Use TikZ to typeset the following Sudoku puzzle: ②

8								
		3	6					
	7			9		2		
	5				7			
			4	5	7			
			1				3	
		1					6	8
		8	5			4	1	
	9							