CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

http://www.cit.ie

Research Practice & Ethics

COMP9011

Mubashir Husain Rehmani

Mubashir.Rehmani@cit.ie

Delivered To

MSc Software Architecture and Design

MSc Artificial Intelligence

MSc Information Design and Development

Week 5

- Archives
- IEEE ComSoC Best Readings
  - For Idea Generation
- IEEE Technology Trends 2020 (ComSoc & CS)
- IEEE Tools/Platforms
- LaTeX

Archives

- Consider the rise of preprint usage and the repositories available today for math and physics (arXiv), for biology (bioRxiv), for chemistry (ChemRxiv) and for social sciences (SocArXiv), to name a few.
- ArXiv
- https://arxiv.org/

- SocArXiv
- https://osf.io/preprints/socarxiv

IEEE TechRxiv

- In October 2019, the IEEE launched TechRxiv, an open, moderated preprint server for unpublished research in IEEE's technical fields of interest.
- This new repository supports authors and researchers in archiving their unpublished work before any formal peer review.
- The launch of TechRxiv is a strategic move on IEEE's part to help IEEE maintain its competitiveness in today's evolving publishing landscape.
- https://www.techrxiv.org/
- For IEEE, TechRxiv provides a new path to increase both submissions to IEEE journals and IEEE Xplore usage.

IEEE TechRxiv

- For researchers, TechRxiv is a place where they can stake a claim to early research findings, quickly disseminate their work to a wide audience, and gain community feedback on preliminary versions of their research before considering submission to a conference or journal.

BioRxiv

- https://www.biorxiv.org/

ChemRxiv

- https://chemrxiv.org/

IEEE ComSoC Best Readings

- Source: https://www.comsoc.org/publications/best-readings
- Best Readings is a collection of books, articles, and papers on a featured topic.
- **Backhaul and Fronthaul: Communications, Networking, and Signal Processing**
  This Best Readings list is expected to provide several archival papers and special issues on the backhaul/fronthaul and related networking, communication, and signal processing issues that are currently available.
- **Broadband Access**
  The subject of broadband access covers a surprisingly wide range of technologies, and spans several decades of intensive research by groups from all over the world.

IEEE ComSoC Best Readings

- **Cloud Communications and Networking**
  Cloud computing is an innovative technology that relies on sharing of resources similar to a utility over the Internet.
- **Cognitive Radio**
  This Best Readings is on Cognitive Radio (CR) Communications and Networking.
- **Communications and Information Systems Security**
  This Best Readings is on Communications and Information Systems Security (CIS).
- **e-Health**
  This Best Readings is on e-Health.

IEEE ComSoC Best Readings

- **Device-to-Device Communications**
  Device-to-device (D2D) communication has been foreseen as a key complimentary emerging technology within the 5G mobile communication paradigm, providing potential use cases such as peer-to-peer communication (e.g. for public safety, vehicle-to-everything (V2X), etc.), cellular offloading, device-based relaying, joint reception/transmission, content sharing, proximity detection, and other proximity-related services.
- **Green Communications**
  This Best Readings is on Green Communications.

IEEE ComSoC Best Readings

- **Internet of Things**
  The Internet of Things started as the basis of providing identification and connectivity to any entity that could be relevant into a process, action or provide relevant data that could be used by other entities.
- **Machine Learning in Communications**
  This collection of Best Readings focuses on ML in the physical and medium access control (MAC) layer of communication networks.
- **Massive MIMO**
  While massive MIMO is still in its early stages of development, it is such a radical departure for current technologies that it stands to revolutionize the way that future cellular networks are designed, standardized, and implemented.

IEEE ComSoC Best Readings

- **Multi-Tier Cellular**
  This Best Readings is on Multi-Tier Cellular.
- **Nanoscale Communication Networks**
  Nanoscale communication networks are more precisely distinguished from today's macroscale communication systems by the IEEE 1906.1 standard as communication systems having essential elements with at least one dimension on the order of hundreds of nanometers and that utilize a unique physical principal of operation.
- **Optical Wireless Communications**
  This Best Readings section presents papers on optical wireless communications that cover several fronts, including information theoretic aspects, communication theoretic aspects, and implementation aspects.

IEEE ComSoC Best Readings

- **Physical-Layer Security**
  In this Best Readings, we highlight overview articles, archival technical papers, as well as special issues on physical-layer security that are representative of physical-layer security today.
- **Polar Coding**
  In this Best Readings, we summarize several papers on the theoretical foundations of polarization theory, the construction and decoding of practical polar codes, as well as some generalized polar codes, which can help to overcome limitations of classical Arıkan polar codes.
- **Power Line Communications**
  The topic of PLCs is difficult as it lies at the intersection of several fields: circuit analysis, transmission line theory, electromagnetic theory, signal processing, and communications and information theory.

IEEE ComSoC Best Readings

- **Smart Grid Communications**
  This Best Readings is a concise list of must-read books and articles that reveal the role and the potential of communication networks and systems in the smart grid.
- **UAV Assisted Wireless Networks**
  In this Best Readings, we introduce several books, archival papers and special issues on the topic of UAV assisted communication and sensing applications over cellular networks.

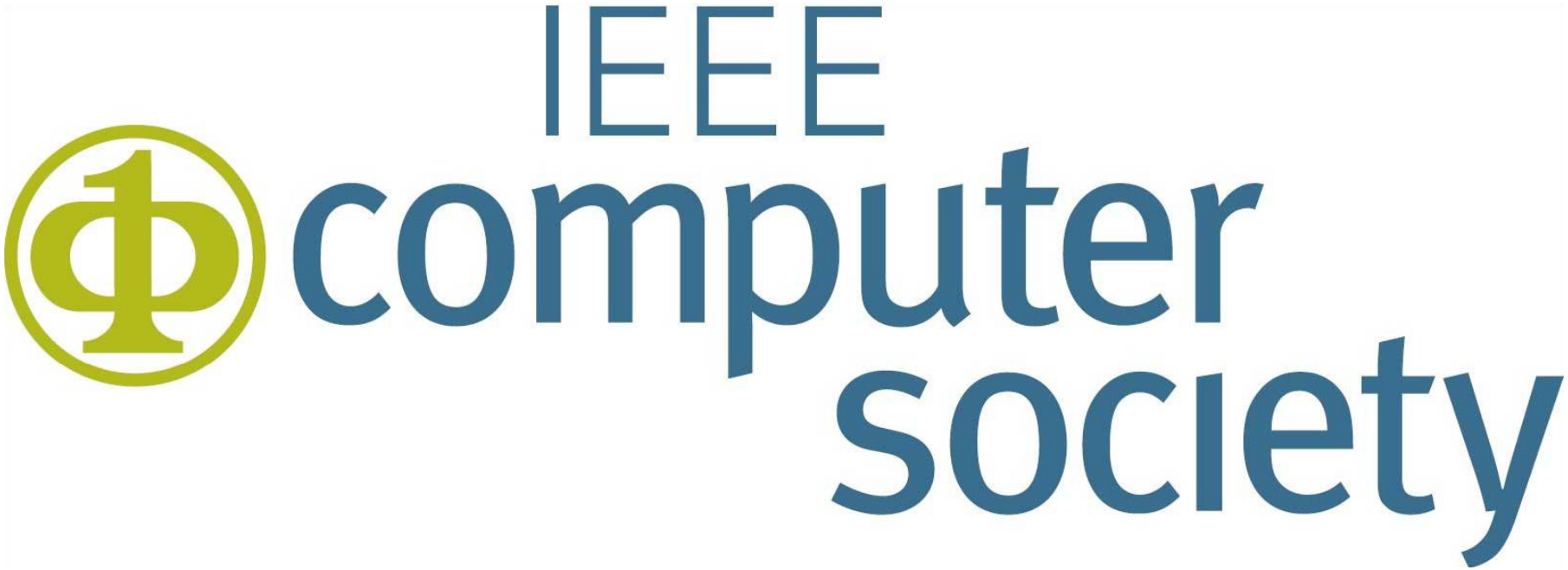
Nine Communications Technology Trends for 2020
IEEE Communications Society

Source: https://www.comsoc.org/publications/ctn/nine-communications-technology-trends-2020

Nine Communications Technology Trends for 2020 IEEE Communications Society

- 1. THz Spectrum Heats Up Talk of 6G
- 2 . AI Reaches the Boonies with Federated Learning
- 3. Meta-materials, Meta-surfaces, Meta-resonators, Meta-anything
- 4. The Cellphone is Dead. All Hail IoT!
- 5. Cellular is Dead. All Hail IT!
- 6. The Year the Telecom World Cracked
- 7. Come Fly with Me, and My Network (UAVs)
- 8. Massive MIMO Implementation Becomes a Career Plan
- 9. Everyone is Slicing and Virtualizing

Top 12 Technology Trends for 2020 by IEEE Computer Society



Source: https://www.computer.org/publications/tech-news/trends/exclusive-content-ieee-cs-tech-trends-for-2020

Top 12 Technology Trends for 2020 by IEEE Computer Society

- Artificial Intelligence (AI) at the edge (AI@Edge).
- Non-volatile memory (NVM) products, interfaces and applications.
- Digital twins, including cognitive twins.
- AI and critical systems.
- Practical delivery drones.
- Additive manufacturing.
- Cognitive skills for robots.
- AI/ML applied to cybersecurity.
- Legal related implications to reflect security and privacy.
- Adversarial Machine Learning (ML).
- Reliability and safety challenges for intelligent systems.
- Quantum Computing.

IEEE Collabratec and IEEE Publication Recommender

- https://ieee-collabratec.ieee.org/

- IEEE Publication Recommender
- Search 190+ periodicals and 1800+ conferences
- Compare critical points such as Impact Factor and Submission-To-Publication Time
- Get all the key data about IEEE publications at a glance
- Download the results of your search
- https://publication-recommender.ieee.org/periodicals

IEEE PDF Checker, IEEE LaTeX Checker

- https://www.ieee.org/publications/authors/pdf_checker.html

- Speed up your scholarly publishing process with the IEEE by validating your article's LaTeX files prior to submission. Avoid delays in publishing due to different versions of LaTeX, incomplete files, or other potential setbacks.
- http://latexqc.ieee.org/

- IEEE Graphics Analyzer
- https://graphicsqc.ieee.org/

LaTeX

- Tutorial: https://upload.wikimedia.org/wikipedia/commons/2/2d/LaTeX.pdf

- Tutorial on Wiki:
- https://en.wikibooks.org/wiki/LaTeX

MikTex

- Download it from:
  - https://miktex.org/
- MiKTeX (pronounced *mick-tech*) is an up-to-date implementation of TeX/LaTeX and related programs.
- TeX is a typesetting system written by Donald Ervin Knuth who says that it is *intended for the creation of beautiful books - and especially for books that contain a lot of mathematics*.

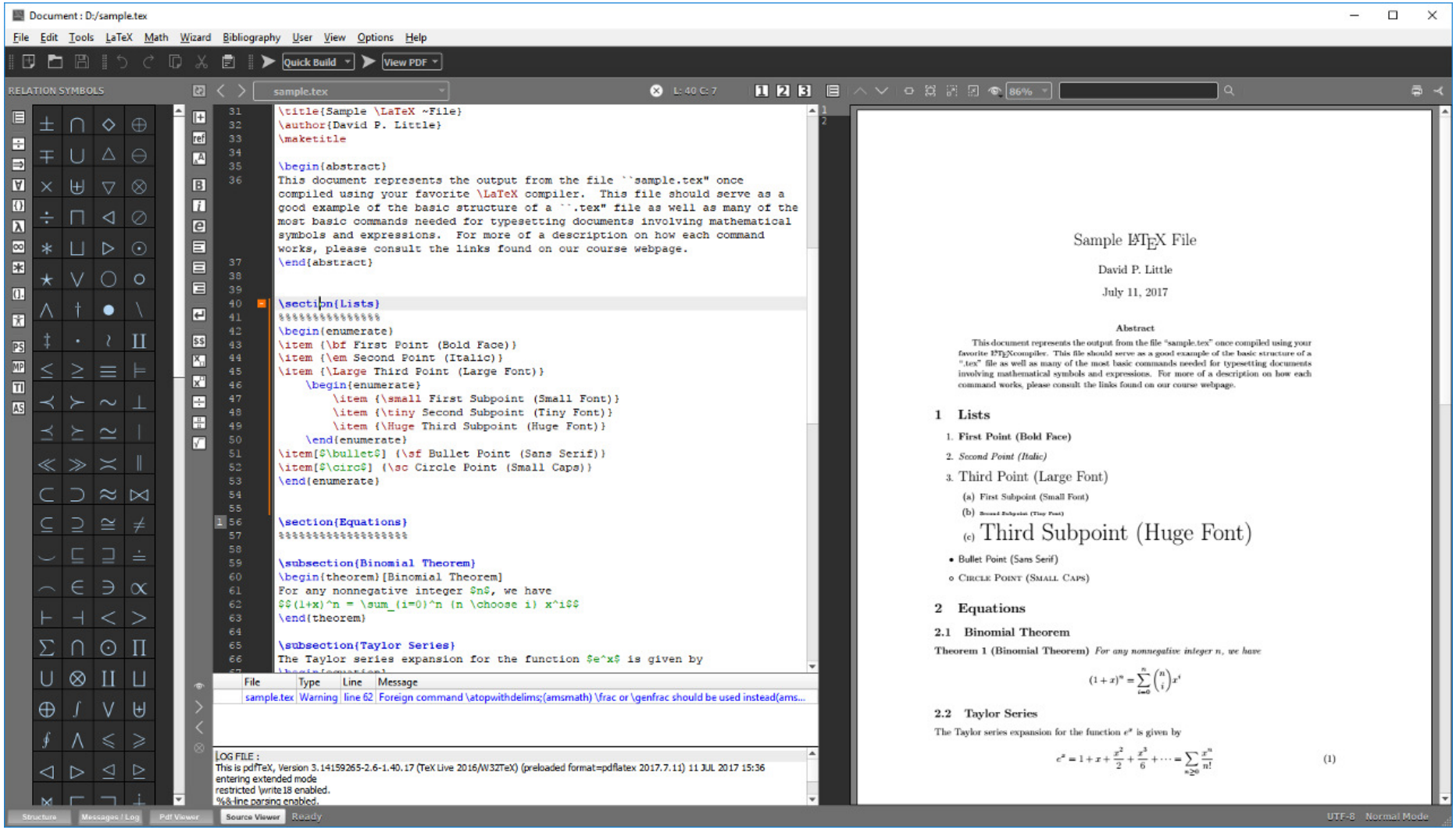
LaTeX

- LaTeX was originally written in the early 1980s by Leslie Lamport at SRI International.
- The current version is LaTeX2e (stylised as LaTeX2ε).
- LaTeX is free software and is distributed under the LaTeX Project Public License (LPPL).
- LaTeX is a document preparation system.
- When writing, the writer uses plain text as opposed to the formatted text found in WYSIWYG ("what you see is what you get") word processors like Microsoft Word, LibreOffice Writer and Apple Pages.
- The writer uses markup tagging conventions to define the general structure of a document (such as article, book, and letter), to stylise text throughout a document (such as bold and italics), and to add citations and cross-references.
- A TeX distribution such as TeX Live or MikTeX is used to produce an output file (such as PDF or DVI) suitable for printing or digital distribution.

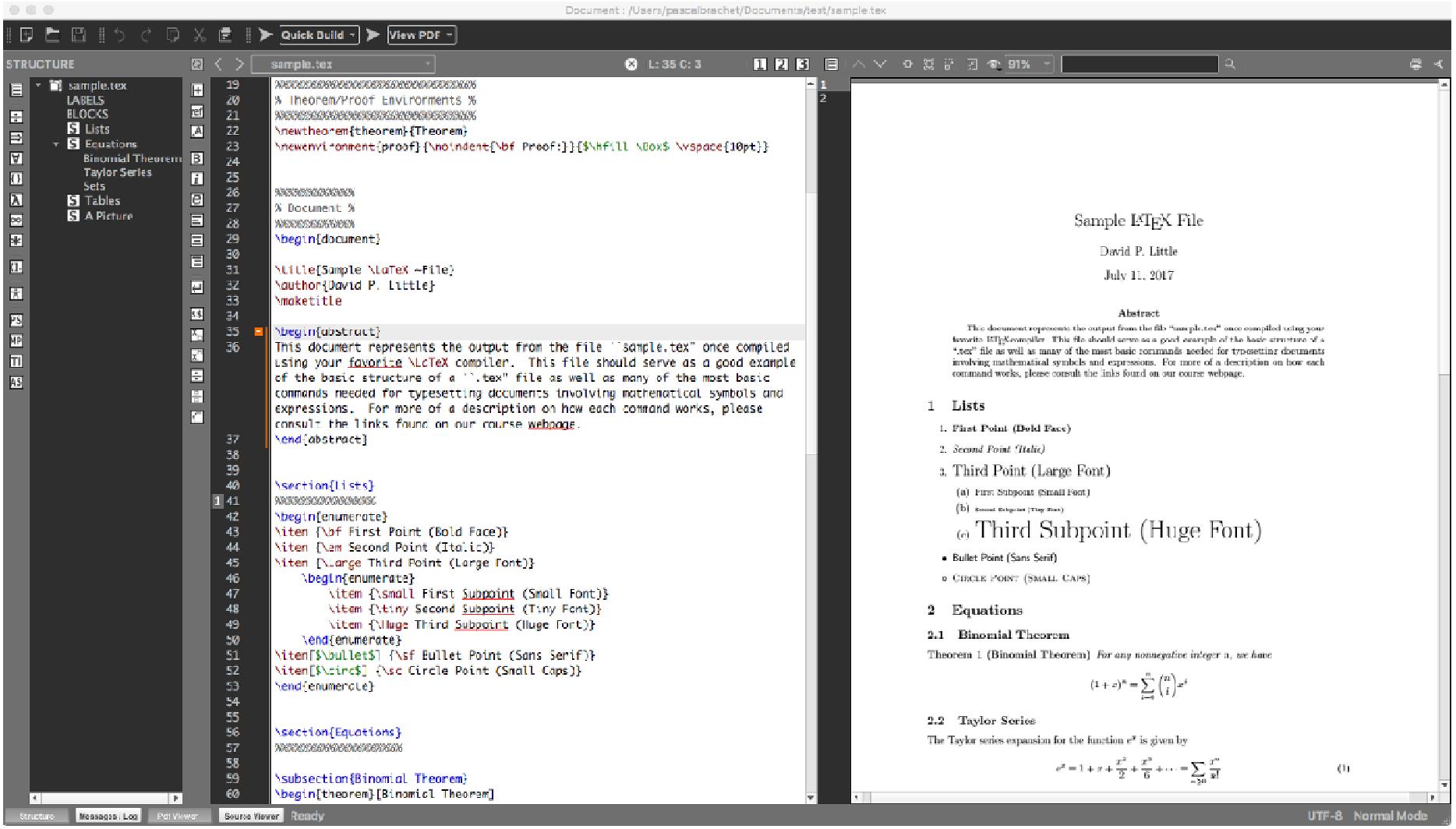
TeXMaker

- **Texmaker** is a free, modern and cross-platform LaTeX editor for **linux**, **macosx** and **windows** systems that integrates many tools needed to develop documents with LaTeX, in just one application.
- Download it from:
  - https://www.xm1math.net/texmaker/
- Texmaker user manual
  - https://www.xm1math.net/texmaker/doc.html

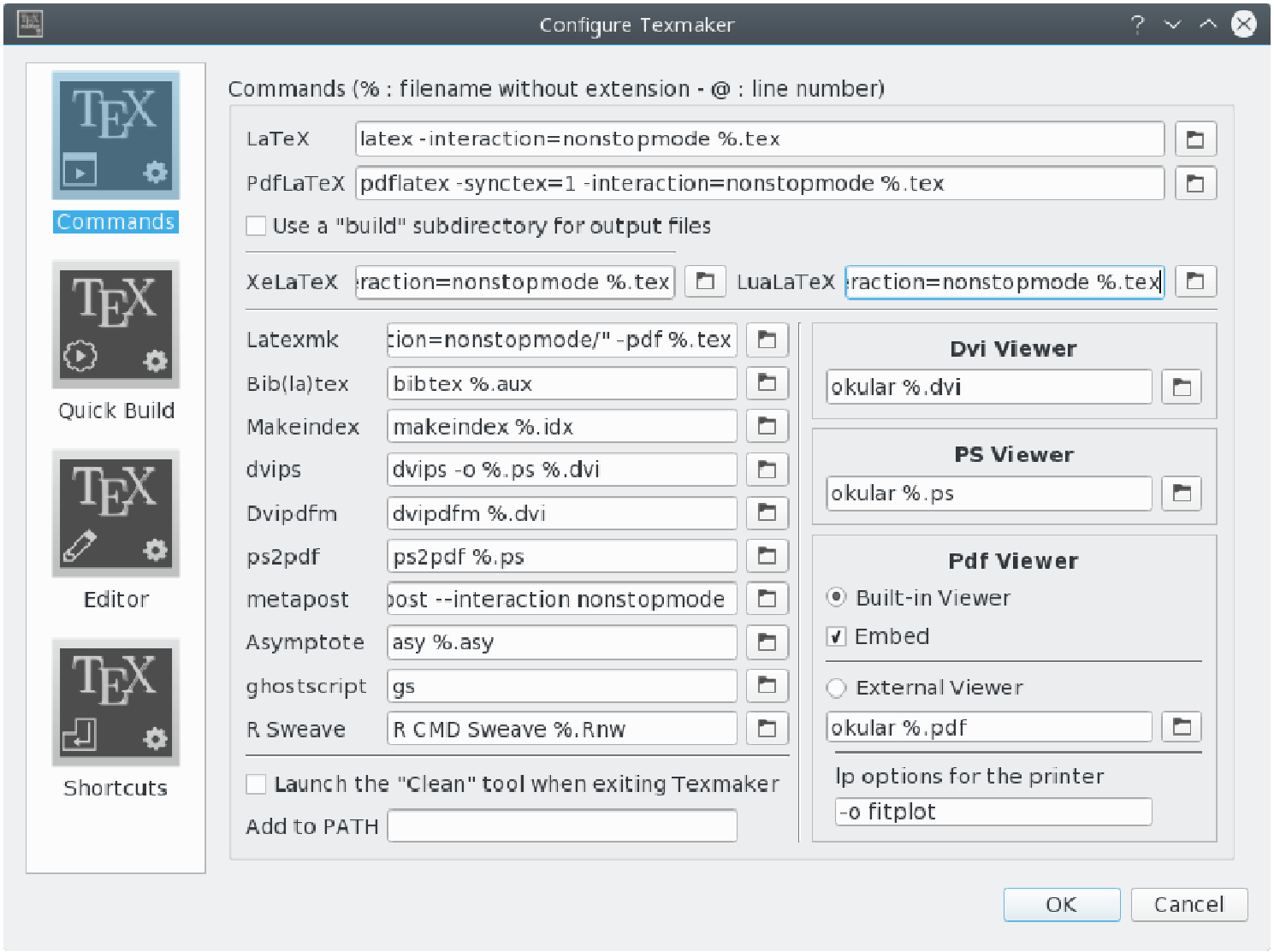
Texmaker – Windows OS



Texmaker – MAC OSX

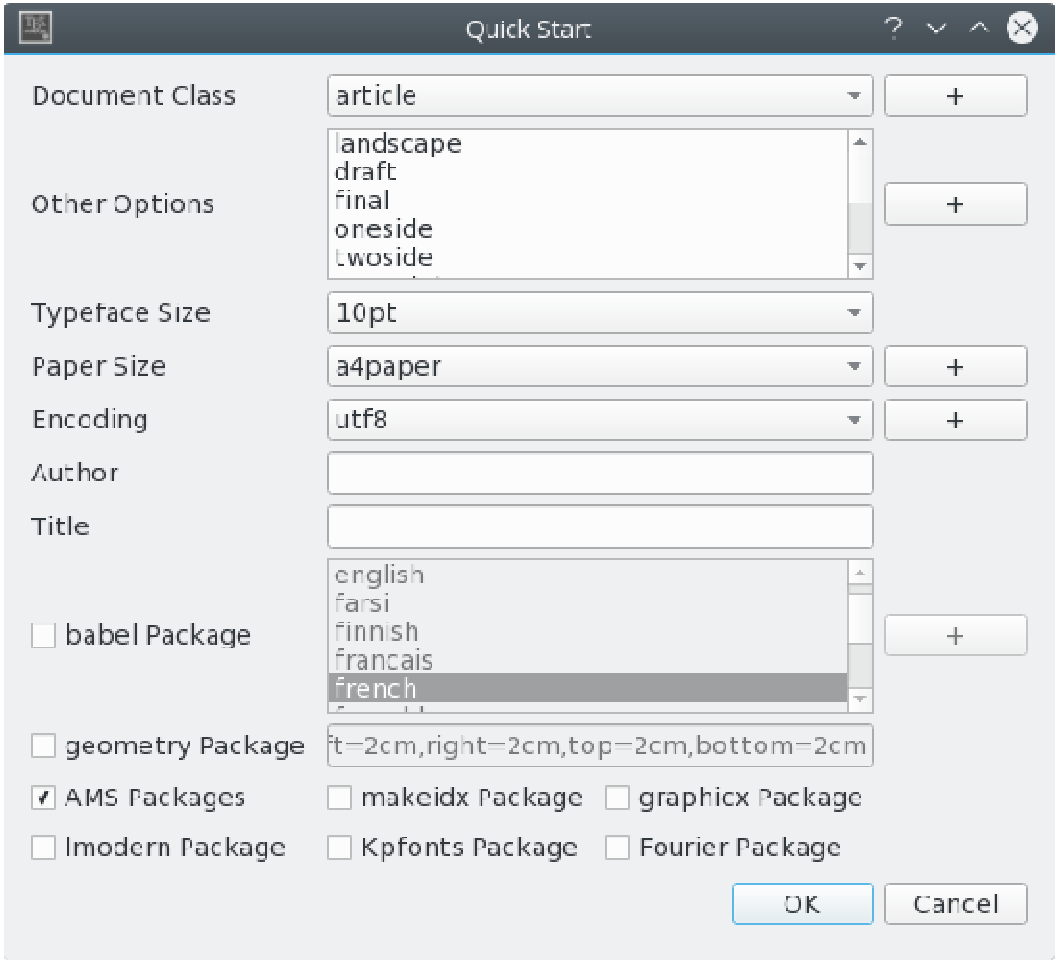


Configuring Texmaker



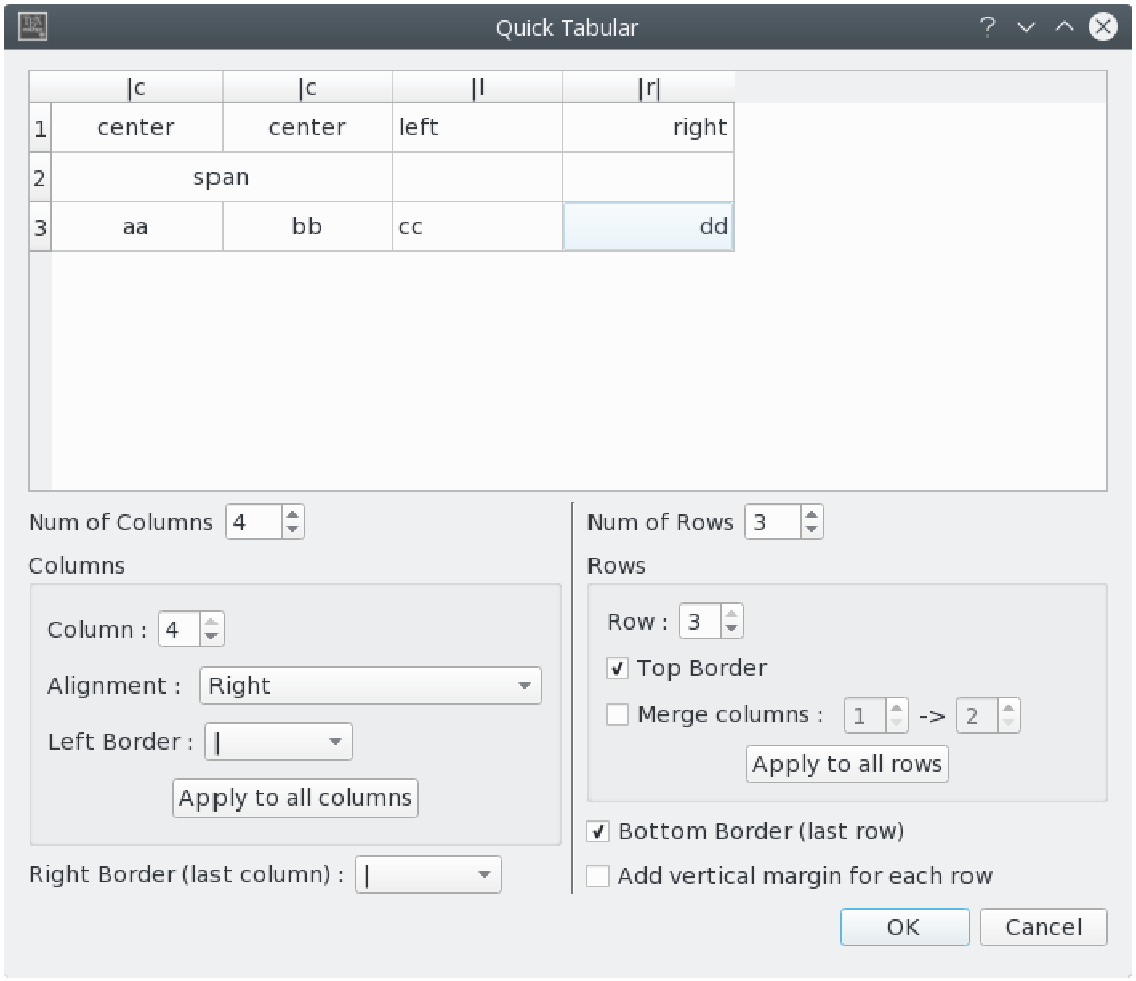
Setting the Preamble of Tex Document

- To define the preamble of your document, you can use the "Quick start" wizard ("Wizard" menu).

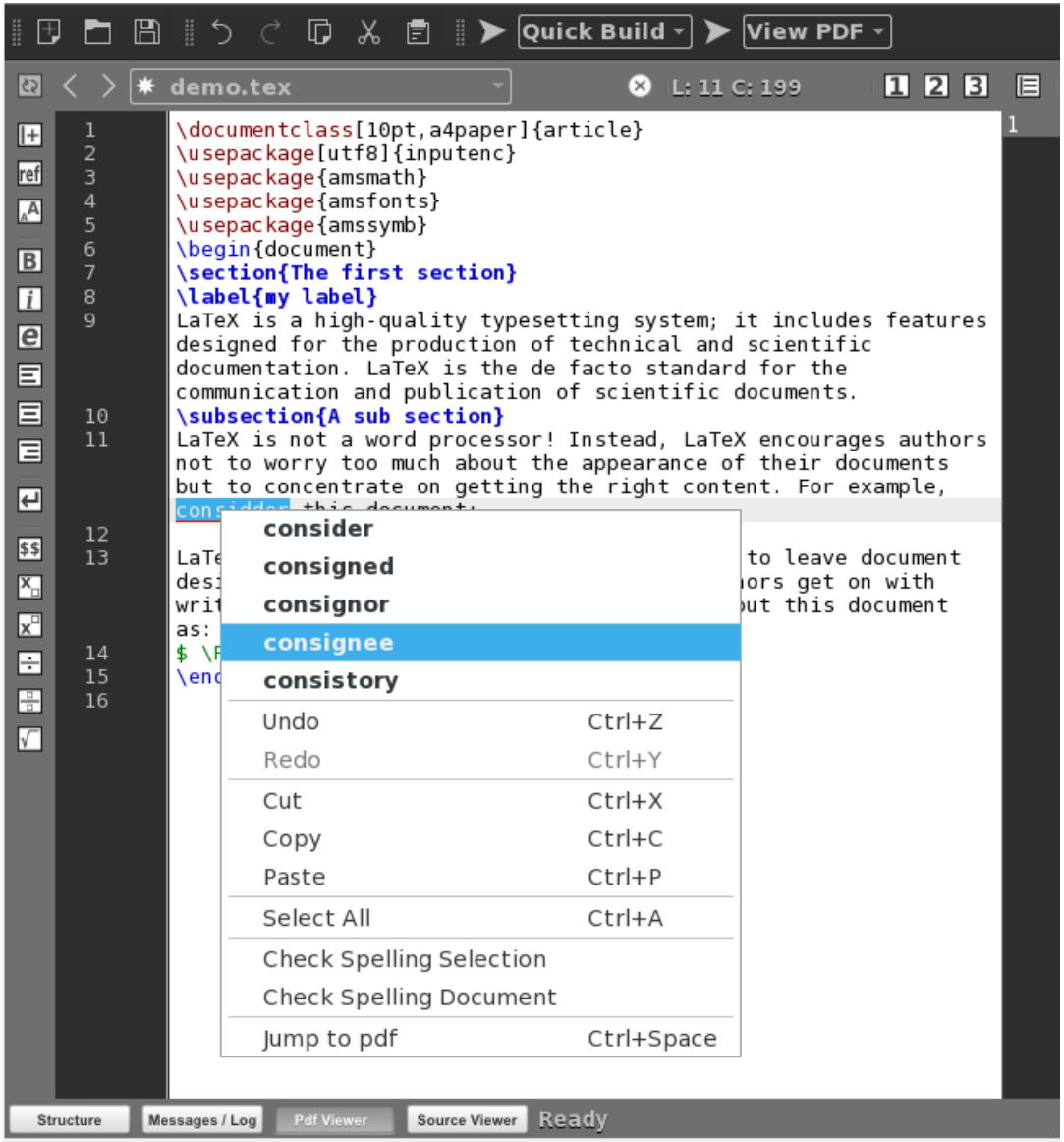


Inserting a Table

- With the "Tabular" wizard ("Wizard" menu), the LaTeX code for a tabular environment can be quickly inserted:



Texmaker – Spell Checking



Texmaker – Easy Compilation