





# Yilei TU

Bülachhof 3, Zürich, 8057, Switzerland    

 [yileitu@student.ethz.ch](mailto:yileitu@student.ethz.ch) • [yileitu.tt@gmail.com](mailto:yileitu.tt@gmail.com)

All the text and icons in Cadet Blue are hyperlinked.

## EDUCATION

### ETH Zurich (Swiss Federal Institute of Technology Zurich)

*MSc. in Data Science • Department of Computer Science (D-INFK)*

Zurich, ZH, Switzerland

*Sep 2021 – Sep 2024*

- **GPA:** 5.4/6.0 **Award:** ETH Scholarship

### The Chinese University of Hong Kong, Shenzhen

*BSc. in Statistics • Stream in Data Science • School of Science and Engineering*

Shenzhen, GD & Sha Tin, HK, China

*Sep 2017 – Nov 2020*

- First Class Honours. Completed the 4-year program 6 months in advance.
- **Cumulative GPA:** 3.764/4.0 (Rank 11/313 of School) **Major GPA:** 3.847/4.0 (Rank 5/150 of Stat Cohort)
- **Awards:** Academic Performance Scholarship; Dean's List; Master's List (All 3 consecutive years)

### University of California, Berkeley

*Summer Session • Non-degree • GPA: 4.0/4.0*

Berkeley, CA, US

*Jun 2019 – Aug 2019*

## PUBLICATIONS & PREPRINTS

- [1] [Yilei Tu](#) and [Freda Shi](#). [Blessing of Multilinguality: Enhancing Low-Resource Language Performance through Multilingual Demonstrations](#). Manuscript to be submitted to ARR 2024 Dec.
- [2] [Yilei Tu\\*](#), [Noah Mamié\\*](#), [Xi Susie Rao](#), and [Peter Egger](#). [Knowledge-Enhanced Academic Chatbot: Harnessing Large Language Models and Knowledge Graphs](#). Manuscript to be submitted to ARR 2025 Feb.
- [3] [Buse Giledereli\\*](#), [Yifan Hou\\*](#), [Yilei Tu](#), and [Mrinmaya Sachan](#). [Do Vision-Language Models Really Understand Visual Language?](#) Manuscript submitted to ICLR 2025. arXiv preprint: [arXiv:2410.00193](#).
- [4] [Yilei Tu](#), [Jiaoda Li](#), and [Ryan Cotterell](#). [Complex Probes are Favored: A Revisit of Probe Complexity](#). Manuscript submitted but not committed to ARR 2023 Oct.
- [5] [Susie Xi Rao](#), [Yilei Tu](#), and [Peter H. Egger](#). [SAINE: Scientific Annotation and Inference Engine of Scientific Research](#). In *IJCNLP-AACL 2023: System Demonstrations*, pages 41–58, Bali, Indonesia, November 2023. Association for Computational Linguistics.
- [6] [Yuan Wang](#), [Weilin Cai](#), [Yilei Tu](#), and [Jianfeng Mao](#). [Reinforcement-Learning-Informed Prescriptive Analytics for Air Traffic Flow Management](#). *IEEE Transactions on Automation Science and Engineering*, pages 1–15, 2023.
- [7] [Lechen Wang](#), [Jianfeng Mao](#), [Lishuai Li](#), [Xuechun Li](#), and [Yilei Tu](#). [Prediction of estimated time of arrival for multi-airport systems via “Bubble” mechanism](#). *Transportation Research Part C: Emerging Technologies*, 149:104065, 2023.

## RESEARCH EXPERIENCE

Anyone with [blue hyperlinks](#) to their personal website is my recommender.

### CompLING Lab, University of Waterloo & Vector Institute

*Visiting Scholar • Supervisor: Prof. [Freda Shi](#)*

Waterloo, ON, Canada

*Aug 2024 – Dec 2024*

- Exploring multilingual LLM in-context learning (ICL) performance: ICL with multilingual exemplars performs better than English-only exemplars for low-resource languages (even without alphabetical overlapping) across various domains and LLMs.
- Interpreting this phenomenon from the perspectives of universal neurons and input embedding gradients.

### LRE Lab, ETH Zurich

*Research Assistant • Supervisor: Prof. [Mrinmaya Sachan](#)*

Zurich, ZH, Switzerland

*May 2024 – Aug 2024*

- Found that VLMs can nearly perfectly identify entities in diagrams and demonstrate strong reasoning abilities on entities, while barely identify relations, and they are unable to reason about them.
- Validated that VLMs rely on knowledge shortcuts answering complex relation reasoning questions, indicating that the successes of VLMs on diagram reasoning tasks give a false illusion of their diagram understanding capabilities.
- Curated a test suite of 1k real diagrams and 500 synthetic diagrams with 8 annotated questions each to benchmark VLMs' ability to recognize and reason about entities and relations with/without background knowledge.

### Rycolab, ETH Zurich

*Research Assistant • Supervisor: Prof. [Ryan Cotterell](#)*

Zurich, ZH, Switzerland

*Jun 2023 – Dec 2023*

- Investigated the probing accuracy of probes across varying complexities on pretrained and randomized representations (rep), found that more complex probes perform worse, especially when linguistic information is not present in the representations.
- Revealed a counter-intuitive trend that increased complexity leads to lower accuracy and that the noise in randomized rep hampers learning, while for pretrained rep, high and stable probing accuracy is observed, insensitive to hyperparam variations.

## Chair of Applied Economics, ETH Zurich

Research Assistant • Part-time • Supervisor: Prof. *Peter Egger, Dr. Susie Rao*

Zurich, ZH, Switzerland

Jan 2023 – Aug 2024

- Building a chatbot combining Llama3 and SemOpenAlex knowledge graph to support meta-science research, recommending similar papers and authors and answering users' questions about scientific literatures.
- Applied LLMs for classification and keyword extraction of literatures; Developed an open-source and cross-discipline scientific annotation and inference engine demo that allows user to annotate features easily and to fine-tune downstream tasks in meta-science studies.

## Shenzhen Research Institute of Big Data & CUHK-Shenzhen

Research Assistant • Supervisor: Prof. *Jianfeng Mao, Dr. Yuan Wang*

Shenzhen, GD, China

Dec 2020 – May 2021

- Developed of a new two-stage medium-term data- driven model that combined various algorithms such as ARIMA, DBSCAN, LSTM and random forest, to predict the estimated time of arrival in a multi-airport system.
- Developed a three-staged online decision-making framework with colleagues to optimize sector-wise air traffic flow with multi-agent reinforcement learning and combinatorial programming.

## INTERNSHIPS

### Tencent

Algorithm Engineer • Financial Technology (FiT) • Supervisor: *Liang Chen*

Shenzhen, GD, China

Jul 2021 – Sep 2021

- Collaborated with colleagues to propose a new algo-trading based on neural models (XGBoost and LSTM) and modern portfolio theories (CAPM, Black-Litterman). Backtested the strategy and achieved a 12% outperformance over S&P 500.
- Collected and analyzed US stock indicators and designed their calculation methods or alternatives in China's stock market.

### AITO Automobile

Software Development Engineer • Intelligent Automotive Solution (IAS)

Shenzhen, GD, China

Jun 2020 – Aug 2020

- Developed audit-log module by Golang to concurrently monitor and report crucial behaviors of the administrators and users.
- Completed a set of APIs' design, development and deployment of the IAS cloud identity management system.
- Wrote white- and black-box test cases, and undertook daily work of deploying and optimizing automated test cases.

## TEACHING

### Department of Mathematics, ETH Zurich

Teaching Assistant • Part-time • Institute for Operations Research

Zurich, ZH, Switzerland

Sep 2023 – Jan 2024

- 401-0647-00L Introduction to Mathematical Optimization; Lecturer: Dr. David Adjashvili

## EXTRACURRICULAR

### Board Game Club (BGC), CUHK-Shenzhen

Co-founder • Minister of Publicity • Excellent Club Organization Prize

Shenzhen, GD, China

Oct 2017 – Sep 2019

- Coordinated with other departments to organize monthly board game events of 200+ players.
- Managed social media accounts; Promote BGC activities and cooperate with other board game organizations.

## SKILLS

**Programming Languages & Tools:** Python (PyTorch, HuggingFace, vLLM), R, Golang, SQL, Git, Unix, JetBrains, Dokcer, Tex  
**Natural Languages:** English (Advanced/C1, TOEFL 109); Mandarin Chinese & Sichuanese Dialects (Native); Cantonese (Fluent); Standard High German (A2); Japanese (N4)

## EXTERNAL LINKS

In case the PDF reader does not support the clicking of links, some URLs are provided explicitly below.

- Personal Website: <https://yileitu.github.io/>
- Google Scholar: <https://scholar.google.com/citations?user=jPeyGn4AAAAJ&hl=en>
- GitHub Profile: <https://github.com/yileitu>
- LinkedIn: <https://www.linkedin.com/in/yileitu/>
- Paper [1]: [https://yileitu.github.io/assets/pdf/multilingual\\_icl.pdf](https://yileitu.github.io/assets/pdf/multilingual_icl.pdf)
- Paper [2]: <https://yileitu.github.io/assets/pdf/Chatbot.pdf>
- Paper [3]: <https://www.arxiv.org/abs/2410.00193>
- Paper [4]: [https://yileitu.github.io/assets/pdf/EACL\\_submission.pdf](https://yileitu.github.io/assets/pdf/EACL_submission.pdf)
- Paper [5]: <https://arxiv.org/abs/2302.14468>
- Paper [6]: <https://ieeexplore.ieee.org/abstract/document/10258410>
- Paper [7]: <https://www.sciencedirect.com/science/article/pii/S0968090X23000542>