





# 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

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 & Hong Kong, 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 (both 3 consecutive years)

### University of California, Berkeley

Summer Session • GPA: 4.0/4.0

Berkeley, CA, US

Jun 2019 – Aug 2019

## PUBLICATIONS & PREPRINTS

- [1] [Yilei Tu](#) and Freda Shi. *The title hasn't been decided yet*. 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 2024 Dec.
- [3] Buse Gilereli, 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 *Proceedings of the 13th International Joint Conference on Natural Language Processing and the 3rd Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics: 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 the mechanism of multilingual LLMs: why in-context learning with multilingual exemplars works better than English-only exemplars for low-resource languages with zero alphabetical overlap.

### 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, 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 representations hampers learning, and it is exacerbated with increasing probe complexity, while for pretrained representations, high and stable probing accuracy is observed, insensitive to hyperparameter variations.

## Chair of Applied Economics, ETH Zurich

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

Zurich, ZH, Switzerland  
Jan 2023 – Present

- 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, Hugging Face), R, Golang, SQL, Git, Unix, JetBrains, Dokcer, Tex  
**Natural Languages:** English (Advanced/C1, TOEFL 109); Mandarin Chinese, Sichuanese (Native); Cantonese (Fluent); Standard High German (A2); Japanese (N4)

## EXTERNAL LINKS

In case the PDF reader does not support the clicking of links, the specific 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 [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>