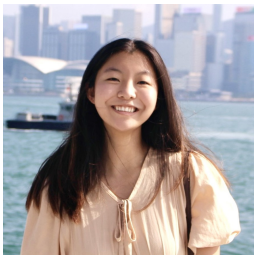
YU Tingyang (Yist)



tyyistyu@link.cuhk.edu.hk | +852 5132 0299 | https://yistyu.github.io/

EDUCATION

The Chinese University of Hong Kong (CUHK) Sep. 2019 – Sep. 2023 (expected)
Bachelor of Science in Mathematics and Information Engineering (MIEG) Hong Kong SAR, China

- Cumulative GPA: 3.737/4.000; Ranking: **Top 3%** among MIEG students admitted in 2019-20.
- **Winter semester exchange program in Faculty of Applied Science & Engineering, University of Toronto (UoT).**
- Ranked **Top 0.4% among 163,000 science students** in the National College Entrance Exam.
- Relevant courses:
  - *Mathematics:* Linear Algebra, Mathematics Analysis, Differentiation Analysis, Probability Theory, Complex Variables with Applications, Ordinary Differential Equation, Discrete Mathematics, Algebraic Structures.
  - *Computer Science and Information Science:* Introduction to AI (MIE369, UoT), Algorithms & Data Structure (ECE345, UoT), Signals and Systems, Network Coding Theory (Grad Level), Computer Networks.

RESEARCH EXPERIENCE

Expressive Equivariant Subgraph Aggregation Network Sep. 2022 – Present
Final year project supervised by Professor Irwin King (CUHK) Hong Kong SAR, China

- Proposed subgraph sampling strategies based on Weisfeiler-Lehman similarity and subtree kernel for equivariant subgraph aggregation network to improve the expressive power and the scalability of the network. [report|code]
- Conducted thorough experiments which showed that this efficient strategy outperformed the second best subgraph sampling strategy on graph classification up to 3% on TU datasets. The draft of this work is progressing and will catch IJCAI 2023.

Projection Robust Unbalanced Optimal Transport Feb. 2022 – Present
Research Assistant to Professor Ma Shiqian (University of California, Davis) California, USA

- Presented the projection robust unbalanced optimal transport model (PRUOT) that has the potential to alleviate the curse of dimensionality for computing the Wasserstein distance between unbalanced distributions.
- Illustrated a Riemmanian optimization algorithm RGAS-UOT for solving this model and proved its finite-time convergence to obtain the stationary point. Numerical experiments on both synthetic datasets and real-world datasets were given to demonstrate the advantages of the PRUOT model in high-dimensional cases.**The work was presented in Preprint [2]**

Multi-omics Integration with Random Walk and Graph Convolutional Network June. 2021 – Present
Research Assistant to Professor Li Yu (CUHK) Hong Kong SAR, China

- Presented **scMinerva**, an unsupervised Graph Convolutional Network framework for single-cell multi-omics integration, which featured a novel algorithm *omics2vec* that enabled random walk algorithm for heterogeneous graphs.
- scMinerva achieved superior classification performance among 7 state-of-the-art methods and improved the classification accuracy up to 20% on dataset GSE128639. **The work was presented in Preprint [1] and planned to submit to KDD 2023.**
- Won the Best Project Award for Summer Research Internship of CUHK, 2020-21 **(Top 10% out of 46 projects)**.

Zyablov Bound on General Adversarial Various Channels June. 2020 – Sep. 2020
Research Asistant to Professor Sidharth Jaggi (CUHK) Hong Kong, China

- Worked on extending Zyablov Bound which is based on concetenated code to the general adversarial various channels.

PREPRINTS

1. **scMinerva: a GCN-featured Interpretable Framework for Single-cell Multi-omics Integration with Random Walk on Heterogeneous Graph**
   Tingyang Yu, Yongshuo Zong, Yixuan Wang, Xuesong Wang, Yu Li
   *biorXiv Preprint 2021 (Planned submission to **SIGKDD 2023**)* [paper|code]
2. **Projection Robust Optimal Transport Between Unbalanced Distributions**
   Tingyang Yu*, Yuxuan Wan*, Shiqian Ma *(Planned submission to **ICML 2023**)* [paper|code]
3. **conST: an interpretable multi-modal contrastive learning framework for spatial transcriptomics**
   Yongshuo Zong, Tingyang YU, Xuesong Wang, Yixuan Wang, Zhihang Hu, Yu Li
   *biorXiv Preprint 2021 (Accepted with major revision at **Bioinformatics**)* [paper|code]
4. **Contrastive Cycle Adversarial Autoencoders for Single-cell Multiomics Alignment and Integration**
   Xuesong Wang, Zhihang Hu, Tingyang YU, Ruijie Wang, Yumeng Wei, Juan Shu, Jianzhu Ma, Yu Li
   *arXiv Preprint 2021 (Under review at **Bioinformatics**)* [paper|code]

ACADEMIC AWARDS AND SCHOLARSHIPS

Morningside Admission Scholarship (12,000 HKD) of 2019-20; *Morningside College*
ELITE Stream Scholarship (20,000 HKD) of 2019-20, 2020-21; *ELITE Stream*
Dean's List (Top 10%) of 2019-20, 2020-21; *University*
Morningside College Master's List of 2019-20, 2020-21; *Morningside College*
Morningside Academic Scholarship (10,000 HKD) of 2020-21; *Morningside College*
Best Project Award for Summer Research Internship of CUHK, 2020-21; *Faculty of Engineering*
IE Award for Academic Exchange (30,000 HKD), 2021-22; *Dept. of Information Engineering*
Professor Charles K. Kao Exchange Scholarship (50,000 HKD), 2021-22; *The Charles K. Kao Foundation*
Second Prize of Hua Xia Cup Mathematical Olympiad, 2018-19. *Asia Maths Alliance*

LEADERSHIP EXPERIENCE

Mandarin Debate Team of CUHK Sep. 2019 – May, 2021
Captain and Team Member Hong Kong, China

- Coordinated over 120 team members and managed team daily affairs. Be responsible for preparing for more than 10 international competitions and the 3 weekly training sessions of the team. As a member, read more than 20 relevant papers every week during the preparation period to quick-learning the field within one week.
- Initiated the New Media Group of the team to advertise the competition results and seek collaborations with other parties. The team received over 30,000 CNY from the corporate sponsors and companies which covered 80% expenses of team members during the international competition trips and debate visits.

Exemplar Tournament Freshman Mandarin Debate Competition March, 2021 – May 2021
Founder and Contributor Hong Kong, China

- Founded the "Exemplar Tournament" Freshman Mandarin Debate Competition as the first international Mandarin debate competition initiated by CUHK. The competition received more than 14,000 HKD as support from the university. The results of the competition were displayed on the homepage of the CUHK Office of Student Affairs.
- Drew up the Tournament Regulations, dealt with emergencies during the 2-month competition period, and organized the registered teams from more than 50 universities and debate clubs all over the world.

COMMUNITY CONTRIBUTIONS

"WOMEN US" Girl Empowerment Project Feb. 2021 – Present
Founder and Contributor Mainland, China

- Initiated the "WOMEN US" Girl Empowerment project which is a non-profit self-empowerment project for female high school students in mainland China. The project freely provides appropriate books about the power of women to empower high school girls and broaden their horizons.
- Collaborated with the International Genetically Engineered Machine team from Fudan University to introduce the project online to the students of No.1 Middle School in Huangzhong District, Xining City, Qinghai Province.
- Led the development of the mini-program on WeChat to support the efficient functioning of the project.

SANGCHU Marmots Youth Hostel June, 2021 – July, 2021
Full-time Volunteer Gannan Tibetan Autonomous Prefecture

- Worked on the daily affairs of the hostel, including cleaning, cooking, and advertising on social media.
- Participated in marmot protection activities to prevent the spread of the infectious disease plague and marmot hunting. Be the guide of international visitors to introduce the local religious cultures and social culture.

EXTRA-CURRICULUM AWARDS

2020 HANGZHOU Mandarin Debate Grand Prix (256 teams) Jan. 2020 - Mar. 2020
The only candidate for "Best Debater Award Among All the Teams" in Hong Kong area. (Top 2%) Virtual

The 1st FENGYE Cup Mandarin Debate Competition (32 teams) Mar. 2020 - May 2020
Champion; Best Debater Award for the Competition. Virtual

The Thirteenth XINWEI-HUAXIA Mandarin Debate World Cup (48 teams) Sep. 2020
Best Debater Award for the Competition The University of New South Wales

SKILLS & MISC.

- *Language* Mandarin (native), English (IELTS overall 7.5, Speaking 7.5), Cantonese (fluent).
- *Programming* Pytorch, Tensorflow, NetworkX, Pandas, Numpy, sklearn, Matplotlib, Matlab, Java, C, C#, R.
- *Tools* LaTeX, Linux, Anaconda, Git, MongoDB, Docker, WanDB, Abode Illustrator.
- *Hobbies* Writing, songwriting, swimming, bodybuilding, *etc.*