

# Yanxiao Liu

 [yanxiaoliu-mike.github.io](https://github.com/yanxiaoliu-mike)

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## Education

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### The Chinese University of Hong Kong

2021.8–2025.7

*Ph.D. candidate, Department of Information Engineering*

Advisors: Prof. [Cheuk Ting Li](#) and Prof. [Raymond W. Yeung](#)

### Stanford University

2024.1–2024.6

*Visiting Student Researcher, Department of Electrical Engineering*

Advisor: Prof. [Ayfer Özgür](#)

### The Chinese University of Hong Kong, Shenzhen

2017.9–2021.6

*B.Eng. in Electronic Information Engineering and minor in Philosophy*

Advisor: Prof. [Shenghao Yang](#)

## Research

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- **One-shot/Nonasymptotic Network Information Theory:** I derive explicit one-shot coding schemes for network information theory, uncovering the fundamental nonasymptotic limits. I am particularly interested in multiuser (a.k.a. multihop) settings, e.g., multiterminal source coding, interference channels, and noisy network coding.
- **Distributed Learning, Privacy, and Security:** Inspired by channel simulation (a.k.a. remote source generation), I develop novel algorithms for compression, quantization, and differential privacy, with wide-ranging applications in distributed machine learning.
- **Wireless Communications:** I develop both fundamental theory, low-complexity algorithms, and optimization frameworks for large-scale networks, possibly in challenging environments.

## Awards

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- CUHK PhD International Mobility for Partnerships and Collaborations Award 2023-24.
- NeurIPS Scholar Award (2024).
- ISIT Travel Award (2024).



## Publications

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### Preprints

- [1] **Yanxiao Liu** and Cheuk Ting Li. “One-Shot Coding over General Noisy Networks”. In: *Submitted to IEEE Transactions on Information Theory*, revised in June. (2025).
- [2] **Yanxiao Liu** and Cheuk Ting Li. “One-Shot Information Hiding and Compound Wiretap Channels”. In: (2025).
- [3] **Yanxiao Liu**, Shenghao Yang, and Cheuk Ting Li. “Joint Scheduling and Multiflow Maximization in Wireless Networks”. In: *Submitted to IEEE Transactions on Networking* (2025).
- [4] **Yanxiao Liu**, Chih Wei Ling, and Cheuk Ting Li. “Weighted Polar Codes for Channels with State”. In: (2024).

### Journal Articles

- [5] Chih Wei Ling\*, **Yanxiao Liu\***(equal contribution), and Cheuk Ting Li. “Weighted Parity-Check Codes for Channels with State and Asymmetric Channels”. In: *IEEE Transactions on Information Theory* 70.8 (2024), pp. 5573–5588.
- [6] Shenghao Yang, Jun Ma, and **Yanxiao Liu**. “Wireless Network Scheduling with Discrete Propagation Delays: Theorems and Algorithms”. In: *IEEE Transactions on Information Theory* 70.3 (2024), pp. 1852–1875.

### Conference Proceedings

- [7] **Yanxiao Liu**, Sepehr Heidari Advary, and Cheuk Ting Li. “Nonasymptotic Oblivious Relaying and Variable-Length Noisy Lossy Source Coding”. In: *2025 IEEE International Symposium on Information Theory (ISIT)*. 2025.
- [8] **Yanxiao Liu**, Wei-Ning Chen, Ayfer Özgür, and Cheuk Ting Li. “Universal Exact Compression of Differentially Private Mechanisms”. In: *The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS)*. 2024.
- [9] **Yanxiao Liu** and Cheuk Ting Li. “One-Shot Coding over General Noisy Networks”. In: *2024 IEEE International Symposium on Information Theory (ISIT)*. 2024.
- [10] **Yanxiao Liu** and Cheuk Ting Li. “One-Shot Information Hiding”. In: *2024 IEEE Information Theory Workshop (ITW)*. 2024.
- [11] Yijun Fan, **Yanxiao Liu**, Yi Chen, Shenghao Yang, and Raymond W. Yeung. “Reliable Throughput of Generalized Collision Channel Without Synchronization”. In: *2023 IEEE International Symposium on Information Theory (ISIT)*. 2023.
- [12] Yijun Fan, **Yanxiao Liu**, and Shenghao Yang. “Continuity of Link Scheduling Rate Region for Wireless Networks with Propagation Delays”. In: *2022 IEEE International Symposium on Information Theory (ISIT)*. 2022.
- [13] Chih Wei Ling, **Yanxiao Liu**, and Cheuk Ting Li. “Weighted Parity-Check Codes for Channels with State and Asymmetric Channels”. In: *2022 IEEE International Symposium on Information Theory (ISIT)*. 2022.



- [14] Jun Ma, **Yanxiao Liu**, and Shenghao Yang. “Rate Region of Scheduling a Wireless Network with Discrete Propagation Delays”. In: *IEEE INFOCOM 2021-IEEE Conference on Computer Communications (INFOCOM)*. 2021.

## Teaching Assistance

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I have served as a teaching assistant for [9 courses](#), 8 of which were unique, including 2 at the graduate level. My areas of assistance spanned information theory, optimization, probability theory, statistics, discrete mathematics, electronic circuits, and practical computer network laboratories.

### Graduate School Courses:

- ENGG5301: Information Theory (Fall 2022-23, Instructor: Prof. Cheuk Ting Li)
  - PhD-level course. I was the [sole TA supporting  \$\approx 60\$  PhD students](#). I prepare materials, give weekly tutorials, hold weekly office hours, and grade homework and exams.
- CIE6010 (CUHKSZ): Optimization Theory and Examples (Fall 2019-20, Instructor: Prof. Stark Draper)
  - PhD-level course. [I build up, organize and compile lecture notes \(155 pages\) from scratch, click to see  \$\rightarrow\$  \[Notes\]](#).

### Undergraduate Courses:

- IERG2060-ESTR2304: Basic Analog and Digital Circuits (Fall 2021-22, Instructor: Dr. Marco Ho)
- IERG2470-ESTR2308: Probability Models and Applications (Spring 2021-22, Instructor: Prof. Raymond W. Yeung)
- IERG2470-ESTR2308: Probability Models and Applications (Spring 2022-23, Instructor: Prof. Cheuk Ting Li)
- IERG3800: Information Infrastructure Design Lab (Fall 2023-24, Instructor: Prof. Yiu Bun Lee)
- IERG3050: Simulation and Statistical Analysis (Fall 2023-24, Instructor: Prof. Cheuk Ting Li)
- ENGG2440: Discrete Mathematics for Engineers (Fall 2024-25, Instructor: Prof. Cheuk Ting Li)
- MIEG2440-ESTR2362: Discrete Structures and Probability (Spring 2024-25, Instructor: Prof. Cheuk Ting Li)

## Industrial Experience

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**Shenzhen Research Institute of Big Data** **2021.5–2021.8**  
*Research Intern*

**Pingan Technology** **2020.8–2020.10**  
*Software Engineer Intern*

## Postgraduate Courses Studied

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- ENGG5301 Information Theory (Fall 2021-22, Instructor: Prof. Raymond W. Yeung)
- ENGG5781 Matrix Analysis and Computations (Fall 2021-22, Instructor: Prof. Wing-Kin (Ken) Ma)
- ENGG5303 Advanced Wireless Communications (Spring 2021-22, Instructor: Prof. Ying-Jun Angela Zhang)
- IERG5200 Channel Coding and Modulation (Spring 2021-22, Instructor: Prof. Pascal O. Vontobel)



- IERG6300 Theory of Probability (Spring 2021-22, Instructor: Prof. Chandra Nair)
- IERG5290 Network Coding Theory (Fall 2022-23, Instructor: Prof. Raymond W. Yeung)
- IERG6154 Network Information Theory (Spring 2022-23, Instructor: Prof. Chandra Nair)
- IERG6130 Positive Definite Matrices (Sit-in, Spring 2024-25, Instructor: Prof. Amin Gohari)