

# Yuwen HUANG (Anthony)

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## Curriculum Vitae

September 2025

## Education

### 2018–2024 PhD in Information Engineering

Department of Information Engineering

The Chinese University of Hong Kong (CUHK), Hong Kong

Thesis supervisor: [Prof. Pascal O. Vontobel](#) [PhD Thesis]

### 2014–2018 Bachelor of Engineering

School of Electronic and Information Engineering

South China University of Technology (SCUT), Guangzhou, China

Thesis supervisor: [Prof. Yuan Liu](#)

## Employment

### 11/2024– Postdoctoral fellow

11/2026 Department of Computer Science and Engineering

The Chinese University of Hong Kong (CUHK), Hong Kong

Supervisor: [Prof. John C.S. Lui](#)

Core duties: 1) Theoretical Research: Developing novel models for distributed quantum computing via collaboration with other professors, leading to high-impact journal submissions. 2) Mentorship: Guiding PhD students through the full research lifecycle, from project ideation to publication at prestigious conferences like ICML.

## Research Interests

**Quantum information processing, quantum network, quantum computing, optimization theory, graphical models, information theory**

## Publications

### Journal Papers (Submitted)

- [1] **Y. Huang** and P. O. Vontobel, "Characterizing the Bethe partition function of double-edge factor graphs via graph covers (extended version)," submitted for *IEEE Trans. on Inf. Theory*. [[arxiv](#)].

### Journal Papers (In Preparation)

- [2] **Y. Huang**, Xiaojun Lin, Bin Luo and John C.S. Lui, "Factor graph-based scalable distributed quantum optimization with provable quadratic-like speedup," in preparation for *IEEE/ACM Trans. on Networking*.
- [3] **Y. Huang** and P. O. Vontobel, "On the relationship between the global minimum of the Bethe free energy function of a factor graph and sum-product algorithm fixed points (extended version)," in preparation for *IEEE Trans. on Inf. Theory*.
- [4] **Y. Huang** and P. O. Vontobel, "Sets of marginals and Pearson-correlation-based CHSH inequalities for a two-qubit system (extended version)," in preparation for *IEEE Trans. on Inf. Theory*.

### Journal Papers (Published)

- [5] **Y. Huang**, N. Kashyap and P. O. Vontobel, "Degree-M Bethe and Sinkhorn permanent based bounds on the permanent of a non-negative matrix," *IEEE Trans. on Inf. Theory*, vol. 70, no. 4, pp. 5289–5308, Jul. 2024. [[ieeexplore](#)].

- [6] **Y. Huang**, Y. Liu, and F. Chen, "NOMA-aided mobile edge computing via user cooperation," *IEEE Trans. on Commun.*, vol. 68, no. 4, pp. 2221–2235, Apr. 2020. [[ieeexplore](#)].
- [7] **Y. Huang**, Y. Liu, and G. Y. Li, "Energy efficiency of distributed antenna systems with wireless power transfer," *IEEE J. Sel. Areas Commun.*, vol. 37, no. 1, pp. 89–99, Jan. 2019. [[ieeexplore](#)].
- [8] **Y. Huang**, M. Liu, and Y. Liu, "Energy-efficient SWIPT in IoT distributed antenna systems," *IEEE Internet Things J.*, vol. 5, no. 4, pp. 2646–2656, Aug. 2018. [[ieeexplore](#)].

### Conference Papers (Published)

- [9] B. Luo, **\*Y. Huang**, J. Allcock, X. Lin, S. Zhang, J. C.S. Lui, "Quantum algorithms for finite-horizon Markov decision processes," in *Proc. Forty-second International Conference on Machine Learning (ICML)*, 2025. [[link](#)] (\* for corresponding author).
- [10] **Y. Huang** and P. O. Vontobel, "The Bethe partition function and the SPA for factor graphs based on homogeneous real stable polynomials," in *Proc. IEEE Int. Symp. Inf. Theory*, Athens, Greece, Jul. 7–12, 2024, pp. 3029–3034. [[ieeexplore](#)].
- [11] **Y. Huang** and P. O. Vontobel, "Bounding the permanent of a non-negative matrix via its degree- $M$  Bethe and Sinkhorn permanents," in *Proc. IEEE Int. Symp. Inf. Theory*, Taipei, Taiwan, Jun. 25–30, 2023, pp. 2774–2779. [[ieeexplore](#)].
- [12] **Y. Huang** and P. O. Vontobel, "On the relationship between the global minimum of the Bethe free energy function of a factor graph and sum-product algorithm fixed points," in *Proc. IEEE Inf. Theory Workshop*, Mumbai, India, Nov. 6–9, 2022, pp. 666–671. [[ieeexplore](#)].
- [13] **Y. Huang** and P. O. Vontobel, "Sets of marginals and Pearson-correlation-based CHSH inequalities for a two-qubit system," in *Proc. IEEE Int. Symp. Inf. Theory*, Melbourne, Australia, Jul. 12–20, 2021, pp. 1338–1343. [[ieeexplore](#)].
- [14] **Y. Huang** and P. O. Vontobel, "Characterizing the Bethe partition function of double-edge factor graphs via graph covers," in *Proc. IEEE Int. Symp. Inf. Theory*, Los Angeles, CA, USA, Jun. 2020, 21–26, pp. 1331–1336. [[ieeexplore](#)].
- [15] **Y. Huang** and Y. Liu, "User cooperation for NOMA-based mobile edge computing," in *Proc. IEEE Int. Conf. Commun. Syst.*, Chengdu, China, Dec. 19–21, 2018, pp. 395–400. [[ieeexplore](#)].
- [16] **Y. Huang** and Y. Liu, "Energy-Efficient SWIPT in Distributed Antenna Systems," in *Proc. IEEE Globecom Workshops*, Singapore, Dec. 4–8, 2017, pp. 1–6. [[ieeexplore](#)].

### Talks

- Feb. 2025 **The Bethe approximation for binary contingency table counting and nonnegative matrix permanents**  
Seminar talk (via Zoom) in Department of Computer Science at the TU-Dortmund, Germany
- Sept. 2024 **The Bethe partition function and the SPA for factor graphs based on homogeneous real stable polynomials**  
Seminar talk (via Zoom) in the School of Cyber Science and Engineering at the Southeast University, China
- Mar. 2023 **Bounding the permanent of a non-negative matrix via its degree- $M$  Bethe and Sinkhorn permanents**  
Seminar talk in the Institute of Theoretical Computer Science and Communications at CUHK
- Nov. 2022 **On the relationship between the minimum of the Bethe free energy function of a factor graph and sum-product algorithm fixed points**  
Seminar talk in the Institute of Theoretical Computer Science and Communications at CUHK
- Apr. 2022 **Sets of marginals and Pearson-correlation-based CHSH inequalities for a two-qubit system**  
Seminar talk (via Zoom) for Prof. Marco Tomamichel's research group at the National University of Singapore

## Professional Service

- Reviewer for **Journals**: IEEE Communications Magazine, IEEE Transactions on Communications (TCOM), IEEE Journal of Selected Topics in Signal Processing (J-STSP), IEEE Communications Letters
- Reviewer for **Conferences**: IEEE International Symposium on Information Theory (ISIT), IEEE International Conference on Communications (ICC), IEEE Wireless Communications and Networking Conference (WCNC)

## Awards

- 2024 **Student Travel Grant**, 2024 IEEE International Symposium Information Theory (ISIT)
- 2018 **Bachelor's Thesis Award**, South China University of Technology

## Teaching Assistantship

- 2019, 2020, 2022 **Electronic Circuit Design Laboratory** at CUHK
- 2022 **Social Media and Human Information Interaction** at CUHK
- 2021 **Basic Analog and Digital Circuits** at CUHK
- 2021 **Linear Algebra for Engineers** at CUHK
- 2018, 2019, 2020 **Principles of Communication Systems** at CUHK

## Languages

- Programming **Matlab, C, Latex**
- Spoken **Cantonese (Native), Mandarin (Native), English (Fluent)**

## Academic Referees

1. **Prof. John C.S. Lui**  
Department of Computer Science & Engineering, The Chinese University of Hong Kong (CUHK)  
email: cslui@cse.cuhk.edu.hk  
tel: (852) 3943-8407
2. **Prof. Pascal O. Vontobel**  
Department of Information Engineering, The Chinese University of Hong Kong (CUHK)  
email: pascal.vontobel@ie.cuhk.edu.hk  
tel: (852) 3943-8390
3. **Prof. Yuan Liu**  
School of Electronic and Information Engineering, South China University of Technology (SCUT)  
email: eeyliu@scut.edu.cn  
tel: (86) 13928876361