

SHENGHAO YANG

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RESEARCH INTERESTS

Information Theory Coding Theory Network Coding
Network Communication, Computation, and Security
Quantum Information AI

ACADEMIC EXPERIENCE

Associate Professor

School of Science and Engineering (SSE), The Chinese University of Hong Kong, Shenzhen (CUHK(SZ))

📅 2023/07 – Ongoing 📍 Shenzhen, China

Assistant Professor

SSE, CUHK(SZ)

📅 2017/09 – 2023/06

Research Assistant Professor

SSE, CUHK(SZ)

📅 2015/09 – 2017/08

Research Associate

Institute of Network Coding, The Chinese University of Hong Kong

📅 2015/02 – 2015/08 📍 Hong Kong, China

Assistant Professor

Institute for Interdisciplinary Information Sciences, Tsinghua University

📅 2012/05 – 2015/01 📍 Beijing, China

Postdoctoral Fellow, Research Associate

Institute of Network Coding, The Chinese University of Hong Kong

📅 2010/01 – 2012/05 📍 Hong Kong, China

Postdoctoral Fellow

Department of Electrical and Computer Engineering, University of Waterloo

📅 2008/11 – 2009/11 📍 Waterloo, Canada

EDUCATION

Ph.D. in Information Engineering

The Chinese University of Hong Kong

📅 2004/08 – 2008/09 📍 Hong Kong, China

Thesis title: Coherent Network Error Correction

Master in Communication Engineering

Peking University

📅 2001/08 – 2004/07 📍 Beijing, China

Thesis: Linear Space Representation and Characteristics of MIMO Communication Systems

Bachelor in Electronics Science

Nankai University

📅 1997/08 – 2001/07 📍 Tianjin, China

ACHIEVEMENTS

🏆 Teaching Achievement Award, CUHK(SZ), 2023
for innovation in teaching Linear Algebra

💖 Published an informative RFC, 2023
about BATS coding scheme for network communications

💖 Presidential Young Fellow, CUHK(SZ), 2020

🏆 Gold Medal, 47th International Exhibition of Inventions of Geneva, 2019
for a multi-hop wireless network solution based on network coding designed for smart lamppost

💖 Published a monograph about BATS code, 2017

INDUSTRIAL EXPERIENCE

Co-founder

n-hop technologies

📅 2018 – Ongoing 📍 Hong Kong, China

Intern

Hitachi, Thomson

📅 2004/08–2005/06 📍 Beijing, China

PUBLICATIONS

My publication list on Google Scholar: <https://scholar.google.com/citations?user=wogDSg0AAAAJ>

REPRESENTATIVE PUBLICATIONS

Book

- [1] S. Yang and R. W. Yeung, *BATS Codes: Theory and Practice* (Synthesis Lectures on Communication Networks). Morgan & Claypool Publishers, 2017. DOI: 10.2200/S00794ED1V01Y201708CNT019.

RFC

- [2] S. Yang, X. Huang, R. W. Yeung, and D. J. K. Zao, *BATched Sparse (BATS) Coding Scheme for Multi-hop Data Transport*, RFC 9426, Jul. 2023. DOI: 10.17487/RFC9426. [Online]. Available: <https://www.rfc-editor.org/info/rfc9426>.

Selected Articles

- [3] S. Yang, J. Ma, and Y. Liu, “Wireless network scheduling with discrete propagation delays: Theorems and algorithms,” *IEEE Transactions on Information Theory*, vol. 70, no. 3, pp. 1852–1875, 2024. DOI: 10.1109/TIT.2023.3324180.
- [4] S. Yang and R. W. Yeung, “Network communication protocol design from the perspective of batched network coding,” *IEEE Communications Magazine*, vol. 60, no. 1, pp. 89–93, 2022. DOI: 10.1109/MCOM.001.21828.
- [5] X. Fu, S. Yang, and Z. Xiao, “Decoding and repair schemes for shift-xor regenerating codes,” *IEEE Transactions on Information Theory*, vol. 66, no. 12, pp. 7371–7386, 2020. DOI: 10.1109/TIT.2020.3019168.
- [6] X. Guang, R. W. Yeung, S. Yang, and C. Li, “Improved upper bound on the network function computing capacity,” *IEEE Transactions on Information Theory*, vol. 65, no. 6, pp. 3790–3811, 2019. DOI: 10.1109/TIT.2019.2893107.
- [7] C. Huang, Z. Tan, S. Yang, and X. Guang, “Comments on cut-set bounds on network function computation,” *IEEE Transactions on Information Theory*, vol. 64, no. 9, pp. 6454–6459, 2018, ISSN: 0018-9448. DOI: 10.1109/TIT.2018.2827405.
- [8] B. Tang and S. Yang, “An LDPC approach for chunked network codes,” *IEEE/ACM Transactions on Networking*, no. 1, pp. 605–617, 2018. DOI: 10.1109/TNET.2017.2787726.
- [9] S. Yang, T. C. Ng, and R. W. Yeung, “Finite-length analysis of BATS codes,” *IEEE Transactions on Information Theory*, vol. 64, no. 1, pp. 322–348, 2018, ISSN: 0018-9448. DOI: 10.1109/TIT.2017.2769122.
- [10] B. Tang, S. Yang, B. Ye, S. Guo, and S. Lu, “Near-optimal one-sided scheduling for coded segmented network coding,” *IEEE Transactions on Computers*, vol. 65, no. 3, pp. 929–939, 2016, ISSN: 0018-9340. DOI: 10.1109/TC.2015.2435792.
- [11] Y. Teng, S. Yang, S. Wang, and M. Zhao, “Tight bound on randomness for violating the Clauser-Horne-Shimony-Holt inequality,” *IEEE Transactions on Information Theory*, vol. 62, no. 4, pp. 1748–1757, 2016, ISSN: 0018-9448. DOI: 10.1109/TIT.2016.2535179.
- [12] S. Yang, S.-W. Ho, J. Meng, and E.-H. Yang, “Capacity analysis of linear operator channels over finite fields,” *IEEE Transactions on Information Theory*, vol. 60, no. 8, pp. 4880–4901, 2014, ISSN: 0018-9448. DOI: 10.1109/TIT.2014.2326976.
- [13] S. Yang and R. W. Yeung, “Batched sparse codes,” *IEEE Transactions on Information Theory*, vol. 60, no. 9, pp. 5322–5346, 2014, ISSN: 0018-9448. DOI: 10.1109/TIT.2014.2334315.
- [14] A. A. Gohari, S. Yang, and S. Jaggi, “Beyond the cut-set bound: Uncertainty computations in network coding with correlated sources,” *IEEE Transactions on Information Theory*, vol. 59, no. 9, pp. 5708–5722, 2013, ISSN: 0018-9448. DOI: 10.1109/TIT.2013.2262454.
- [15] S. Yang, R. W. Yeung, and C. K. Ngai, “Refined coding bounds and code constructions for coherent network error correction,” *IEEE Transactions on Information Theory*, vol. 57, no. 3, pp. 1409–1424, 2011, ISSN: 0018-9448. DOI: 10.1109/TIT.2011.2106930.