Hang Liu

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Education

The Chinese University of Hong Kong (CUHK) **Hong Kong**
Ph.D. Candidate in Information Engineering, GPA: 3.96/4.0 *08/2017–2021*

- Supervisor: Prof. Angela Yingjun Zhang
- Expected to graduate in July 2021

CUHK **Hong Kong**
B.Sc. (Hons.) in Mathematics and Information Engineering (Double Major) *09/2012–05/2017*

Research Interests

My current research interests focus on signal processing and optimization techniques in wireless communications, particularly in

- Massive MIMO;
- Reconfigurable intelligent surface/intelligent reflecting surface;
- Federated edge learning.

Working Experience

Dept. of Information Engineering, CUHK **Hong Kong**
Teaching Assistant *08/2017–07/2020*

Dept. of Information Engineering, CUHK **Hong Kong**
Summer Research Intern (advisor: Prof. Chandra Nair) *05/2016–08/2016*

Sierra Wireless Limited **Hong Kong**
Junior Software Validation Engineer *06/2015–05/2016*

Student Mentorship

Mr. Zehong Lin: Ph.D. candidate at CUHK *2020–present*

Mr. Daoyuan Chen: undergraduate final year student at CUHK *09/2020–05/2021*

Mr. Longhui Yin: Visiting student from Tsinghua University *Summer, 2019*

Publications (Google Scholar Profile)

Book Chapter

[B1] **H. Liu**, X. Yuan, and Y.-J. A. Zhang, "PHY-Layer design challenges in reconfigurable intelligent surface aided 6G wireless networks", in *6G Mobile Wireless Networks*, in preparation.

Journal Papers

[J1] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. CSIT-free federated edge learning via reconfigurable intelligent surface. Submitted to *IEEE Wireless Communications Letters*.

[J2] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Reconfigurable intelligent surface enabled federated learning: A unified communication-learning design approach. Submitted to *IEEE Transactions on Wireless Communications*, arXiv preprint arXiv:2011.10282. [ArXiv Link]

[J3] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Matrix-calibration-based cascaded channel estimation for reconfigurable intelligent surface assisted multiuser MIMO. *IEEE Journal on Selected Areas in Communications*, 38(11):2621–2636, Nov. 2020.

[J4] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Statistical beamforming for FDD downlink massive MIMO via spatial information extraction and beam selection. *IEEE Transactions on Wireless Communications*, 19(7):4617–4631, Jul. 2020.

[J5] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Super-resolution blind channel-and-signal estimation for massive MIMO with one-dimensional antenna array. *IEEE Transactions on Signal Processing*, 67(17):4433–4448, Sep. 2019.

[J6] Z.-Q. He, **H. Liu**, X. Yuan, Y.-J. A. Zhang, and Y.-C. Liang. Semi-blind channel estimation for reconfigurable intelligent surface aided massive MIMO systems. Submitted to *IEEE Transactions on Signal Processing*.

[J7] X. Yuan, Y.-J. A. Zhang, Y. Shi, W. Yan, and **H. Liu**. Reconfigurable-intelligent-surface empowered 6G wireless communications: Challenges and opportunities. *IEEE Wireless Communications*, accepted. (ComSoc Best Readings in RIS)

[J8] X. Kuai, X. Yuan, W. Yan, **H. Liu**, and Y.-J. A. Zhang. Double-sparsity learning based channel- and-signal estimation in massive MIMO with generalized spatial modulation. *IEEE Transactions on Communications*, 68(5):2863–2877, May 2020.

Conference Papers

[C1] Z.-Q. He, **H. Liu**, X. Yuan, Y.-J. A. Zhang, and Y.-C. Liang. Semi-Blind Channel Estimation for RIS-Aided Massive MIMO: A Trilinear AMP Approach. Submitted to *IEEE ISIT 2021*.

[C2] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Joint Communication-Learning Design for RIS-Assisted Federated Learning. Submitted to *IEEE ICC 2021*.

[C3] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Message-passing based channel estimation for reconfigurable intelligent surface assisted MIMO. In *IEEE International Symposium on Information Theory (ISIT)*, pages 2983–2988, Jun. 2020.

[C4] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Beam-selection-based statistical beamforming for FDD massive MIMO: Exploiting spatial reciprocity. In *IEEE Global Communications Conference (GLOBECOM)*, pages 1–6, Dec. 2019.

[C5] **H. Liu**, X. Yuan, and Y.-J. A. Zhang. Message-passing based blind signal detection for massive MIMO with general antenna arrays. In *IEEE International Conference on Communications (ICC)*, pages 1–7, May 2019.

[C6] X. Kuai, X. Yuan, W. Yan, **H. Liu**, and Y.-J. A. Zhang. Sparsity learning based blind signal detection for massive MIMO with generalized spatial modulation. In *IEEE/CIC International*

Conference on Communications in China (*ICCC*), pages 64–69, Aug. 2019.

Teaching

Graduate course

IEMS5723 *Social Media Analytics* **CUHK**
Teaching Assistant (*instructor: Prof. Rosanna Chan*) *Spring, 2019*

Undergraduate courses

IERG2080 *C Programming* **CUHK**
Teaching Assistant (*instructor: Prof. Kenneth Shum/Prof. Jack Lee*) *Fall, 2017/2018*

ENGG1410 *Linear Algebra* **CUHK**
Teaching Assistant (*instructor: Prof. Kenneth Shum*) *Spring, 2018*

IERG3060 *Microcontrollers & Embedded Systems* **CUHK**
Teaching Assistant (*instructor: Prof. Lian-Kuan Chen/Dr. Marco Ho*) *Spring, 2019/2020*

IERG2060 *Analog & Digital Circuits* **CUHK**
Teaching Assistant (*instructor: Dr. Marco Ho*) *Fall, 2019*

Academic Services

Journal Reviews

- IEEE Transactions on Signal Processing
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Communications
- IEEE Transactions on Cognitive Communications and Networking
- IEEE Transactions on Vehicular Technology
- IEEE Journal on Selected Areas in Communications
- IEEE Vehicular Technology Magazine
- IEEE Systems Journal
- IEEE Communications Letters
- IEEE Wireless Communications Letters
- IET Communications

Conference Reviews

- GLOBECOM
- ICC
- ICCC
- SAM
- VTC
- ...