

Hang Liu

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Education

The Chinese University of Hong Kong (CUHK) <i>Ph.D. Candidate in Information Engineering, GPA: 3.96/4.0</i> ○ Supervisor: Prof. Angela Yingjun Zhang ○ Expected to graduate in July 2021	Hong Kong 08/2017–2021
CUHK <i>B.Sc. (Hons.) in Mathematics and Information Engineering (Double Major)</i>	Hong Kong 09/2012–05/2017

Research Interest

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 <i>Teaching Assistant</i>	Hong Kong 08/2017–07/2020
Dept. of Information Engineering, CUHK <i>Summer Research Intern (advisor: Prof. Chandra Nair)</i>	Hong Kong 05/2016–08/2016
Sierra Wireless Limited <i>Junior Software Validation Engineer</i>	Hong Kong 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
- ICC
- SAM
- VTC
- ...