

LIANG JIAXIN

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PERSONAL SUMMARY

- Familiar with the commercial communication standards, e.g., WiFi (IEEE 802.11a/b/g/n/ac/ax) and Bluetooth.
- Extensive research experience on Wireless Network System design (Industrial Internet of Things (IIoT) in particular) and implementation using Software-Defined Radio (SDR).
- Strong experience in cross-layer optimization of wireless communication systems, including physical layer, data link layer and network layer.

EDUCATION

Ph.D. Candidate in Information Engineering

Aug. 2015 - Oct. 2021

Department of Information Engineering

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

Advisor: Prof. Liew Soung-Chang, *Fellow, IEEE*

B.E. in Information Engineering

Sep. 2013 - Jun. 2015

Department of Information Engineering

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

First two years of undergraduate study

Sep. 2011 - Jul. 2013

School of Information Science and Technology

Sun Yat-sen University (SYSU), Guangzhou

Visiting Scholar

Sep. 2018 - Feb. 2019

McCormick School of Engineering

Northwestern University (NWU), Illinois, United States

Advisor: Prof. Guo Dongning, *Fellow, IEEE*

RESEARCH EXPERIENCE

Competition

DARPA Spectrum Collaboration Challenge (SC2)

Nov. 2016 - Feb. 2019

- It was the first-of-its-kind collaborative machine-learning competition to overcome scarcity in the radio frequency (RF) spectrum.
- Built a real-time wireless system on SDR that supports application traffic with high reliability and low latency.
- Cooperated with the Prof. Guo Dongning's research group from the Northwestern University, USA
- Qualified for Preliminary Event 1 & 2 (PE1 & 2) and presented in the events hosted in Johns Hopkins University Applied Physics Laboratory.

Selected Projects

Wireless Time-Sensitive Network (TSN) for IIoT

Mar. 2019 - Feb. 2020

- A real-time wireless system that is implemented on PC-USRP using GNURadio, targeting to provide TSN service to the upper layer with high accuracy synchronization.

- Achieving synchronization among nodes to within $100ns$, and the end-to-end latency can be down to $3.75ms$.
- Easy-deployable and reconfigurable for many other time-critical wireless applications.
- TUN/TAP is leveraged to provide an interface for the applications to exchange data.

Network-Coded Multiple Access on Unmanned Aerial Vehicle *Feb. 2018 - Aug. 2018*

- Design and implement a wireless system running on the DJI Matrice 600.
- Leveraging the embeded USRP E312 to transmit and receive signals to evaluate the algorithm.

A Generic Real-Time Time-Slotted System on SDR (RTTS-SDR) *Sep. 2015 - Jan. 2017*

- Built a full-stack time-slotted system based on Software-defined radio platform (USRP and GNURadio) that could be used to verify many MAC scheme (e.g. Coded Slotted Aloha, Physical-layer Network Coding, Compute and forward).
- Served as the implementation platform for several projects in our research group.

Design and Implementation of High Performance Decoders for Next Generation Wireless Systems *Aug. 2014 - May. 2015*

- Implemented a reduced-complexity convolutional decoder for Physical-layer Network Coding (PNC) in GNU Radio.
- Built the first single General Purpose Processor based development environment for PNC with a video streaming demonstration.

PUBLICATIONS

Journal

- **J. Liang**, S. C. Liew, “ROFA: An OFDMA system for Ultra-Reliable Wireless Industrial Networking”, submitted to *IEEE Transactions on Mobile Computing*, 2021.
- T. T. Chan, H. Pan, and **J. Liang**, “Age of Information with Joint Packet Coding in Industrial IoT”, *IEEE Wireless Communication Letter*, 2021.
- **J. Liang**, H. Chen, S. C. Liew, “Design and Implementation of Time-Sensitive Wireless IoT Networks on Software-Defined Radio”, *IEEE Internet of Things Journal*, 2020.
- **J. Liang**, H. Pan, S. C. Liew, “Is Multichannel Access Useful in Timely Information Update?”, *IEEE Wireless Communication Letter*, 2020.
- H. Pan, **J. Liang**, S. C. Liew, “Practical NOMA-based Coordinated Direct and Relay Transmission”, *Wireless Communication Letter*, 2020.
- H. Pan, **J. Liang**, S. C. Liew, V. Leung, J. Li, “Timely Information Update with Non-Orthogonal Multiple Access”, *IEEE Transactions on Industrial Informatics*, 2020.
- H. Pan, S. C. Liew, **J. Liang**, V. Leung, J. Li, “Coding of Multi-Source Information Streams with Age of Information Requirements”, *IEEE Journal on Selected Areas in Communications*, 2020.
- Y. Shao, S. C. Liew and **J. Liang**, “Sporadic Ultra-Time-Critical Crowd Messaging in V2X”, *IEEE Transactions on Communications*, 2020.
- H. Pan, S. C. Liew, **J. Liang**, Y. Shao and L. Lu, “Network-Coded Multiple Access on Unmanned Aerial Vehicle”, *IEEE Journal on Selected Areas in Communications*, 2018.

Conference

- T. Li, **J. Liang***, Y. Ding, K. Zheng, X. Zhang, and K. Xu, “On Design and Performance of Offline Finding Network”, *IEEE INFOCOM*, 2023.
(*Corresponding Author)
- T. Li, B. Hu, J. Shuai, **J. Liang**, Y. Ding, Z. Li, and K. Xu, “Accelerating BLE Neighbor Discovery via Wi-Fi Fingerprints”, *IEEE INFOCOM Demo*, 2023.
- Q. Ren, T.T. Chan, **J. Liang**, and H. Pan, “Age of information in sic-based non-orthogonal multiple access”, *IEEE Wireless Communications and Networking Conference (WCNC)*, 2022.
- Y. Ding, T. Li, **J. Liang**, and D. Wang, “Blender: Toward Practical Simulation Framework for BLE Neighbor Discovery”, *ACM Modeling Analysis and Simulation of Wireless and Mobile Systems (MSWiM)*, 2022.
- J. Feng, H. Pan, T.T. Chan, and **J. Liang**, “Timely Status Update: Should ARQ be Used in Two-Hop Networks?”, *IEEE GLOBECOM*, 2022.
- G. Chen, T. -T. Chan, H. Pan and **J. Liang**, “DNN-aided Low-complexity Physical-layer Network Coding Enabled Non-orthogonal Multiple Access”, *2022 IEEE 19th Annual Consumer Communications & Networking Conference (CCNC)*, 2022.
- Z. Han*, **J. Liang***, Y. Gu, H. Chen, “Software-Defined Radio Implementation of Age-of-Information-Oriented Random Access”. *IEEE IECON*, 2020.
(*two authors have equal contributions.)
- Y. Shao, S. C. Liew, and **J. Liang**, “Sporadic Ultra-Time-Critical Messaging in V2X”. *IEEE ICC*, 2018.
- R. Y. Y. Chan, C. K. Y. Chan, M. Tahernia, **J. Liang**, and Q. Cao, “Engineering Education for Sustainable Development and Global Citizenship: A Course-level Implementation Case in Hong Kong”. *American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, UT, 2018.
- R. Y. Y. Chan, C. K. Y. Chan, C. Lau, **J. Liang**, H. Huang, Q. Cao, and M. Tahernia, “Direct evidence of engineering students’ generic skills learning: From research to practice in an undergraduate course in information engineering”. *2017 IEEE Frontiers in Education Conference (FIE)*, Indianapolis, IN, 2017.

HONORS AND AWARDS

The Chinese University of Hong Kong

- Finalist of DARPA SC2 Competition Preliminary Event 1 & 2 *Year 2019*
- Awardee of Overseas Research Attachment Programme from Engineering Faculty *Year 2018*
- Best Teaching Assistant award of Information Engineering *Year 2018*
- C.F. Hu Memorial Scholarship *Year 2015*
- Best Project Awards in CUHK Engineering Faculty Summer research *Year 2014*
- Chung Chi College Departmental Prize with honorary title *Year 2014*
- Chung Chi College Class Scholarship with honorary title *Year 2014*

Sun Yat-sen University

- The first prize scholarship of SYSU Scholarship Fund for 2012/13 *Year 2013*

- The third prize in the Finance Union of Guangdong Debating Competition *Year 2013*
- The third prize scholarship of SYSU Scholarship Fund for 2011/12 *Year 2012*

COURSES

IERG 5200 Channel Coding and Modulation
IERG 6130 Probabilistic Models and Inference Algorithms for Machine Learning
ENGG 5303 Advanced Wireless Communications
ENGG 5301 Information Theory
ENGG 5108 Big Data Analytics

TEACHING EXPERIENCE

Teaching Assistant

IERG 4110 Hands-on Wireless Communication *Sep. 2015 - Jan. 2016*
IERG 3310 Computer Network *Sep. 2016 - Jan. 2017*
IERG 3320 Social Media and Human Information Interaction *Feb. 2017 - Jan. 2018*
IERG 3810 Microcontrollers and Embedded Systems Laboratory *Feb. 2018 - May. 2018*
IERG 1810 Electronic Circuit Design Laboratory *Sept. 2019 - Feb. 2020*
IERG 3800 Information Infrastructure Design Laboratory *Sept. 2019 - Feb. 2020*

WORKING EXPERIENCE

Curator

Open Innovation Lab
The Chinese University of Hong Kong

Aug. 2014 - Jun. 2019

Research Assistant

Institute of Network Coding
The Chinese University of Hong Kong

May. 2015 - Jul. 2015

PROFESSIONAL SERVICES

- **Journal reviewer**

- IEEE Journal on Selected Areas in Communications (J-SAC)
- IEEE Transactions on Communications (TCom)
- IEEE Wireless Communication Letter
- IEEE Access
- KSII Transactions on Internet and Information Systems

- **Conference Reviewer**

- IEEE ICC
- IEEE Globecom
- IEEE WCNC
- IEEE VTC
- IEEE PIMRC

PERSONAL SKILL

Programming Language

- *Text-based Language*: C, C++, Python, MATLAB
- *Graphical-based Language*: LabView, Simulink

Language

- Cantonese *Native*
- Mandarin *Native*
- English *Fluent*

Software Skills

- Microsoft Office (Word, PowerPoint, Excel, etc.)
- Adobe Software (Photoshop, Premier)
- Gephi & Network X

Sepecial Skills

- GNURadio and UHD (A software-defined Radio platform) Programming
- Linux Kernel Programming