# Jingyi Liao

Curriculum Vitæ Summary

Email: jingyi.liao@aalto.fi
Website: users.aalto.fi/~liaoj5/
LinkedIn: linkedin.com/in/jingyi-liao-a828471a9/
Google Scholar: scholar.google.com/citations?user=Hd1pxLEAAAAJ
Address: Meistentie 2, A 015, 02150 Espoo, Finland.

Department of Information and Communications Engineering,
School of Electronic Engineering,
Aalto University, Finland

I am working on communication engineering, PHY layer, signal processing.

## Education

| | |
|---|---|
| 2022–now | Ph.D. in Information and Communication Engineering, Aalto University, Espoo, Finland (ETA: **2026 May**) |
| 2018–2021 | M.Eng. in Information and Communication Engineering, University of Electronic Science and Technology of China, Chengdu, China |
| 2014–2018 | B.Eng. in Electronic Engineering, University of Electronic Science and Technology of China, Chengdu, China |

## Work

| | |
|---|---|
| 2021–2022 | RF Algorithm Engineer, Huawei Technologies Co., Ltd., Chengdu, China |

## Awards and Grants

| | |
|---|---|
| 2025 | HPY Research Foundation Grant 10/300 |
| 2022–2026 | State Scholarship Fund |
| 2020,2018 | First National Scholarship (top 10%) |
| 2019 | IEEEXtreme Competition 83/9400 |
| 2017 | Recommended to academic master program |
| 2015 | Second National Scholarship (top 25%) |
| 2015 | Algorithm Design Contest of Southwest China Second Prize |
| 2014 | Dean Scholarship (top 5%) |
| 2014 | Recommended to undergraduate program |
| 2013 | Second Scholarship (top 4%) |
| 2012 | National Olympiad in Informatics in Provinces Second Prize |

## Selected Publications

### Journal Papers

1. A. Al-nahari, **J. Liao**, R. Jäntti, D. Mishra, D.-T. Phan-Huy, Y. Zhou, "Ambient IoT Connectivity Topologies: Technology Enablers, Applications, and Challenges," *IEEE IoT Magazine*, to be published.
2. R. Jäntti, **J. Liao (co-first author)**, et al., "Integration of Backscatter-based Ambient IoT to Cellular Communication Systems," *IEEE Communications Standards Magazine*, early access online.
3. **J. Liao**, X. Wang, K. Ruttik, R. Jäntti and D.-T. Phan-Huy, "In-Band Ambient FSK Backscatter Communications Leveraging LTE Cell-Specific Reference Signals," *IEEE Journal of RFID*, vol. 7, pp. 267-277, May 2023. **(Awarded in IEEE RFID-TA 2024)**

### Conference Papers

1. **J. Liao**, K. Ruttik, R. Jäntti and Z. Han, "Data Assisted Backscatter Communications using DECT-2020 NR+ as Ambient Signal," *IEEE 26th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Surrey, UK, 2025.
2. **J. Liao**, K. Ruttik, R. Jäntti and Z. Han, "Starlink Ku-band Downlink Based Ambient Backscatter Communication," *IEEE SPAWC*, Surrey, UK, 2025.
3. **J. Liao**, K. Ruttik, R. Jäntti, M. U. Sheikh and D.-T. Phan-Huy, "Measurement of Coded Backscatter Communication Utilizing Commercial LTE Ambient Signal," *3rd International Conference on 6G Networking (6GNet)*, Paris, France, 2024.
4. **J. Liao**, K. Ruttik and R. Jäntti, "Data Assistance Cellular Signal Based Ambient Backscatter Receiver," *IEEE 25th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Lucca, Italy, 2024.
5. **J. Liao**, X. Wang, K. Koskinen, et al., "Indoor Backscattering Communication by Using Commercial LTE Pilots," *2024 IEEE 99th Vehicular Technology Conference (VTC2024-Spring)*, Singapore, 2024.

### Chapters

1. **J. Liao**, B. Xie and D.-T. Phan-Huy, "Cellular-backscattered ZEDs," in *Final Design of Enabling Technologies for 6G Devices and Infrastructure*, European Union, 2025.
2. **J. Liao** and D.-T. Phan-Huy, "ZE PoC," in *Initial Design and Validation of Technologies and Architecture of 6G Devices and Infrastructure*, European Union, 2024.

### Demonstrations

1. **J. Liao**, K. Ruttik, R. Jäntti and D.-T. Phan-Huy, "Demo: Ambient Backscatter Communication with Convolutional Code based on LTE Pilots," *Joint European Conference on Networks and Communications & 6G Summit (EuCNC/6G Summit)*, Antwerp, Belgium, 2024.
2. **J. Liao**, K. Koskinen, X. Wang, et al., "Demo: UE Assisted Ambient Internet of Things in LTE Downlink, Energy Autonomous," *6G Summit Abu Dhabi*, 2023.
3. **J. Liao**, K. Ruttik, R. Jäntti and D.-T. Phan-Huy, "Demo: UE Assisted Ambient IoT in LTE Downlink, in Real-time and Open Source," *21st Annual International Conference on Mobile Systems, Applications and Services (ACM MobiSys '23)*, Helsinki, Finland, 2023.

### Software

1. 4G Downlink Receiver based on C++ USRP: github.com/Aalto5G/CellularAmBC
2. 5G DECT-2020 MATLAB Toolbox: github.com/Aalto5G/DECT-NR-Matlab-Toolbox

### Invited Talks

1. "In-Band Ambient Backscatter Communications Leveraging Cellular System", Friday Seminar Series, University of Houston, Houston, USA, 2025.
2. "Ambient Backscatter Communications Using LTE Cell Specific Reference Signals", Doctoral training network in Electronics, Telecommunications and Automation (DELTA) Summer Workshop, Espoo, Finland, 2022.

## Service

### Teaching Assistant

Real-Time Computing Systems and Architecture | Digital Systems Design | VLSI Design
Electric Power Engineering | Dynamics and Control

### Thesis Advisor

Expected 2025 Tianshu Zhang (M. Eng.) | 2025 Xingji Chen (M. Eng.) | 2022 Zheyu Dong (M. Eng.)
Expected 2025 Turunen Ilmari (M. Eng.) | 2023 Yuqi He (M. Eng.) | 2020 Han Liu (B. Eng.)

### Research Project Mentor

2025 Sheverdyaev Alexander | 2023 Giang Phan | 2023 Muneeb Naveed

### Committee Member

2024 Deputy Doctoral Student Representative
Aalto University, School of Electronic Engineering Doctoral Programme Committee

### Peer Reviewer

2025 IEEE 101st Vehicular Technology Conference (VTC2025-Spring)

### Student Volunteer

2023 31st European Signal Processing Conference (EUSIPCO)

## Projects

2025–now **Ambient 6G**: Towards standardized 6G connectivity for ambiently-powered energy neutral IoT devices.
Funded by the European Union, Horizon Europe research and innovation programme, Grant No. 101192113.

2023–2025 **Hexa-X-II**: A holistic flagship towards the 6G network platform and system, to inspire digital transformation, for the world to act together in meeting needs in society and ecosystems with novel 6G services.
Funded by the European Union, Horizon Europe research and innovation programme, Grant No. 101095759.

2023–2024 **6G-eMTC**: Extreme Machine Type Communications for 6G.
Funded by Business Finland, Grant No. 8028/31/2022.

2022–2024 **BESIMAL**: Backscatter enabled sustainable monitoring Infrastructure for assisted living.
Funded by Academy of Finland, Decision No. 334197.

2022–2023 **Hexa-X**: A flagship for B5G/6G vision and intelligent fabric of technology enablers connecting human, physical, and digital worlds.
Funded by the European Union, Horizon Europe research and innovation programme, Grant No. 101015956.

2021–2022 **5G Micro Base Station**: A 5G micro base station chip design from the perspectives of digital signal processing algorithms, integrated analog and RF circuits, and digital microelectronics.
Huawei Technologies Co., Ltd.,

## Skill

Matlab, Sci-Lab; Cadence, Altium Designer, LTspice; Arduino Embedded System Development; ELECTRIC VLSI Design; Xilinx FPGA Development; CUDA Parallel computing; GNU radio USRP.
Pascal, C/C++, Python; VHDL; Unix/Linux; Origin; LaTex.

## Referees

PhD. Supervising Professor: **Prof. Riku Jäntti** (riku.jantti@aalto.fi) Professor, Aalto University, Finland.
PhD. Thesis Advisor: **Dr. Kalle Ruttik** (kalle.ruttik@aalto.fi) Senior University Lecturer, Aalto University, Finland.