

# KANG EUN JEON

ON-DEVICE MACHINE LEARNING · SUSTAINABLE IoT · ENERGY HARVESTING

Electronic and Computer Engineering Department, HKUST, Clear Water Bay, Hong Kong

🌐 <https://linktr.ee/kejeon> · 📞 (KR) +82 10 2685 7151 / (HK) +852 9794 5752 · ✉ [kejeon@ust.hk](mailto:kejeon@ust.hk)

## EDUCATION

- 2022 **Ph.D. in Electronic & Computer Engineering**  
| *The Hong Kong University of Science and Technology*
- 2015 Thesis: Smart BLE Beacons for Sustainable IoT: Hardware, Firmware and Machine Learning Co-designs  
Supervised by James SHE & Jun ZHANG
- 2015 **B.Eng. in Electronic Engineering**  
| *The Hong Kong University of Science and Technology*
- 2012 FYP: Development of low-cost collaborative robot platform using IR communication system  
Advised by Chi Ying TSUI

## EXPERIENCE

- 2022 **Graduate Research Assistant**  
| *The Hong Kong University of Science and Technology*
- 2015 Research topics:
- Energy harvesting IoT hardware platform, *luXbeacon*, and design methodology/optimization
  - Energy-saving firmware for BLE devices through a novel user existence detection mechanism
  - Time-series forecasting for IoT data with low temporal resolution using machine learning
  - Energy-efficient neural network architecture for long-term time-series forecasting on embedded system
- Other achievements/contributions:
- Conducted several real-life deployments and field tests to validate the proposed research works
  - Contributed to multiple tech-transfer and an open source initiative related to *luXbeacon*
- 2021 **Consultant**  
*Office of the Government Chief Information Officer (OGCIO)*
- Integrated BLE beacon technology with Hong Kong's contact tracing app, *LeaveHomeSafe*
  - Designed and manufactured +100 energy harvesting BLE beacons, *luXbeacon*
  - Deployed over 30 *luXbeacons* in public transports for pilot test
- 2020 **Research Engineer Intern**  
*CyPhy Media Ltd.*
- Led the research and development of energy harvesting sensor device, *luXsensing beacon*
  - Contributed to the development of cloud platform for the management of sensor devices
  - Deployed *luXsensing beacons* for greenhouse and rooftop temperature monitoring applications

## HONORS & AWARDS

- 2021 **Dream Builder Funds Award** – *HKUST Entrepreneurship Center*  
Funding award to support the development and acceleration of start-up projects from HKUST
- 2019 **U\*STAR Award** – *HKUST Technology Transfer Center*  
Funding award to support start-up projects with unique and novel technologies from HKUST
- 2019 **FYP+ Award** – *Hong Kong X Foundation*  
Selected as top 5 most outstanding projects among 100+ projects from all universities in Hong Kong
- 2019 **Smart Airport Accelerator Finalist** – *Airport Authority Hong Kong X Hong Kong Science and Technology Park*  
Selected as top 3 most outstanding technologies to enable smart airport applications
- 2018 **Proof-of-Concept Fund Award** – *HKUST Technology Transfer Center*  
Funding award to translate HKUST's research outcomes into viable intellectual property  
Project title: User Presence-aware Firmware and IoT Analytics for Long-lasting Beacon-based IoT Network
- 2017 **Proof-of-Concept Fund Award** – *HKUST Technology Transfer Center*  
Project title: A Crowd-assisted Software Framework for Securing Bluetooth Low Energy (BLE) Beacon Network
- 2017 **Postgraduate Excellence Award** – *Hong Kong Telecom Institute of Information Technology*  
Awarded to 4 postgraduate students with outstanding scholarly research outputs in the areas of Networking Technology, Wireless Communications or Video/Multimedia Technology

## PUBLICATIONS (368 CITATIONS)

### JOURNALS AND MAGAZINES (7 + 1)

- J7 **K. E. Jeon**, J. She and S. Wong, "LuXSensing Beacon: Batteryless IoT Sensor, Design Methodology and Field-test for Sustainable Greenhouse Monitoring Application," in *IEEE Transactions on Mobile Computing*, 2022. (under review)
- J6 **K. E. Jeon**, and J. She, "Sensor Information-aware Machine Learning Framework for Long-lasting IoT Sensing Device," in *IEEE Transactions on Mobile Computing*, 2022. (major revision)
- J5 C. H. Lam, **K. E. Jeon**, S. Wong and J. She, "Distance Estimation using BLE Beacon on Stationary and Mobile Objects," in *IEEE Internet of Things Journal*, vol. 9, no. 7, pp. 4928-4939, 2022.
- J4 **K. E. Jeon** and J. She, "User Existence-aware BLE Beacon for Maximized Battery Lifetime," in *IEEE Transactions on Mobile Computing*, vol. 21, no. 1, pp. 366-377, 2022
- J3 **K. E. Jeon**, J. She, J. Xue, S. Kim and S. Park, "luXbeacon—A Batteryless Beacon for Green IoT: Design, Modeling, and Field Tests," in *IEEE Internet of Things Journal*, vol. 6, no. 3, pp. 5001-5012, 2019. (26 citations)
- J2 **K. E. Jeon**, J. She, P. Soonsawad and P. C. Ng, "BLE Beacons for Internet of Things Applications: Survey, Challenges, and Opportunities," in *IEEE Internet of Things Journal*, vol. 5, no. 2, pp. 811-828, 2018. (189 citations)
- J1 P. C. Ng, J. She, **K. E. Jeon**, and M. Baldauf, "When Smart Devices Interact with Pervasive Screens: A Survey," in *ACM Transactions on Multimedia Computing, Communications, and Applications*, vol. 13, no. 4, pp. 55:1-55:23, 2017.
- M1 P. Tedeschi, **K. E. Jeon**, J. She, S. Wong, S. Bakiras and R. Di Pietro, "Privacy-Preserving and Sustainable Contact Tracing Using Batteryless BLE Beacons," in *IEEE Security & Privacy*, 2021.

### CONFERENCES (10)

- C10 **K. E. Jeon**, J. She, and B. Wang, "Sensor Information-aware Machine Learning Framework for Long-lasting IoT Sensing Devices," 2023 *IEEE Wireless Communications and Networking Conference (WCNC)*, Glasgow, 2023 (under review)
- C9 S. Wong, J. She, **K. E. Jeon**, "Energy Status Recovery using Recurrent SVR Framework for Solar BLE Beacons," 2022 *IEEE Wireless Communications and Networking Conference (WCNC)*, Austin, TX, 2022.
- C8 P. Soonsawad, **K. E. Jeon** and J. She, "Improved Energy Harvesting with One-time Adjusted Solar Panel for BLE Beacon," 2021 *IEEE 93rd Vehicular Technology Conference (VTC)*, Helsinki, 2021.
- C7 **K. E. Jeon** and J. She, "BLE Beacon with User Traffic Awareness Using Deep Correlation and Attention Network," 2021 *IEEE Wireless Communications and Networking Conference (WCNC)*, Nanjing, 2021.
- C6 **K. E. Jeon**, J. She and S. Wong, "Extending BLE Beacon Lifetime by a Novel Neural Network-driven Framework," 2020 *IEEE Wireless Communications and Networking Conference (WCNC)*, Seoul, 2020.
- C5 S. Wong, J. She and **K. E. Jeon**, "Efficient Updates of Battery Status for BLE Beacon Network," 2019 *IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*, Barcelona, 2019.
- C4 P. Soonsawad, **K. E. Jeon**, J. She, C. H. Lam and P. C. Ng, "Maximizing Energy Harvesting with Adjustable Solar Panel for BLE Beacon," 2019 *IEEE International Conference on Cyber Physical and Social Computing (CPSCom)*, Atlanta, 2019.
- C3 **K. E. Jeon** and J. She, "User Existence-aware BLE Beacon Firmware for Extended Battery Lifetime," 2019 *IEEE Wireless Communications and Networking Conference (WCNC)*, Marakech, 2019.
- C2 **K. E. Jeon**, J. She and S. Wong, "A Crowd-assisted Architecture for Securing BLE Beacon-based IoT Infrastructure," 2018 *IEEE Wireless Communications and Networking Conference (WCNC)*, Barcelona, 2018.
- C1 **K. E. Jeon**, T. Tong and J. She, "Preliminary design for sustainable BLE Beacons powered by solar panels," 2016 *IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPs)*, San Francisco, 2016.

## INTELLECTUAL PROPERTIES & TECHNOLOGY TRANSFER

- Now | **luXbeacon: Open Source Design Initiatives towards Green and Sustainable IoT Infrastructure**
- Developed/published open source energy harvesting IoT device design including HW, FW, and casing designs
- 2015 | • Adopted by 10+ academic and industrial collaborators
- 2021 | **luXbeacon-based contact tracing on LeaveHomeSafe**  
Office of the Government Chief Information Officer (OGCIO)
- Integrated BLE technology with Hong Kong's contact tracing mobile app, *LeaveHomeSafe*
  - Deployed 30+ luXbeacons on public transports and delivered 100 luXbeacons
- 2018 | **Batteryless Indoor Positioning System Infrastructure Deployment**  
Electrical and Mechanical Services Department (EMSD)
- Deployed 120+ luXbeacons at EMSD headquarters for indoor positioning application
  - Demonstrated batteryless operation of luXbeacons since 2018 until now

## PROFESSIONAL SERVICES

### PAPER REVIEWS

IEEE Internet of Things Journal  
IEEE Wireless Communications and Networking Conference (WCNC)  
ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)  
Elsevier Computer Networks

### TEACHING EXPERIENCE

ELEC 6910Q: Analytics for Social Media and Big Data Applications  
ELEC 4170: Digital Media and Multimedia Applications  
ELEC 1020: Media Production: Technology and Design  
ELEC 1200: A System View of Communications: From Signals to Packets

## REFERENCES

**Prof. James She** (Ph.D. Supervisor) - HKUST · [eejames@ust.hk](mailto:eejames@ust.hk)  
**Prof. Soochang Park** - Chungbuk National University · [cwint@cbnu.ac.kr](mailto:cwint@cbnu.ac.kr)  
**Prof. Sang-ha Kim** - Chungnam National University · [shkim@cnu.ac.kr](mailto:shkim@cnu.ac.kr)