

Jaeheon Kwak (곽재헌)

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EDUCATION & EXPERIENCE

Postdoc. in Computer science, KAIST <i>Department: Information & Electronics Research Institute</i> <i>Advisor: Insik Shin</i>	2024 – Now
Ph.D in Computer science, KAIST <i>Thesis: Alleviating the low-battery experience of mobile users through heterogeneous batteries and their scheduling</i> <i>Advisor: Insik Shin</i>	2019 – 2024
M.S. in Computer science, Sungkyunkwan University <i>Thesis: Battery scheduling for maximizing operational time in real-time systems</i> <i>Advisor: Jinkyu Lee</i>	2017 – 2019
B.S. in Computer science, Sungkyunkwan University <i>Advisor: Jinkyu Lee</i>	2014 – 2017
Internship at Entrue consulting, LG CNS <i>Role: Development of a generative AI consulting program and a demo chatbot</i>	2023 – 2023
Lecturer at Hanbom High School <i>Role: Python and data analysis lecturer</i>	2017 – 2018
Field placement at Dexta (KR) <i>Role: Development of the k-th shortest path algorithm for smart factories</i>	2016 – 2016

RESEARCH INTERESTS & SKILLS

Battery Systems:

Battery modeling, battery scheduling, heterogeneous battery systems, battery usage pattern

Mobile / Embedded / Real-Time Systems:

Android AOSP & kernel, user experience, DVFS / PMIC, voltage regulation, DVFS / real-time scheduling

Deep Learning / Reinforcement Learning / Data Analysis / Optimization:

PyTorch, soft-actor critic, TensorFlow, XGBoost, convex optimization, feature engineering

AWARDS & GRANTS

Post-Doctoral Domestic Training from National Research Foundation of Korea <i>Research funding for domestic postdoctoral researchers</i>	2024-2025
Outstanding Dissertation Award from KAIST <i>An award celebrating superb doctoral dissertations</i>	2024
Dean's List from Sungkyunkwan University <i>A reward for students who got obvious academic performance</i>	2016-2017
The National Scholarship for Science and Engineering from Korean Government <i>A scholarship supports undergraduates who have outstanding Korean SAT scores in math and science</i>	2014-2017

MAJOR RESEARCH ACHIEVEMENT

Submitted/published papers on mobile low-battery anxiety to top-tier publications (MobiSys & others)

Alleviated low-battery experience by utilizing heterogeneous battery systems in mobile systems [2, 6]

Developed a power consumption prediction system to alleviate the low-battery anxiety of mobile users [4]

Published papers on battery scheduling and real-time scheduling to top-tier publications (RTSS & others)

Proposed novel real-time scheduling frameworks by applying physical characteristics of battery systems [1, 5, 7]

Developed the first multi-processor non-preemptive non-work-conserving real-time scheduling algorithm [8]

PUBLICATIONS

- [1] (Anonymized title) Reinforcement learning-based DVFS for mobile systems
1st author
- [2] (Anonymized title) Heterogeneous battery systems for alleviating low-battery anxiety in mobile systems
1st author
- [3] (Anonymized title) Cache-aware CPU affinity management for concurrent workloads
1st author
- [4] (To appear) Scheduling EV Battery Swap/Charge Operations
Jaeheon Kwak*, Seongtae Lee*, Kang G. Shin and Jinkyu Lee
IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), 2025
* co-first authors
- [5] RAC+: Supporting Reconfiguration-Assisted Charging for Large-Scale Battery Systems
Kyunghoon Kim, Jaeheon Kwak, and Jinkyu Lee
IEEE Transactions on Industrial Informatics (TII), 2024
- [6] Serenus: Alleviating Low-Battery Anxiety Through Real-time Accurate and User-Friendly Energy Consumption Prediction of Mobile Applications
Sera Lee*, Dae R. Jeong*, Junyoung Choi, Jaeheon Kwak, Seoyun son, Jean Y. Song, Insik Shin
ACM Symposium on User Interface Software and Technology (UIST), 2024
* co-first authors
- [7] Battery-aging-aware run-time slack management for power-consuming real-time systems
Jaeheon Kwak, Kyunghoon Kim, Youngmoon Lee, Insik Shin, Jinkyu Lee
Journal of Systems Architecture, 2024
- [8] MixMax: Leveraging Heterogeneous Batteries to Alleviate Low Battery Experience for Mobile Users
Jaeheon Kwak, Sunjae Lee, Dae R. Jeong, Arjun Kumar, Dongjae Shin, Ilju Kim, Donghwa Shin, Kilho Lee, Jinkyu Lee, and Insik Shin
ACM International Conference on Mobile Systems, Applications, and Services (MobiSys), 2023
- [9] Battery aging deceleration for power-consuming real-time systems
Jaeheon Kwak, Kilho Lee, Taehee Kim, Jinkyu Lee and Insik Shin
IEEE Real-Time Systems Symposium (RTSS), 2019

- [10] Non-preemptive real-time multiprocessor scheduling beyond work-conserving
Hyeongboo Baek, Jaeheon Kwak and Jinkyu Lee
IEEE Real-Time Systems Symposium (**RTSS**), 2020

- [11] Minimizing capacity degradation of heterogeneous batteries in a mobile embedded system
Jaeheon Kwak and Jinkyu Lee
IEEE Embedded Systems Letters, 2019

- [12] Covert timing channel design for uniprocessor real-time systems
Jaeheon Kwak and Jinkyu Lee
International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT), 2019