Jaeheon Kwak (곽재헌)

Postdoctoral Researcher at KAIST

Phone: +82-10-2140-0938
Homepage: https://0jaehunny0.github.io
E-mail: 0jaehunny0@kaist.ac.kr
LinkedIn: https://www.linkedin.com/in/jaehunny

EDUCATION & EXPERIENCE

Postdoc. in Computer science, KAIST 2024 – Now
Department: Information & Electronics Research Institute
Advisor: Insik Shin

Ph.D in Computer science, KAIST 2019 – 2024
Thesis: Alleviating the low-battery experience of mobile users through heterogeneous batteries and their scheduling
Advisor: Insik Shin

M.S. in Computer science, Sungkyunkwan University 2017 – 2019
Thesis: Battery scheduling for maximizing operational time in real-time systems
Advisor: Jinkyu Lee

B.S. in Computer science, Sungkyunkwan University 2014 – 2017
Advisor: Jinkyu Lee

Internship at Entrue consulting, LG CNS 2023 – 2023
Role: Development of a generative AI consulting program and a demo chatbot

Lecturer at Hanbom High School 2017 – 2018
Role: Python and data analysis lecturer

Field placement at Dexta (KR) 2016 – 2016
Role: Development of the k-th shortest path algorithm for smart factories

RESEARCH INTERESTS & SKILLS

Mobile Systems:
Android AOSP & kernel, DVFS, thermal throttling, voltage regulation, PMIC, user experience

Battery Systems:
Battery scheduling/modeling, heterogeneous battery systems, next-generation batteries

Real-time Systems:
Non-preemptive tasks, non-work-conserving scheduling, mission-critical systems

AWARDS & GRANTS

Post-Doctoral Domestic Training from National Research Foundation of Korea 2024-2025
Research funding for domestic postdoctoral researchers

Outstanding Dissertation Award from KAIST 2024
An award celebrating superb doctoral dissertations

Dean's List from Sungkyunkwan University 2016-2017
A reward for students who got obvious academic performance

The National Scholarship for Science and Engineering from Korean Government 2014-2017
A scholarship supports undergraduates who have outstanding Korean SAT scores in math and science

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, 9]

Developed a power consumption prediction system to alleviate the low-battery anxiety of mobile users [7]

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 [5, 8, 11]

Developed the first multi-processor non-preemptive non-work-conserving real-time scheduling algorithm [10]

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] (In progress) Cache-aware CPU affinity management for concurrent workloads
1st author

[4] (In progress) Arrhythmia diagnosis using mobile sensors
3rd author

[5] (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

[6] RAC+: Supporting Reconfiguration-Assisted Charging for Large-Scale Battery Systems
Kyunghoon Kim, Jaeheon Kwak, and Jinkyu Lee
IEEE Transactions on Industrial Informatics (**TII**), 2024

[7] 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

[8] 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

[9] 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

[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] 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

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

[13] 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