

Jaeheon Kwak (곽재헌)

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EDUCATION & EXPERIENCE

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

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

Data Analysis / Deep Learning / Optimization:

PyTorch, TensorFlow, XGBoost, convex optimization, reinforcement learning, feature engineering

AWARDS

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

MAJOR RESEARCH ACHIEVEMENT

Submitted/published papers on mobile low-battery anxiety to top-tier publications (MobiSys & others)	
<i>Alleviated low-battery experience by utilizing heterogeneous battery systems in mobile systems</i>	[2, 6]
<i>Developed a power consumption prediction system to alleviate the low-battery anxiety of mobile users</i>	[4]
Published papers on battery scheduling and real-time scheduling to top-tier publications (RTSS & others)	
<i>Proposed novel real-time scheduling frameworks by applying physical characteristics of battery systems</i>	[1, 5, 7]
<i>Developed the first multi-processor non-preemptive non-work-conserving real-time scheduling algorithm</i>	[8]

PUBLICATIONS

- [1] **(Anonymized title) Reinforcement learning-based DVFS for mobile systems**
1st author
Under review, design automation top-tier conference, 2024

- [2] **(Anonymized title) Real-time scheduling for battery swap stations**
1st author
Under review, real-time systems top-tier conference, 2024

- [3] **(Anonymized title) Heterogeneous battery systems for alleviating low-battery anxiety in mobile systems**
1st author
Under review, mobile systems top-tier journal, 2024

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

- [5] **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

- [6] **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

- [7] **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

- [8] **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

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

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

[11] **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