Jaeheon Kwak (곽재헌)

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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*

1. (Anonymized title) Heterogeneous battery systems for alleviating low-battery anxiety in mobile systems

*1st author*

1. (In progress) Cache-aware CPU affinity management for concurrent workloads

*1st author*

1. (In progress) Arrhythmia diagnosis using mobile sensors

*3rd author*

1. (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

1. RAC+: Supporting Reconfiguration-Assisted Charging for Large-Scale Battery Systems  
   *Kyunghoon Kim, Jaeheon Kwak, and Jinkyu Lee*IEEE Transactions on Industrial Informatics (**TII**), 2024
2. 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
3. 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
4. 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
5. Non-preemptive real-time multiprocessor scheduling beyond work-conserving  
   *Hyeongboo Baek, Jaeheon Kwak and Jinkyu Lee*  
   IEEE Real-Time Systems Symposium (**RTSS**), 2020
6. 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
7. Minimizing capacity degradation of heterogeneous batteries in a mobile embedded system  
   *Jaeheon Kwak and Jinkyu Lee*IEEE Embedded Systems Letters, 2019
8. 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