Jaeheon Kwak (곽재헌)

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EDUCATION & EXPERIENCE

**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

**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  
*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, 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*  
Under review, design automation top-tier conference, 2024

1. **(Anonymized title) Real-time scheduling for battery swap stations**

*1st author*  
Under review, real-time systems top-tier conference, 2024

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

*1st author*  
Under review, mobile systems top-tier journal, 2024

1. **RAC+: Supporting Reconfiguration-Assisted Charging for Large-Scale Battery Systems***Kyunghoon Kim, Jaeheon Kwak, and Jinkyu Lee*IEEE Transactions on Industrial Informatics , 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. **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
6. **Non-preemptive real-time multiprocessor scheduling beyond work-conserving**  
   *Hyeongboo Baek, Jaeheon Kwak and Jinkyu Lee*  
   IEEE Real-Time Systems Symposium (RTSS), 2020
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