Park, Seonghoon

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Research Interests

On-device artificial intelligence

As mobile applications increasingly employ deep neural networks (DNNs), efficient and accurate execution on resource-constrained mobile devices has become critical. My research focuses on enabling such efficiency across various DNN tasks on mobile platforms, including vision foundation models for AR [c8], super-resolution for omnidirectional video streaming [c6], vision transformers, and real-time gaze tracking [c3].

Energy-aware mobile systems

Reducing energy consumption has consistently been a crucial concern for mobile devices. I have researched energy optimization for native [c1], web [c2], and game applications [j1] on smartphones. I am also interested in energy-efficient on-device AI techniques and AI-based energy optimization strategies [c2].

Mobile immersive computing

Immersive videos, such as omnidirectional and volumetric videos, can provide interactive and engaging experiences on mobile devices, but their large data sizes and computational demands pose significant technical challenges. I have explored techniques to maximize video quality under time and resource constraints, such as adaptive super-resolution for live 360-degree videos [c6] and 3DGS-based volumetric video streaming.

Cross-device computing

As users increasingly interact with multiple personal devices, cross-device computing has garnered interest. However, prior approaches often suffer from platform dependency. My research explores platform-agnostic methods for I/O sharing and interface distribution by leveraging the meta-platform characteristics of the web. I have analyzed user experience on the mobile web [c4] and proposed cross-device web computing techniques [c5, c7].

Experiences

Postdoctoral Researcher *Sep. 2025 (Expected) –*

Virginia Tech, VA, USA

Supervisors:

- Prof. Lingjia Liu (Department of Electrical and Computer Engineering)
- Prof. Bo Ji (Department of Computer Science)

EDUCATION

Ph.D. in Computer Science and Engineering *Mar. 2018 – Aug. 2025 (Expected)*

Yonsei University, Seoul, Republic of Korea

- Advisor: Prof. Hojung Cha (Mobile Embedded Systems Lab.)
- Thesis: Providing Resource-Optimized User Experiences in Networked Mobile Systems

B.S in Computer Science and Engineering *Mar. 2014 – Feb. 2018*

Yonsei University, Seoul, Republic of Korea

PUBLICATIONS (PEER-REVIEWED)

'BK21 IF' refers to the IF listed for top CS conferences by the National Research Foundation of Korea.

* Co-primary authors

Conference Papers

[c8] ARIA: Optimizing Vision Foundation Model Inference on Heterogeneous Mobile Processors for Augmented Reality
Chanyoung Jung*, Jeho Lee*, Gunjoong Kim, Jiwon Kim, Seonghoon Park, and Hojung Cha
The 23rd Annual International Conference on Mobile Systems, Applications and Services
ACM MobiSys 2025. June 23–27, 2025. Anaheim, California, US.
(Acceptance rate: 18.0%; BK21 IF: 3; Top conference in mobile computing; Best paper award!)

[c7] Vulture: Cross-Device Web Experience with Fine-Grained Graphical User Interface Distribution
Seonghoon Park, Jeho Lee, Yonghun Choi, and Hojung Cha
IEEE INFOCOM 2024 – IEEE Conference on Computer Communications
IEEE INFOCOM 2024. May 20–23, 2024. Vancouver, Canada.
(Acceptance rate: 19.6%; BK21 IF: 4; Top conference in computer networks)

[c6] OmniLive: Super-Resolution Enhanced 360° Video Live Streaming for Mobile Devices
Seonghoon Park*, Yeonwoo Cho*, Hyungchol Jun, Jeho Lee, and Hojung Cha
The 21st Annual International Conference on Mobile Systems, Applications and Services
ACM MobiSys 2023. June 18–22, 2023. Helsinki, Finland.
(Acceptance rate: 20.7%; BK21 IF: 3; Top conference in mobile computing)

[c5] Crow API: Cross-device I/O Sharing in Web Applications
Seonghoon Park, Jeho Lee, and Hojung Cha
IEEE INFOCOM 2023 – IEEE Conference on Computer Communications
IEEE INFOCOM 2023. May 17–20, 2023. New York, NY, USA.
(Acceptance rate: 19.2%; BK21 IF: 4; Top conference in computer networks)

[c4] WebMythBusters: An In-depth Study of Mobile Web Experience
Seonghoon Park, Yonghun Choi, and Hojung Cha
IEEE INFOCOM 2021 – IEEE Conference on Computer Communications
IEEE INFOCOM 2021. May 10–13, 2021. Virtual Conference.
(Acceptance rate: 19.7%; BK21 IF: 4; Top conference in computer networks)

[c3] GAZEL: Runtime Gaze Tracking for Smartphones
Joonbeom Park, Seonghoon Park, and Hojung Cha
The 19th International Conference on Pervasive Computing and Communications
IEEE PerCom 2021. March 22–26, 2021. Virtual Conference.
(Acceptance rate: 10.6% for full papers; BK21 IF: 3)

[c2] Optimizing Energy Efficiency of Browsers in Energy-Aware Scheduling-enabled Mobile Devices
Yonghun Choi, Seonghoon Park, and Hojung Cha
The 25th Annual International Conference on Mobile Computing and Networking
ACM MobiCom 2019. October 21–25, 2019. Los Cabos, Mexico.
(Acceptance rate: 19.0%; BK21 IF: 4; Top conference in mobile computing)

[c1] Graphics-aware Power Governing for Mobile Devices
Yonghun Choi, Seonghoon Park, and Hojung Cha
The 17th Annual International Conference on Mobile Systems, Applications, and Services
ACM MobiSys 2019. June 17–21, 2019. Seoul, South Korea.
(Acceptance rate: 22.7%; BK21 IF: 3; Top conference in mobile computing)

Journal Papers

[j1] Optimizing Energy Consumption of Mobile Games
Yonghun Choi, Seonghoon Park, Seunghyeok Jeon, and Hojung Cha
IEEE Transactions on Mobile Computing, Vol. 21, Issue 10, Oct. 2022, pp 3744–3756.
(JCR 2023 IF: 7.7; Top 5% journal in Computer Science, Information Systems)

Under Review/Revision

[u8] Anonymized Paper (Energy efficiency)
First author
Under Review (Conference)

[u7] Anonymized Paper (Mobile immersive computing, Energy efficiency)
First author
Under Review (Conference)

[u6] Anonymized Paper (Mobile immersive computing)
First author
Under Review (Conference)

[u5] Anonymized Paper (Energy harvesting, On-device AI)
First author
Under Review (Journal)

[u4] Anonymized Paper (Mobile immersive computing)
Co-first author
Under Review (Conference)

[u3] Anonymized Paper (Energy harvesting, Mobile immersive computing)
Co-first author
Under Review (Conference)

[u2] “Anonymized Paper (Assistive web interaction)”
Co-author
Under Review (Journal)

[u1] “Anonymized Paper (On-device AI)”
Co-author
Under Review (Conference)

Oral Presentations

Vulture: Cross-Device Web Experience with Fine-Grained Graphical User Interface Distribution
Main Technical Session C-11 at IEEE INFOCOM 2024—Vancouver, Canada *May. 23, 2024*

OmniLive: Super-Resolution Enhanced 360° Video Live Streaming for Mobile Devices
Main Conference Session 7 at ACM MobiSys 2023—Helsinki, Finland *Jun. 21, 2023*

Crow API: Cross-device I/O Sharing in Web Applications
Main Technical Session E-8 at IEEE INFOCOM 2023—New York, NY, USA *May. 19, 2023*

WebMythBusters: An In-depth Study of Mobile Web Experience *(Invited)*
Top Conference Session I at Korea Software Congress 2021—Pyeongchang, Republic of Korea *Dec. 21, 2021*

WebMythBusters: An In-depth Study of Mobile Web Experience
Main Technical Session F-9 at IEEE INFOCOM '21—Virtual Conference *May. 13, 2021*

Patents

[p3] "I/O Sharing Device and Method"
Seonghoon Park, Jeho Lee, and Hojung Cha
Registration Decision Received
Patent Application No. 10-2023-0111882 (Republic of Korea; filed Aug. 25, 2023)

[p2] "Method for Omnidirectional 3D Object Detection, Program Performing the Method, and Computing Device Executing the Program"
Jeho Lee, Chanyoung Jung, Seonghoon Park, Hyungchol Jun, and Hojung Cha
Patent Pending, Patent Application No. 10-2024-0120347 (Republic of Korea; filed Sep. 04, 2024)

[p1] "System and Operating Method for Cross-Device Experiences using In-Browser Virtual Proxy"
Seonghoon Park, Jeho Lee, and Hojung Cha
Patent Pending, Patent Application No. 10-2024-0112156 (Republic of Korea; filed Aug. 21, 2024)

Research Projects

Development of AI-powered Real-time Cross-device 360-degree Video Sharing Technique
RS-2024-00412632, NRF, Republic of Korea *Sep. 2024 – Present*

Development of On-device DNN Inference System for Real-time 3D Perception with Mobile 360-degree Camera
RS-2024-00344323, NRF, Republic of Korea *May. 2024 – Present*

Development of High-Assurance (≥EAL6) Secure Microkernel
RS-2018-II180532, IITP, Republic of Korea *Apr. 2018 – Present*

Task Relation Graph Prediction based on RNN
Samsung Electronics, Republic of Korea *Mar. 2023 – Feb. 2024*

Development of Energy Management Techniques for Batteryless IoT System
2019R1A2C200461913, NRF, Republic of Korea *Mar. 2019 – Feb. 2022*

Highly Flexible Device Profiling and Analysis System for Web Experiences Measurement
2017M3C4A708367723, NRF, Republic of Korea *Nov. 2017 – Dec. 2020*

System Software for Mobile Device Power Management to Improve Available Time by 30%
Samsung Science & Technology Foundation, Samsung Electronics, Republic of Korea *Jan. 2017 – Aug. 2018*

Academic Services

Peer Reviewer

- IEEE Transactions on Mobile Computing (TMC): 2023, 2024

Teaching Experiences

System Programming (CSI 3107)
Teaching Assistant—Yonsei University, Seoul, Republic of Korea *Fall 2024, Fall 2020, Fall 2019, Fall 2018*

Operating Systems (CSI3101)
Teaching Assistant—Yonsei University, Seoul, Republic of Korea *Spring 2020, Spring 2019, Spring 2018*

Awards and Honors

Best Paper Award
ACM MobiSys 2025 *Jun. 2025*

Ph.D. Fellowship
National Research Foundation of Korea (NRF), Republic of Korea *Sep. 2024 – Aug. 2025*

Honors
Department of Computer Science, *2017 Fall, 2017 Spring, 2014 Fall, 2014 Spring*
Yonsei University, Seoul, Republic of Korea

TECHNICAL SKILLS

Language

- Korean (Native)
- English

Programming Skills

- Machine learning frameworks (PyTorch, TensorFlow, TensorFlow Lite)
- Android applications
- Operating systems (Android kernel, Android framework, ChibiOS/RT microkernel)
- Web programming (Web applications with Node.js, Flask, etc.; Web extensions)