<Professor Song Min Kim's Lab.>

Smile LAB

SMart and MobILE Systems (SMILE) Lab

■ Contact Information		
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Lab.	N1 #918	
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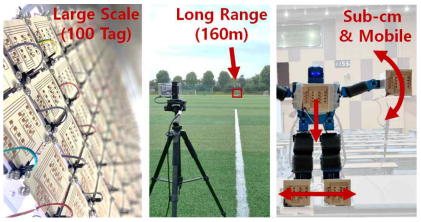
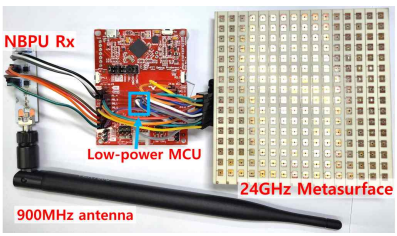
■ Current State of the Lab (in 2025 Spring Semester)

Postdoctoral Fellows : 1 PhD Students: 8 Master's Student: 3

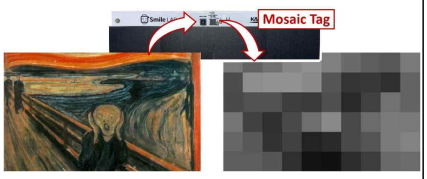
■ Research Areas



mmWave Backscatter Localization: Accurate localization of a large number of objects over a wide area is one of the keys to the pervasive interaction with the IoT. Our technique, for the first time, offers over (i) hundred-scale simultaneous 3D localization at (ii) sub-cm accuracy for over an (iii) hectometer distance. The performance practically applies to indoors and outdoors as well as under mobility.



Next-Generation Mobile Networking: Metasurface has recently emerged as an economic solution to expand mmWave coverage. However, their pervasive deployment remains a challenge, mainly due to the difficulty in achieving real-time NR-compatible wireless reconfiguration while maintaining multi-year battery life. We present the first intelligent metasurface that offers (i) real-time reconfiguration, (ii) compliance with the NR standard, and (iii) micropower operation 2.1-year lifetime on an AA battery.



Battery-free AI of Things: Despite the potential of vision-based monitoring, data leakage concerns hinder its wide deployment in personal spaces. Besides, continuous and pervasive monitoring without blind spots in complicated indoor spaces requires a scalable system. We design vision-based end-to-end action recognition framework that (i) intrinsically achieves data anonymity from the sensing stage and (ii) battery-free operation for blind spot-free continuous monitoring.

■ Recommended Courses & Career after Graduation

Computer networks, network programming, system programming, probability theory, wireless communication, and signal processing would be helpful (not required). You will have both top quality publications and rich experience in system implementation, offering freedom in career path: from academia and research labs to industry.

■ Introduction to Other Activities besides Research

International trips to top conferences, frequent get-together parties, and more. Any new suggestions are welcome. We are open to all kinds of new and fun activities! We value the relationship among members. As an academic family, we should be the strongest supporter for each other throughout the career.

■ Introduction to the Lab

We are recruiting in the areas of (i) wireless networks and communication, (ii) RF systems, (iii) AI on edge devices! Please contact us if you are passionate in one or more of these areas.

Our research is about innovation and practicality. We enjoy creative and interesting designs and seeing it work in practice through hands-on implementation on everyday devices, such as smartphones and wearables. Our ideas lie in the intersection of networking, communications, and signal/data processing. We share our excitement with the world by publishing in top conferences. **SMILE lab is looking for enthusiastic students to join our journey!** If interested, please do not hesitate to contact Prof. Song Min Kim at songmin@kaist.ac.kr

■ Recent Research Achievements (2018-2025)

Many top conference and premier journal papers: MobiCom, SenSys, MobiSys, ICDCS, INFOCOM, NSDI, TON, TCOMM, TMC, and TOSN. Most students have published top conference papers within the first two years after joining, thanks to their hard-work. The students were nominated **MobiSys'24 Best Paper Award** (3/263), following their previous work selected as **MobiSys'22 Best Paper Award** (2/176) -- selected as **SIGMOBILE Research Highlight,** the first in the world to win multiple Best Paper Awards at three major conferences in mobile/wireless networks as the first authors. Another student was nominated **ICDCS'18 Best Paper Award** (1/378). For details and videos please visit https://smile.kaist.ac.kr