

# SEUNGJOO LEE

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## RESEARCH INTERESTS

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Machine Learning for Healthcare, Mobile Sensing, Federated Learning, Large Language Model

## EDUCATION

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- KAIST (Korea Advanced Institute of Science and Technology)** Sep 2024 - Present  
Ph.D. in Electrical Engineering  
Advised by [Sung-Ju Lee](#)
- KAIST (Korea Advanced Institute of Science and Technology)** Sep 2022 - Aug 2024  
M.S. in Electrical Engineering  
GPA : 4.17/4.3  
Advised by [Sung-Ju Lee](#)
- KAIST (Korea Advanced Institute of Science and Technology)** Mar 2016 - Aug 2022  
B.S. in Computer Science  
Major GPA : 4.13/4.3 | Total GPA : 4.0/4.3  
🎓 *Graduated with Honors (2nd place out of 715 students)*  
🎓 *Summa Cum Laude*  
\* Including 1.5 years of mandatory military service

## PUBLICATIONS

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(C: Conference, D: Demo, B: Book, U: Under Review)

\* *Equal contribution.* † *Equal senior role*

### [U1] Anonymized Title

XiaoMeng Chen\*, **Seungjoo Lee**\*, Hyungjun Yoon\*, Yu Wu\*, Taiting Lu, Freddy Yifei Liu, Sung-Ju Lee†, Dongyao Chen†, Cecilia Mascolo†, Lili Qiu  
International Conference on Machine Learning (ICML) 2025

### [C3] (FL)<sup>2</sup>: Overcoming Few Labels in Federated Semi-Supervised Learning

**Seungjoo Lee**, Thanh-Long V. Le, Jaemin Shin, Sung-Ju Lee  
Conference on Neural Information Processing Systems (NeurIPS) 2024  
Top ML Conference - Acceptance rate 25.8%

### [C2] FedTherapist: Mental Health Monitoring with User-Generated Linguistic Expressions on Smartphones via Federated Learning

Jaemin Shin, Hyungjun Yoon, **Seungjoo Lee**, Sungjoon Park, Yunxin Liu, Jinho D. Choi, Sung-Ju Lee  
Conference on Empirical Methods in Natural Language Processing (EMNLP Main) 2023  
Top NLP Conference - Acceptance rate 21.3%

### [C1] MyDJ: Sensing Food Intakes with an Attachable on Your Eyeglass Frame

Jaemin Shin, **Seungjoo Lee**, Taesik Gong, Hyungjun Yoon, Hyunchul Roh, Andrea Bianchi, Sung-Ju Lee  
Conference on Human Factors in Computing Systems (CHI) 2022  
🎓 **Best Paper Honorable mention award (top 5%)**  
Top HCI Conference - Acceptance rate 24.7%

### [D1] Accurate Eating Detection on a Daily Wearable Necklace (Demo)

Jaemin Shin, **Seungjoo Lee**, Sung-Ju Lee  
International Conference on Mobile Systems, Applications and Services (MobiSys) 2019

## [B1] High School Arduino

Comprehensive guide on conducting scientific experiments using Arduino  
Chapter 4, 7, and 13 are written by me

## RESEARCH EXPERIENCE

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### Microsoft Research Asia

Sep 2024 - Present

*Research Intern*, Advised by [Lili Qiu](#)

Wearable sensing for healthcare with EXG signal. Developing foundation model for EXG data.

### KAIST Network and Mobile Systems Lab

Dec 2018 - Present

*Graduate Student & Undergraduate Research Intern*, Advised by [Sung-Ju Lee](#)

- **Federated Learning for Medical Applications (Lead)**  
Addressing the costly labeling process in medical applications through weak supervision.
- **Federated Semi-Supervised Learning with Label Deficiency (Lead) [C3]**  
Mitigating the label deficiency problem of federated semi-supervised learning for its practical applications.
- **Mental Health Monitoring with User-Generated Linguistic Expressions on Smartphones via Federated Learning [C2]**  
Contributed to methodology development. Implemented federated learning framework. Experimented handling long input for LLMs. Reproduced existing paper to handle clients with only positive label. Pre-training LLMs with large corpus and distillation of pre-trained model into small models. Did the experiments about resource efficiency (computation, memory, battery) on various mobile devices.
- **Sensing Food Intakes with an Attachable on Your Eyeglass Frame [C1, D1]**  
Designing a novel wearable device that can be easily attached to eyeglass frames, capable of eating detection. Contributed the whole research process; problem definition, implementation, and user study.
- **Enhancing Visual LLM Reasoning Capability**  
Advancing multi-hop visual LLM reasoning via dynamic input adjustments during inference.
- **UWB-Based Personal Mobility Warning System for Pedestrians**  
UWB-based sensing of approaching Personal Mobility (PM) and warning pedestrians to prevent collision.

### KAIST Computer Architecture & Systems Lab

Mar 2018 - Jun 2018

*Individual Research*, Advised by [Jaehyuk Huh](#)

Worked on optimizing TLB shutdown by conducting an in-depth analysis of the Linux kernel with cscope, ctags, and ftrace. Investigated and identified unnecessary TLB shutdowns using ftrace and systemtap.

## AWARDS & HONORS

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### CHI 2022 Honorable Mention Award

Mar 2022

Awarded to top 5% of all submissions in CHI 2022 [C1].

### Winner of the Graduate of the Year Award (KAIST Board of Trustee Chairpeson's Prize)

Feb 2023

**2nd place out of 715** students, awarded to top 5 students (0.7%) who demonstrated outstanding performances in various activities as well as in grades. Awarded at the commencement ceremony.

### Summa Cum Laude

Sep 2022

Awarded for achieving the highest academic performance among students.

### Dean's List

Spring 2019, Fall 2019

Awarded to top 3% among 2,900+ students in College of Engineering.

### Engineering Innovator Award

Sep 2022

Awarded to students showing outstanding performance in extracurricular activities, including academic publications,

entrepreneurial activities, exhibitions, and inventions  
Five students are picked from college of engineering (2,900+) each semester.

#### **KAIST Breakthroughs**

Spring 2023

Featured in biannual KAIST webzine showcasing groundbreaking works [C2].

#### **U.S. Army Certificate of Appreciation**

Jul 2021

Awarded for exemplary service during military duty, serving as a role model for others.

#### **National Excellence Scholarship**

Fall 2018 - Fall 2019

National scholarship to students who showed excellence.

#### **Samsung Humantech Paper Award**

Spring 2015

Fourth prize on "An optimal path of navigation based on fractal dimension".

### **INVITED TALKS**

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#### **MSRA Intern Tech Talk, MSRA**

Nov 2024

Overcoming Few Labels in Federated Semi-Supervised Learning

### **TEACHING EXPERIENCES**

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#### **Computer Network (EE323)**

Spring 2024

Head of teaching assistants (Prof. Sung-Ju Lee)

#### **Operating Systems and System Programming for Electrical Engineering (EE415)**

Fall 2023

Teaching assistant (Prof. Sung-Ju Lee)

#### **Programming Structures for Electrical Engineering (EE209)**

Spring 2023

Teaching assistant (Prof. Sung-Ju Lee)

### **MENTORING EXPERIENCES**

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#### **Seoyoung Park**

Jun 2024 - Oct 2024

Undergraduate research intern at [NMSL](#)

Doing a research project about *federated learning* together

#### **Thanh Long Le Viet**

Oct 2023 - May 2024

Undergraduate research intern at [NMSL](#)

Doing a research project about *federated learning* together

#### **Rachel Kim**

Dec 2023 - Feb 2024

Undergraduate research intern at [NMSL](#)

Doing a research project about *UWB-based personal mobility warning system for pedestrians* together

### **ACADEMIC SERVICES**

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#### **Conference Reviewer**

- International Conference on Mobile Systems, Applications, and Services (**MobiSys**), 2023-2024
- International Conference On Mobile Computing And Networking (**MobiCom**), 2023-2025
- Special Interest Group on Data Communication (**SIGCOMM**), 2023
- International Joint Conference on Pervasive and Ubiquitous Computing (**UbiComp**), 2022

#### **Outreach**

- **Educational Support for Students in Difficult Circumstances** Mar 2020 - Jun 2021  
Taught math and science to 4 middle school students for 2 hours every week (total ~136 hours)

- **Mentor for the Gifted Education Program, SW/AI Camp** Summer 2022  
Facilitated a 2-night, 3-day program for elementary and middle school students, focusing on creating SW/AI-related kits, providing career mentoring, and conducting quizzes
- **CS101 Tutor** Spring 2017, Fall 2017, Spring 2022  
Taught 5 freshman studying CS101 (introduction to programming)

## WORK EXPERIENCES

- Internship at Samsung Electronics** Jul 2021 - Aug 2021  
*MX (Mobile Experience) division, AI server development team*
- Developing RESTful server using Spring boot. Gained hands-on experience in the entire server development process in a professional setting, including designing server APIs and implementing CI/CD pipelines. Selected as the **best project** in the division
  - Presenting a new business item for Samsung, which was about developing kiosk for elderly people. Won **first place** in team Creathon project
- Internship at SK Hynix** Dec 2017 - Jan 2018  
*NAND development branch, Solution algorithm division*
- Optimizing NAND-simulation program. Achieved 66% performance boost over existing code. Selected as the **best project** in the branch

## PATENTS

- [P3]** "Adaptive State-Space Model-Based Deep Learning System for Real-Time Data Inference on Mobile Devices", Sung-Ju Lee, Seungjoo Lee, HyungJun Yoon, Korea patent (In progress)
- [P2]** "System and Method for Monitoring Mental Health Based on Smartphone User Language Expressions Through Federated Learning", Sung-Ju Lee, HyungJun Yoon, Seungjoo Lee, Jaemin Shin, Korea patent (Filing date: 2024.10.04, No. 10-2024-0135031)
- [P1]** "Artificial Intelligence Model Training Method and Apparatus for Voice Phishing Detection", Sung-Ju Lee, Seungjoo Lee, HyungJun Yoon, Korea patent (Filing date: 2023.10.04, No. 10-2023-0131748)

## MILITARY SERVICE

- KATUSA (Korean Augmentation to the U.S. Army)** Dec 2019 - Jun 2021  
Served national service at eighth army as a KATUSA, providing translation between the U.S. and Korean army. Selected to participate as a Korean military interpreter in the EIB (Expert Infantryman Badge) contest, the U.S. Army's prestigious competition.

## EXTRA-CURRICULAR ACTIVITIES

- International Students Organization (ISO)** Sep 2016 - Dec 2019  
Introduce Korean culture to international students.
- Flute Player in Cantabile (Orchestra)** Mar 2014 - Jan 2016
- Embedded Software Club** Mar 2014 - Dec 2015  
Been a club leader for a year. Published book about doing scientific experiments using Arduino [B1].