

Hyunchul Lim

Education

- 2019–present **PhD, Information Science, Cornell University**, Ithaca, NY, US.
Interest: Human-AI Interaction, VR/AR Input Techniques, Ubiquitous & Wearable Computing, Novel Sensing and Interaction with LLM, Applied Machine/Deep Learning, and Accessibility
Advisor: Cheng Zhang | Committee members: François Guimbretière and Tanzeem Choudhury
- 2014–2016 : **Master of Science in Engineering, Seoul National University**, Seoul, South Korea.
Thesis: A Study on Multi-Device Interaction with a Wearable Device - Joint Interactions on a Smartwatch and a Smartphone.
Advisor: Bongwon Suh | Committee members: Joonhwan Lee and Wonjong Rhee
- 2007–2011 : **Bachelor of Business Administration, Soongsil University**, Seoul, South Korea.
(2011–2013) Reserve Officer's Training Corps (ROTC) in the Republic of Korea Army

Publications

- 2025 **H. Lim** et al. Spelling: Recognizing fingerspelling in american sign language using gyroscope and active acoustic sensing on a ring. *Submitted to a HCI conference (under review), 2025.*
- 2025 **H. Lim** et al. Exploring the impact of emotional voice integration in sign-to-speech translators for deaf-to-hearing communication. *Submitted to a HCI conference (under review), 2025.*
- 2024 T. Yu, G. Hu, R. Zhang, **H. Lim**, S. Mahmud, K. Li, D. Agarwal, S. Nie, J. Oh, F. Guimbretiere, and C. Zhang. Ring-a-pose: A ring for continuous hand pose tracking. *IMWUT'25 (to be appeared), 2024.*
- 2023 **H. Lim**, R. Zhang, W. Liu, S. Pendyal, Y. Li, T. Chen, S. Tao, J. Jo, and C. Zhang. D-touch: Recognizing and predicting fine-grained hand-face touching activities using a neck-mounted wearable. *IUI'23, 2023.*
- 2023 **H. Lim**, G. Hu, H. Chen, R. Jin, R. Mao, R. Zhang, and C. Zhang. C-auth: Exploring the feasibility of user authentication on smart glasses based on subtle skin deformations. *ISWC'23, 2023.*
- 2022 **H. Lim**, Y. Li, M. Dressa, F. Hu, J. Kim, R. Zhang, and C. Zhang. Bodytrak: Inferring full-body poses from body silhouettes using a miniature camera on a wristband. *IMWUT'22, 2022.*
- 2021 R. Zhang, M. Chen, B. Steeper, Y. Li, Z. Yan, Y. Chen, S. Tao, T. Chen, **H. Lim**, and C. Zhang. A smart necklace for silent speech recognition. *IMWUT'21, 2021.*
- 2021 **H. Lim**, D. Lin, J. Tweneboah, and C. Zhang. Handytrak: Recognizing the holding hand on a commodity smartphone from body silhouette images. *UIST'21, 2021.*
- 2021 T. Chen, Y. Li, S. Tao, **H. Lim**, M. Sakashita, R. Zhang, F. Guimbretiere, and C. Zhang. Neckface: Continuously tracking full facial expressions on neck-mounted wearables. *IMWUT'21, 2021.*
- 2019 J. Choi, J. Han, W. Hyun, **H. Lim**, S. Huh, S. Park, and B. Suh. Leveraging smartwatches to estimate students' perceived difficulty and interest in online video lectures. *ICETC'19, 2019.*
- 2018 **H. Lim**, J. Chung, C. Oh, S. Park, J. Lee, and B. Suh. Touch+finger: Extending touch-based user interface capabilities with "idle" finger gestures in the air. *UIST'18, 2018.*

- 2016 **H. Lim**, J. Chung, C. Oh, S. Park, and B. Suh. Octaring: examining pressure-sensitive multi-touch input on a finger ring device. *UIST'16 (Poster)*, 2016.
- 2016 **H. Lim**, G. An, Y. Cho, K. Lee, and B. Suh. Whichhand: automatic recognition of a smartphone's position in the hand using a smartwatch. *MobileHCI'16 (Poster)*, 2016.
- 2016 J. Seo, **H. Lim**, C. Oh, H. Yun, B. Suh, and J. Lee. A system designed to collect users' tv-watching data using a smart tv, smartphones, and smart watches. *TVX'16 (Poster)*, 2016.
- 2015 **H. Lim**, Y. Cho, W. Rhee, and B. Suh. Vi-bros: Tactile feedback for indoor navigation with a smartphone and a smartwatch. *CHI'15 (Poster)*, 2015.
- 2015 S. Park, **H. Lim**, and H. Choi. "gangnam mom": A qualitative study on the information behaviors of korean helicopter mothers. *iConference'15*, 2015.

Research Experience

SciFi Lab, Information Science, Cornell Bowers CIS

Sept, 2019 – **PhD Researcher.**

Now Conduct human-AI interaction research using wearables with LLM and novel sensing

As Project Lead.

Lead 7 projects, designing and implementing novel wearable sensing systems. Develop deep learning models. Conduct user studies for data collection.

(in progress) **ASL Translation on AR glasses with LLM**, "I sign one word, you complete the sentence": Enhancing an ASL Translation System on AR glasses with an Large Language Model for Hearing and DHH Communication, *(to be submitted to IMWUT'25)*.

(in progress) **ASL Sign-to-Emotional Voice Translation.**

1. Exploring the impact of emotional voice integration in sign-to-speech translators for deaf-to-hearing communication. *(Submitted to a HCI conference (under review))*

2. Recognizing emotional and linguistic facial expressions for facilitating communication between hearing and deaf individuals. *(To be submitted to IMWUT'25)*

completed **SpellRing**, Recognizing fingerspelling in American Sign Language (ASL) using gyroscope and active acoustic sensing on a ring, *(to be submitted to a HCI conference (under review))*.

completed **C-Auth**, Exploring the feasibility of user authentication on smart glasses based on subtle skin deformations, *(Accepted to ISWC'23)*.

completed **D-Touch**, Recognizing and predicting fine-grained hand-face touching activities using a neck-mounted wearable, *Accepted in IUI'23*.

completed **BodyTrak**, Inferring full-body poses from body silhouettes using a miniature camera on a wristband, *published in IMWUT'22*.

Covered by the media including [CNET](#), [New Atlas](#), [Cornell Chronicle](#), and etc

completed **HandyTrak**, Recognizing the holding hand on a commodity smartphone from body silhouette images, *published in UIST'22*.

As Collaborator.

Conducted three research projects as a collaborator. Designed systems and conducted user study for data collection.

completed **Ring-a-Pose**, Ring-a-pose: A ring for continuous hand pose tracking, *published in IMWUT'25*.

completed **SpeeChin**, Developing a smart necklace for silent speech recognition, *published in IMWUT'21*.

completed **NeckFace**, Continuously tracking full facial expressions on neck-mounted wearables, *published in IMWUT'21*.

Input Exploration Team, Reality Labs, Meta

May, 2023 – **Research Intern.**

Aug. 2023 Conducted a research project to evaluate EMG gestures for AR/VR interaction

HCC Lab, Seoul National University

Mar, 2014 – **Graduate Student Researcher.**

Aug. 2016 Conducted several research projects using multi-device interaction. Led four projects (*i.e.*, *Touch+Finger*, *OctaRing*, *WhichHand*, and *Vi-Bros*). Collaborated with Ph.D. students on two projects (*i.e.*, *Smart classroom* and *Smart TV*) by implementing systems using smartwatches. Conducted interviews on the 'Gangnam mom' project.

Smart Classroom, Leveraging smartwatches to estimate students' perceived difficulty and interest in online video lectures, *published in ICETC'18*.

Touch+Finger, Extending touch-based user interface capabilities with "idle" finger gestures in the air, *published in UIST'18*.

Octaring, Examining pressure-sensitive multi-touch input on a finger ring device, *published in UIST'16*.

WhichHand, Automatic recognition of a smartphone's position in the hand using a smartwatch, *published in MobileHCI'16*.

SmartTV, A system designed to collect users' TV-watching data using a smart TV, smartphones, and smart watches, *published in TVX'16*.

Vi-Bros, Tactile feedback for indoor navigation with a smartphone and a smartwatch, *published in CHI'15*.

Gangnam Mom, A qualitative study on the information behaviors of Korean helicopter mothers., *published in iConference'15*.

Peer Review

2023 - 2025 **CHI 2025, 2024, 2023**, The ACM Conference on Human Factors in Computing Systems

2024 **CHI 2024**, Serve as an Associate Chair for CHI24 Late Breaking Work

2021 - 2022 **IMWUT 2022 August, 2021 November**, Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

2021 **ISWC 2021**, IEEE International Symposium on Wearable Computers

Patent

2023 Wearable facial movement tracking devices. C Zhang, T Chen, B Steeper, F Guimbretiere, K Li, R Zhang, **H Lim**. US Patent App. 17/986,102

Work Experience

Reality Labs, Meta, NYC, USA

May, 2023 – **Research Intern, Input Exploration Team.**

Aug. 2023 Conducted a research project to evaluate EMG gestures for AR/VR interaction (Manager: [Julian Ramos Rojas](#))

Deloitte Consulting, Seoul, South Korea

Nov, 2018 – **Data Scientist and Consultant, Data Analytic Group.**

Sep, 2019 Analyze data to support data-driven decision management

project 1 : **Design algorithms to calculate house property incomes to prevent tax evasion, with the National Tax Service.**

Implemented a system to calculate individual's income based on housing assets by integrating data held by the Korean government

project 2 : **Analysis of driving data, with Hyundai Motor company.**

1.Analyzed driving data with a telematics On-board diagnostics (OBD) device to detect anomalous states in vehicles. 2.Categorized optimized shifting patterns for a hybrid electronic vehicle (HEV) using the data.

Spoqa (Startup), Seoul, South Korea

Oct, 2016 – **Data Scientist and Researcher, Creator.**

Jul, 2018 Analyzed and visualized large-scale data on a loyalty program for data-driven decision management. Conducted research projects (e.g. churn modeling, fraud detection, and lead generation)

Teaching Assistantship

Information Science, Cornell Bowers CIS, NY, USA

Fall, 2024 **INFO 5001: Computing for Information Science.**

Hold weekly office hours to teach data analysis in RStudio and lead weekly lab sessions.

Spring, 2024 **INFO 4340/5440: Navigation App Design and Prototyping.**

Assist students in learning software development techniques and tools to create high-fidelity interactive prototypes, including UI component libraries, event-driven programming, data stubs, Git workflows, command-line basics, and debugging skills.

Fall, 2022 **INFO 4320: Introduction to Rapid Prototyping and Physical Computing.**

Spring, 2020 Hold weekly office hours to teach rapid prototyping techniques such as laser cutting, 3D printing, and microcontroller programming (e.g., the Arduino system). Mentor students on the hardware projects of their choice such as tangible interfaces, medical assistants, and musical instruments. Grade assignments and prepare hardware kits.
Spring, 2019
Fall, 2019

Fellowships & Awards

2014-2015 **Merit-based Scholarship** of Seoul National University

2014-2015 **Brain Korea 21 Graduate Support Initiative Research Fellowship** of Seoul National University

2008 **Foreign Exchange Scholarship** of Soongsil University

2007 **Superior Academic Performance Scholarship** of Soongsil University

Computer skills

Programming Languages Python, PyTorch, Keras, R, Java, Javascript, D3, SQL, Android programming, Processing, Fusion360

Prototyping 3D printer, Arduino/ESP32, and Sensors (e.g., IMU, optical/Acoustic sensors, heart rate, and EEG)

Mentoring Students

Fall, 2022 – **Taylor Jiang, Undergraduate**, Computer Science, Cornell.

Present Guide her in processing the images from the wearable camera on smart glasses for the SLTrak projet.

Fall, 2021 – **Guilin Hu, Undergraduate**, Computer Science, Cornell.

Present Guided him in developing image segmentation models for extracting a facial contour line using a deep learning model(ResNet18) in the C-Auth project.

Fall, 2021 – **Richard Jin, Undergraduate**, Computer Science, Cornell.

Present Guided him in making synthetic images data set for training image segmentation model in the C-Auth project.

Fall, 2021 – **Hao Chen, Undergraduate**, Information Science, Cornell.

Present Guided her in designing semi-structured interview questions and making the video for the paper submission on the C-Auth project

Fall, 2021 – **Ryan Mao, Undergraduate**, Computer Science, Cornell.

Spring 2022 Guided him in developing user authentication algorithms and conducting user study on the C-Auth project.

Spring, 2021 – **Matthew Dress, MPS student**, Information Science, Cornell.

Spring, 2022 Guided him in conducting a user study and writing the academic paper on the BodyTrak project.

Spring, 2021– **Jaehoon Kim, Undergraduate**, Art and Science, Cornell.

Fall, 2021 Guided him in designing a user study and recruiting participants for the BodyTrak project

- Spring, 2020 – **Samhita Pendyal**, *Undergraduate*, Biometry and Statistics, Cornell.
Spring, 2021 Guided her in conducting the user study on the D-Touch project
- Spring, 2021 – **David Lin**, *Undergraduate*, Computer Science, Cornell.
Spring, 2020 Guided him in segmenting the human body images from the background and developing a deep learning algorithm for the HandyTrak project.
- Spring, 2021 – **Jessica Tweneboah**, *Undergraduate*, Engineering, Cornell.
Spring, 2020 Guided her on designing user study for the HandyTrak project. Thanks to the HandyTrak paper (UIST'21), she was nominated by the ECE department for a research award.
- Fall, 2021 – **Wei Liu**, *Undergraduate*, School of Mechanical Engineering, Shanghai Jiao Tong University.
Spring, 2020 Guided him in developing a deep learning algorithm for the D-Touch project

Referees

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