

Hyunchul Lim

Cornell Bowers CIS
Information Science
☎ (+1) 607.379.8195
✉ hl2365@cornell.edu
inLinkedIn Google Scholar

Education

- 2019–present **PhD, Information Science, Cornell University**, Ithaca, NY, US.
Ubiquitous & Wearable Computing, Novel Sensing and Interaction, Applied Machine/Deep Learning, and VR/AR Input Techniques
Advisor: Cheng Zhang | Committee members: François Guimbretière and Tanzeem Choudhury
(Expected Graduation Date: Dec, 2024)
- 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

- 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. *Submitted to CHI'24 (under review), 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 several research projects using novel sensing with wearable devices to understand human behavior as a fine-grained body poses in the wild.

As Project Lead.

Lead 6 projects, mentoring 10 students. Design and implement novel wearable sensing systems. Develop deep learning models. Revise study procedures. Conduct user studies for data collection.

(in progress) **SLTrak**, Emotional speech translation on sign language using a smart glasses based on facial expression, (*to be submitted to IMMUT'24*).

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 UI'23*.

completed **BodyTrak**, Inferring full-body poses from body silhouettes using a miniature camera on a wristband, *published in IMMUT'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 two research projects as a collaborator. Designed systems and conducted user study for data collection.

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

completed **NeckFace**, Continuously tracking full facial expressions on neck-mounted wearables, *published in IMMUT'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 Univeristy

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

2022 **CHI 2023**, The ACM Conference on Human Factors in Computing Systems

2022, 2021 **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

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

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

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

Spring, 2020 *Science, Cornell Bowers CIS*.

Spring, 2019 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.

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 – Present	Taylor Jiang , <i>Undergraduate</i> , Computer Science, Cornell. Guide her in processing the images from the wearable camera on smart glasses for the SLTrak projet.
Fall, 2021 – Present	Guilin Hu , <i>Undergraduate</i> , Computer Science, Cornell. 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 – Present	Richard Jin , <i>Undergraduate</i> , Computer Science, Cornell. Guided him in making synthetic images data set for training image segmentation model in the C-Auth project.
Fall, 2021 – Present	Hao Chen , <i>Undergraduate</i> , Information Science, Cornell. Guided her in designing semi-structured interview questions and making the video for the paper submission on the C-Auth project
Fall, 2021 – Spring 2022	Ryan Mao , <i>Undergraduate</i> , Computer Science, Cornell. Guided him in developing user authentication algorithms and conducting user study on the C-Auth project.
Spring, 2021 – Spring, 2022	Matthew Dress , <i>MPS student</i> , Information Science, Cornell. Guided him in conducting a user study and writing the academic paper on the BodyTrak project.
Spring, 2021– Fall, 2021	Jaehoon Kim , <i>Undergraduate</i> , Art and Science, Cornell. Guided him in designing a user study and recruiting participants for the BodyTrak project
Spring, 2020 – Spring, 2021	Samhita Pendyal , <i>Undergraduate</i> , Biometry and Statistics, Cornell. Guided her in conducting the user study on the D-Touch project
Spring, 2021 – Spring, 2020	David Lin , <i>Undergraduate</i> , Computer Science, Cornell. Guided him in segmenting the human body images from the background and developing a deep learning algorithm for the HandyTrak project.
Spring, 2021 – Spring, 2020	Jessica Tweneboah , <i>Undergraduate</i> , Engineering, Cornell. 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 – Spring, 2020	Wei Liu , <i>Undergraduate</i> , School of Mechanical Engineering, Shanghai Jiao Tong University. Guided him in developing a deep learning algorithm for the D-Touch project

Referees

Dr. Cheng Zhang

*Associate Professor,
Information Science*

Cornell University

☎ +(404) 263-5635

✉ chengzhang@cornell.edu

Dr. Tanzeem Choudhury

*Professor,
Information Science, Cornell Tech*

Cornell University

✉ tanzeem.choudhury@cornell.edu

Dr. Joonhwan Lee

*Professor,
Department of Communication*

Seoul National University

✉ joonhwan@snu.ac.kr

Dr. François Guimbretière

*Professor,
Information Science*

Cornell University

✉ fvg3@cornell.edu

Dr. Bongwon Suh

*Associate Professor, Department of
Transdisciplinary Studies*

Seoul National University

✉ bongwon@snu.ac.kr

Dr. Wongjong Rhee

*Professor, Department of
Transdisciplinary Studies*

Seoul National University

✉ wrhee@snu.ac.kr