

Hyunsung Cho

✉ hyunsung@cs.cmu.edu

🏠 <http://hyunsungcho.com>

RESEARCH INTERESTS

Context-aware computing for eXtended Reality (XR), adaptive XR interface, computational interactions

EDUCATION

Carnegie Mellon University

Ph.D. student in Human-Computer Interaction

Aug. 2021 -

Advisor: David Lindlbauer

Korea Advanced Institute of Science and Technology (KAIST)

Ph.D. student in Computer Science (Transferred to Carnegie Mellon University)

Mar. 2020 - Apr. 2021

Advisor: Sung-Ju Lee

Korea Advanced Institute of Science and Technology (KAIST)

M.S. in Computer Science

Mar. 2018 - Feb. 2020

Advisor: Sung-Ju Lee

Thesis: Private Status Sharing and Sender-Controlled Notifications in Mobile Instant Messaging

Thesis Committee: Sung-Ju Lee, Juho Kim, Youn-kyung Lim

Korea Advanced Institute of Science and Technology (KAIST)

B.S. in Computer Science (Software Advanced Major)

Aug. 2013 - Feb. 2018

Magna Cum Laude

PUBLICATIONS

Conference & Journal Papers

- [c.11] **BlendMR: A Computational Method To Create Ambient Mixed Reality Interfaces.**

Violet Han, Hyunsung Cho, Kiyosu Maeda, Alexandra Ion, and David Lindlbauer.

ISS 2023: ACM Interactive Surfaces and Spaces Conference

- [c.10] **FinerMe: Examining App-level and Feature-level Interventions to Regulate Mobile Social Media Use.**

Adiba Orzikulova, Hyunsung Cho, Hye-Young Chung, Hwajung Hong, Uichin Lee, and Sung-Ju Lee.

CSCW 2023: ACM Conference on Computer Supported Cooperative Work and Social Computing

- [c.9] **RealityReality: Detecting and Replaying Temporal Changes In Situ using Mixed Reality.**

Hyunsung Cho, Matthew L. Komar, and David Lindlbauer.

IMWUT (UbiComp) 2023: ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies

- [c.8] **A Survey on Remote Assistance and Training in Mixed Reality Environments.**

Catarina Gonçalves Fidalgo, Yukang Yan, Hyunsung Cho, Mauricio Sousa, David Lindlbauer, and Joaquim Jorge.

TVCG 2023: IEEE Transactions on Visualization and Computer Graphics

- [c.7] **FLAME: Federated Learning Across Multi-device Environments.**

Hyunsung Cho, Akhil Mathur, and Fahim Kawsar.

IMWUT (UbiComp) 2022: ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies

- [c.6] **You Are Not Alone: How Trending Stress Topics Brought #Awareness and #Resonance on Campus**

Ryuhaerang Choi, Chanwoo Yun, Hyunsung Cho, Hwajung Hong, Uichin Lee, and Sung-Ju Lee.

CSCW 2022: ACM Conference on Computer Supported Cooperative Work and Social Computing

- [c.5] **Prediction for Retrospection: Integrating Algorithmic Stress Prediction into Personal Informatics Systems for College Students' Mental Health.**

Taewan Kim, Haesoo Kim, Ha Yeon Lee, Hwarang Goh, Shakhboz Abdigapporov, Mingon Jeong, Hyunsung Cho, Kyungsik Han, Youngtae Noh, Sung-Ju Lee, and Hwajung Hong.

CHI 2022: ACM CHI Conference on Human Factors in Computing Systems

- [c.4] **Reflect, not Regret: Modeling Behaviors of Regretful Smartphone Use with App Feature-Level Analysis.**
Hyunsung Cho, DaEun Choi, Donghwi Kim, Wan Ju Kang, Eun Kyoung Choe, and Sung-Ju Lee.
CSCW 2021: ACM Conference on Computer Supported Cooperative Work and Social Computing
🏆 **Best Paper Award & 🏆 Methods Recognition**
- [c.3] **I Share, You Care: Private Status Sharing and Sender-Controlled Notifications in Mobile Instant Messaging.**
Hyunsung Cho, Jinyoung Oh, Juho Kim, and Sung-Ju Lee.
CSCW 2020: ACM Conference on Computer Supported Cooperative Work and Social Computing
- [c.2] **Knocker: Vibroacoustic-based Object Recognition with Smartphones.**
Taesik Gong, Hyunsung Cho, Bowon Lee, and Sung-Ju Lee.
IMWUT (UbiComp) 2019: ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies
- [c.1] **Intelligent Positive Computing with Mobile, Wearable, and IoT Devices: Literature Review and Research Directions.**
Uichin Lee, Kyungsik Han, Hyunsung Cho, Kyong-Mee Chung, Hwajung Hong, Sung-Ju Lee, Youngtae Noh, Sooyoung Park, and John M. Carroll.
Ad Hoc Networks Journal, Volume 83, 2019

Posters, Demos, and Workshop Papers

- [p.6] **Facilitating Instant Interactions for Stressful Experiences Sharing and Peer Support.**
Ryuhaeraeng Choi, Chanwoo Yun, Hyunsung Cho, Hwajung Hong, Uichin Lee, and Sung-Ju Lee.
MobiSys 2022 Demos: ACM International Conference on Mobile Systems, Applications and Services
- [p.5] **Device or User: Rethinking Federated Learning in Personal-Scale Multi-Device Environments.**
Hyunsung Cho, Akhil Mathur, and Fahim Kawsar.
AIChallengesIoT 2021: ACM SenSys 2021 Workshop on Challenges in Artificial Intelligence and Machine Learning for Internet of Things
- [p.4] **I Share, You Care: Private Status Sharing and Sender-Controlled Notifications in Mobile Instant Messaging.**
Hyunsung Cho, Jinyoung Oh, Juho Kim, and Sung-Ju Lee.
CSCW 2020 Demos: ACM Conference on Computer Supported Cooperative Work and Social Computing
- [p.3] **Sender-Controlled Mobile Instant Message Notifications Using Activity Information.**
Hyunsung Cho, Jinyoung Oh, Juho Kim, and Sung-Ju Lee.
MobiSys 2019 Demos: ACM International Conference on Mobile Systems, Applications and Services
- [p.2] **Real-Time Object Identification with a Smartphone Knock.**
Taesik Gong, Hyunsung Cho, Bowon Lee, and Sung-Ju Lee.
MobiSys 2019 Videos: ACM International Conference on Mobile Systems, Applications and Services
🏆 **Best Video Award**
- [p.1] **Identifying Everyday Objects with a Smartphone Knock.**
Taesik Gong, Hyunsung Cho, Bowon Lee, and Sung-Ju Lee.
CHI 2018 Extended Abstract: ACM Conference on Human Factors in Computing Systems

WORK EXPERIENCE

<p>Meta Reality Labs, Redmond, WA, USA <i>Research Intern</i> Manager: Kashyap Todi. Research on adaptive multimodal feedback for Extended Reality (XR) interfaces.</p>	<p>May 2023 - Sep. 2023</p>
<p>Augmented Perception Lab, Pittsburgh, PA, USA <i>Ph.D. Student</i> Advisor: David Lindlbauer. Research on a context-aware adaptive interface for Augmented Reality.</p>	<p>Aug. 2021 -</p>
<p>Nokia Bell Labs, Cambridge, UK <i>Research Intern</i></p>	<p>May 2021 - Jul. 2021</p>

Mentor: Akhil Mathur. Worked on federated learning research in multi-device settings at personal scale in Pervasive Systems Team. Selected as representative of Application Platforms & Software Systems Research Lab for global Bell Labs summer intern presentation (~5%).

- **Federated Learning Across Multi-device Environments** [c.7, p.5]
Led research on federated learning (FL) in multi-device environments (MDEs). Proposed a user-centered FL training approach to counter statistical and system heterogeneity in MDE through user-centered FL training utilizing the time-alignment, model personalization, and accuracy- and efficiency-aware device selection.

KAIST Networking and Mobile Systems Lab (NMSL), Daejeon, South Korea Mar. 2017 - Apr. 2021
Graduate Student

Advisor: Sung-Ju Lee. Research on context-aware computing to reduce digital distractions for digital wellbeing:

- **Modeling Behaviors of Regretful Smartphone Use with App Feature Use Analysis** [c.4]
Led the design and implementation of an Android-based technology probe that tracks the usage of social media app features and samples in-situ level of regret after use. Designed and conducted a one-week field study and mixed-methods analysis.
- **Designing Context-Aware Micro-Interventions for Stress Management** [c.1, c.5]
Designed and implemented an intervention mechanism for stress management that suggests micro-tasks for stress relief in micro spare time detected through mobile sensing.
- **Private Status Sharing and Sender-Controlled Notifications in Mobile Instant Messaging** [c.3, p.3, p.4]
Led the design and implementation of private status sharing and sender-controlled notifications to function on commodity messaging apps. Designed and performed a two-week field study and mixed-methods analysis.
- **Vibroacoustic-based Object Recognition with Commodity Smartphones** [c.2, p.1, p.2]
Designed and implemented 21 applications of knock-based interaction that leverage surrounding objects as contextual information. Modified the system to enable on-device training and inference of the SVM model. Assisted the design of the object recognition method, evaluation design, and user study operation.

Kiswe Mobile Inc., New Providence, NJ, USA Jun. 2017 - Aug. 2017
Web Frontend Developer

Developed a trivia widget for interactive mobile sports streaming service. The widget was included in the live service for the IAAF Diamond League event in collaboration with VRT Sporza. The service was covered in press. Developed tools to support video streamers such as a multi-view layout editor for multi-cam videos; an easy drag-and-drop thumbnail uploader; and a live streaming control interface.

KAIST Interaction Lab (KIXLAB), Daejeon, South Korea Dec. 2015 - Feb. 2017
Research Intern

Advisers: Jihee Kim and Juho Kim. Research on analysis of presidential election promises in relation with government budget expenditure data through crowdsourcing.

AWARDS & HONORS

Sponsored Research by Meta Reality Labs	2023
10th Heidelberg Laureate Forum Young Researcher	2023
Special Recognitions for Outstanding Reviews	2020-2023
ACM CHI 2023, ACM CHI 2022, ACM CSCW 2021, ACM CSCW 2020	
Best Paper Award	2021
ACM CSCW 2021 [c.4]	
Methods Recognition	2021
ACM CSCW 2021 [c.4]	
Bell Labs Summer Intern Award for Outstanding Innovation	2021
Nokia Bell Labs Global Intern Program 2021 [c.7]	
NAVER Ph.D. Fellowship Award	2020
\$5K Academic scholarship, awarded based on research performance	
Best TA Award	2019
KAIST School of Computing	

Google Women Techmakers Scholars	2019
\$1K Academic scholarship, awarded based on academic performance, leadership, and impact on the community of women in tech	
Best Video Award	2019
ACM MobiSys 2019 [p.2]	
Best Poster/Demo Award	2018
ACM SIGCHI Local Chapter [p.1]	
Undergraduate Research Program	2016
\$2K Research grant awarded by KAIST	
Runner-up in the 3rd Korea SW Hackathon	2016
\$3K Award by the Ministry of Science, ICT and Future Planning of Republic of Korea	
National Science & Technology Scholarship	2014 - 2017
Merit-based scholarships	

ACADEMIC SERVICES

ACM CHI Subcommittee Chair Assistant	2024
ACM CHI Reviewer	2022, 2023, 2024
ACM IMWUT Reviewer	2022, 2023
ACM UIST Reviewer	2022, 2023
ACM CSCW Reviewer	2020, 2021
ACM MobileHCI Reviewer	2021, 2023
PRESENCE: Virtual and Augmented Reality Reviewer	2022
IJHCI (International Journal of Human-Computer Interaction) Reviewer	2022
ACM Computing Surveys Reviewer	2020
ACM SIGGRAPH Poster Reviewer	2022, 2023
ACM CHI Late Breaking Work Reviewer	2021, 2023
CMU SCS Women/Non-binary Lunch Organizer	2023
ACM UIST Student Volunteer	2021, 2022
ACM MobiSys Student Volunteer	2019

TEACHING EXPERIENCE

Teaching Assistant , Carnegie Mellon University 05-430 Programming Usable Interfaces (Prof. Alexandra Ion)	Fall 2022
Teaching Assistant , Carnegie Mellon University 05-391 Designing Human-Centered Software (Prof. Chris Harrison)	Spring 2022
Teaching Assistant , KAIST CS101 Introduction to Programming	Fall 2016 - Fall 2017, Fall 2020
Teaching Assistant , KAIST CS341 Introduction to Computer Networks (Prof. Sung-Ju Lee)	Fall 2018, Spring 2020
Head Teaching Assistant , KAIST CS341 Introduction to Computer Networks (Prof. Sung-Ju Lee)	Spring 2019
Invited Student Panel , KAIST CS492 Introduction to Research (invited by Juho Kim, Sung-Ju Lee, and Shin Yoo)	Spring 2019

INVITED TALKS

SELECTED PRESS

KAIST Breakthroughs , Can AI empower college students to be their own health agent?	<i>Sep. 2022</i>
Tech Xplore , Researcher seeks to understand the regret behind social media use	<i>Nov. 2021</i>
EurekAlert , Carnegie Mellon University researcher seeks to understand the regret behind social media	<i>Nov. 2021</i>
Electronics Weekly , Sensor fusion lets phone identify objects by simply knocking against them	<i>Oct. 2019</i>
Science Daily , Object identification and interaction with a smartphone knock	<i>Oct. 2019</i>
NEW ATLAS , Smartphone tech recognizes objects by being knocked against them	<i>Oct. 2019</i>
Nerdiest , This algorithm makes smartphones recognize objects just by Knocking them	<i>Apr. 2018</i>
ICT NEWS , New application allows you to identify an object by tapping it with a smartphone	<i>Apr. 2018</i>
Sporza , Sporza biedt interactieve primeur met Kiswe Mobile tijdens Diamond League Brussel	<i>Aug. 2017</i>
PRWeb , VRT Sporza and Kiswe Offer End Users a First Ever Fully Interactive Mobile Experience Around Diamond League Brussels	<i>Aug. 2017</i>
VRT Innovatie , Interactieve Primeur Tijdens Diamond League Brussel Met VRT Sandbox, Sporza & Kiswe	<i>Aug. 2017</i>