

# Gyuwon Jung

POSTDOCTORAL RESEARCHER, ETRI

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## Summary

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As a researcher in the **Human-Computer Interaction (HCI)** field, my work primarily focuses on enhancing human understanding of data through advanced data analysis techniques related to “**What-If Analysis**,” such as **Causal Inference** and **Counterfactual Explanations**. I am particularly interested in exploring approaches that provide practical and explainable insights based on **everyday-life data** across various domains, including health and behavior change. With my research experience in **Human-Data Interaction**, I have strived to empower users to make more rigorous and effective data-driven decisions. As a result of these efforts, I have published papers in top-tier HCI conferences, including ACM CHI, UbiComp (IMWUT), and CSCW.

My research interests can be summarized with the following keywords:

Mobile Data, Observational Study, Causal Inference, Counterfactual Explanations, Personal Informatics, Behavior Change, Digital Health, Digital Therapeutics, User Engagement, and Quantitative and Qualitative User Study

## Education

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### Ph.D. in Computer Science

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

Daejeon, Republic of Korea

Mar. 2020 - Feb. 2025

- Advisor: Dr. Uichin Lee
- Dissertation Committee: Dr. Eun Kyoung Choe, Dr. Juho Kim, Dr. Hwajung Hong, Dr. Joseph Seering
- Dissertation: Causal Inference and Counterfactual Explanations for Personal Informatics

### M.S. in Knowledge Service Engineering

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

Daejeon, Republic of Korea

Mar. 2016 - Feb. 2018

- Advisor: Dr. Uichin Lee
- Thesis: Mobile Situated Massive Open Online Intervention (MS-MOOL): A Case Study of Parenting Smartphone Usage

### B.S. in Chemistry (*Cum Laude*)

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

Daejeon, Republic of Korea

Feb. 2009 - Feb. 2016

- Double major: Business and Technology Management

## Experience

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### Postdoctoral Researcher

DIGITAL CONVERGENCE RESEARCH LABORATORY, ETRI

Daejeon, Republic of Korea

Mar. 2025 - Current

- **Researcher** of the Human Enhancement & Assistive Technology Research Section, analyzing human behavior from lifelogging mobile data with a focus on causal inference in emotion and sleep-related scenarios

### Research Assistant

INTERACTIVE COMPUTING LAB., KAIST

Daejeon, Republic of Korea

Mar. 2020 - Feb. 2025

- **Lead Research Assistant** on the project titled “Development of Fundamental Technologies of Data-Driven Digital Therapeutic Delivery Receptivity Optimization for Mobile Digital Therapeutic Development” (National Research Foundation of Korea (NRF))
- **Co-lead Research Assistant** on the project titled “Development of Remote Platform Technologies to Prevent and Manage Emotional Disorders in the Post-pandemic Era” (National Research Foundation of Korea (NRF))
- **Research Assistant** on the project titled “Development of Cognitive-Behavioral Routine Computing Platforms for Everyday Mental Health Monitoring and Empirical Research on Depressive Symptoms of Young Adults” (National Research Foundation of Korea (NRF))

### Associate Product Manager

DRONE PLATFORM DEVELOPMENT TEAM, LG UPLUS CORP.

Seoul, Republic of Korea

Jan. 2018 - Sep. 2019

- **Manager** of the development of a remote UAV (Unmanned Aerial Vehicle) control system utilizing 4G/5G networks
- **Lead Manager** of the development of a high-precision positioning system (GPS/RTK, centimeter-level accuracy for UAVs)

- **Internship** at Dun-san Clover Branch (Daejeon) of Korea's top commercial bank; customer service and new product development

## Publications

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### Conference and Journal Papers (★ = major papers)

- [C.12] ★ **Gyuwon Jung**, Heejeong Lim, Kyungsik Han, Hyungsook Kim, Uichin Lee. (2025). "Designing a Visual Analytics Tool to Support Data Analysis Tasks of Digital Mental Health Interventions: A Case Study." *JMIR Human Factors* 12:e64967 doi:10.2196/64967
- [C.11] Kwangyoung Lee, Yeohyun Jung, **Gyuwon Jung**, Xi Lu, Hwajung Hong. (2025). "Peerspective: A Study on Reciprocal Tracking for Self-awareness and Relational Insight." *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)* doi:10.1145/3706598.3713404 (BK21+ IF: 4, acceptance rate: 24.9%)
- [C.10] ★ **Gyuwon Jung**, Uichin Lee. (2025). "CounterStress: Enhancing Stress Coping Planning through Counterfactual Explanations in Personal Informatics." *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)* doi:10.1145/3706598.3713730
- [C.09] Panyu Zhang, **Gyuwon Jung**, Jumabek Alikhanov, Uzair Ahmed, Uichin Lee. (2024). "A Reproducible Stress Prediction Pipeline with Mobile Sensor Data." *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)* 8, 3 doi:10.1145/3678578
- [C.08] ★ **Gyuwon Jung**, Sangjun Park, Uichin Lee. (2024). "DeepStress: Supporting Stressful Context Sensemaking in Personal Informatics Systems Using a Quasi-experimental Approach." *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)* doi:10.1145/3613904.3642766 (BK21+ IF: 4, acceptance rate: 26.4%)
- [C.07] ★ **Gyuwon Jung**, Sangjun Park, Eun-Yeol Ma, Heeyoung Kim, Uichin Lee. (2024). "Tutorial on Matching-based Causal Analysis of Human Behaviors Using Smartphone Sensor Data." *ACM Computing Surveys* 56, 9 doi:10.1145/3648356 (IF: 23.8 (in 2023, ranked 1/143 in Computer Science Theory & Methods))
- [C.06] Yugeong Jung, **Gyuwon Jung**, Sooyeon Jeong, Chaewon Kim, Woontack Woo, Hwajung Hong, Uichin Lee. (2023). "'Enjoy, but Moderately!': Designing a Social Companion Robot for Social Engagement and Behavior Moderation in Solitary Drinking Context." *Proceedings of the ACM on Human-Computer Interaction (CSCW)* 7, CSCW2 doi:10.1145/3610028
- [C.05] Uichin Lee, **Gyuwon Jung**, Eun-Yeol Ma, Jin San Kim, Heebyeung Kim, Jumabek Alikhanov, Youngtae Noh, Heeyoung Kim. (2023). "Toward Data-Driven Digital Therapeutics Analytics: Literature Review and Research Directions." *IEEE/CAA Journal of Automatica Sinica* 10, 1 doi:10.1109/JAS.2023.123015 (IF: 15.3 (in 2023, ranked 1/84 in Automation & Control Systems))
- [C.04] Inyeop Kim, Minsam Ko, Joonyoung Park, Sung Wook Moon, **Gyuwon Jung**, Youn-kyung Lim, Uichin Lee. (2022). "Social-Spiritual Face: Designing Social Reading Support for Spiritual Well-being." *Proceedings of the ACM on Human-Computer Interaction (CSCW)* 6, CSCW2 doi:10.1145/3555162
- [C.03] ★ **Gyuwon Jung**, Jio Oh, Youjin Jung, Juho Sun, Ha-Kyung Kong, Uichin Lee. (2021). "'Good Enough!': Flexible Goal Achievement with Margin-based Outcome Evaluation." *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21)* doi:10.1145/3411764.3445608 (BK21+ IF: 4, acceptance rate: 26.3%)
- [C.02] **Gyuwon Jung**, Hyunsoo Lee, Auk Kim, Uichin Lee. (2020). "Too Much Information: Assessing Privacy Risks of Contact Trace Data Disclosure on People With COVID-19 in South Korea." *Frontiers in Public Health* 8 doi:10.3389/fpubh.2020.00305
- [C.01] Inyeop Kim, **Gyuwon Jung**, Hayoung Jung, Minsam Ko, Uichin Lee. (2017). "Let's FOCUS: Mitigating Mobile Phone Use in College Classrooms." *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)* 1, 3 doi:10.1145/3130928

### Posters, Demos, and Workshop Papers

- [P.11] Panyu Zhang, **Gyuwon Jung**, Uzair Ahmed, Uichin Lee. (2025). "CausalCFF: Causal Analysis between User Stress Level and Contextually Filtered Features Extracted from Mobile Sensor Data." *Extended Abstracts of the 2025 CHI Conference on Human Factors in Computing Systems (CHI EA '25)* doi:10.1145/3706599.3719776
- [P.10] **Gyuwon Jung**, Uichin Lee. (2024). "Counterfactual Explanations in Personal Informatics for Personalized Mental Health Management." *Companion of the 2024 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '24)* doi:10.1145/3675094.3678427

- [P.09] Uichin Lee, **Gyuwon Jung**, Sangjun Park, Eun-Yeol Ma, Heeyoung Kim, Yonggeon Lee, Youngtae Noh. (2023). "Data-driven Digital Therapeutics Analytics." *2023 IEEE International Conference on Big Data and Smart Computing (BigComp)* doi:10.1109/BigComp57234.2023.00093
- [P.08] **Gyuwon Jung**, Sangjun Park, Uichin Lee, Eun-Yeol Ma, Heeyoung Kim. (2023). "Causal Analytic Process for Mobile Health Data." *2023 IEEE International Conference on Big Data and Smart Computing (BigComp)* doi:10.1109/BigComp57234.2023.00088
- [P.07] **Gyuwon Jung**, Youwon Shin, Jieun Lim, Uichin Lee. (2022). "CareMouse: An Interactive Mouse System that Supports Wrist Stretching Exercises in the Workplace." *Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems (CHI EA '22)* doi:10.1145/3491101.3519857
- [P.06] Yongshin Kim, Panyu Zhang, **Gyuwon Jung**, Heebyeung Kim, Uichin Lee. (2021). "Causal Analysis of Observational Mobile Sensor Data: A Comparative Study." *Korean Institute of Information Scientists and Engineers, 2021*
- [P.05] Chaewon Kim, Yugyeong Jung, **Gyuwon Jung**, Woontack Woo, Uichin Lee. (2021). "Cheersbot: Drinking Companion Robot That Provides Physical/Auditory Interaction to Improve Loneliness." *Journal of the HCI Society of Korea, 2021*
- [P.04] Juho Sun, Sangkeun Park, **Gyuwon Jung**, Yong Jeong, Uichin Lee, Kyong-Mee Chung, Changseok Lee, Heewon Kim, Suhyon Ahn, Ahsan Khandoker, Leontios Hadjileontiadis. (2020). "BeActive: Encouraging Physical Activities with Just-in-time Health Intervention and Micro Financial Incentives." *Proceedings of the 2020 Symposium on Emerging Research from Asia and on Asian Contexts and Cultures (AsianCHI '20)* doi:10.1145/3391203.3391206
- [P.03] **Gyuwon Jung**, Andrzej Zarzycki, Ji-Hyun Lee. (2017). "Mom's Tray: Real-Time Dietary Monitoring System." *SIGGRAPH Asia 2017 Mobile Graphics & Interactive Applications (SA '17)* doi:10.1145/3132787.3139196
- [P.02] Inyeop Kim, **Gyuwon Jung**, Hayoung Jung, Minsam Ko, Uichin Lee. (2017). "Let's FOCUS: Location-Based Intervention Tool to Mitigate Phone Use in College Classrooms." *Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers (UbiComp '17)* doi:10.1145/3123024.3123165
- [P.01] **Gyuwon Jung**, Inyeop Kim, Hayoung Jung, Uichin Lee. (2017). "Understanding Smartphone Usage during the University Class And Exploring Design Factors of Intervention System to Promote Concentration in Class." *Journal of the HCI Society of Korea, 2017*

## Patents

- [T.05] Uichin Lee, **Gyuwon Jung**, Heebyeung Kim, Sangjun Park. (2023). "SYSTEM AND METHOD FOR AUTOMATING SELF-EXPERIMENTATION BASED ON LIFELOG DATA FOR HEALTH BEHAVIOR CHANGE." (KR) Application No. 10-2022-0148907, (US) Application No. 18/190,784
- [T.04] Uichin Lee, **Gyuwon Jung**, Eun-Yeol Ma, Heeyoung Kim. (2022). "ANALYSIS SYSTEM AND METHOD FOR CAUSAL INFERENCE OF DIGITAL THERAPEUTICS BASED ON MOBILE DATA." (KR) Application No. 10-2022-0024541, (US) Application No. 17/844,648
- [T.03] **Gyuwon Jung**, Dong-Wook Seo, Sangwook Park, Bo-Gyeong Seong. (2021). "UNMANNED AERIAL APPARATUS AND OPERATING METHOD THEREOF." (KR) Patent No. 10-230904
- [T.02] **Gyuwon Jung**, Dong-Wook Seo. (2021). "CONTROL SERVER AND METHOD FOR SETTING FLIGHT PATH OF UNMANNED AERIAL VEHICLE USING THIS." (KR) Patent No. 10-2252920
- [T.01] **Gyuwon Jung**, Jun-Yong Yoon, Junglae Lee. (2020). "CONTROL SERVER, METHOD FOR SETTING FLIGHT PATH OF UNMANNED AERIAL VEHICLE USING THIS, AND FLIGHT PATH GUIDE SYSTEM THEREFOR." (KR) Patent No. 10-2174205

## Honors, Awards, and Grants

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### 2024 KAIST Graduate Student Outstanding Paper Award

COLLEGE OF ENGINEERING, KAIST

- President's award
- Paper: Tutorial on Matching-based Causal Analysis of Human Behaviors Using Smartphone Sensor Data (ACM CSUR, 2024)

### Certificate of Appreciation

KOREAN INSTITUTE OF INFORMATION SCIENTISTS AND ENGINEERS (KIISE)

- Presenting the latest research in the Top Conference Session at KCC 2024
- Paper: DeepStress: Supporting Stressful Context Sensemaking in Personal Informatics Systems Using a Quasi-experimental Approach (ACM CHI, 2024)

## Certificate of Excellence, Education4.0 Q TA Report

HEAD OF CENTER FOR EXCELLENCE IN LEARNING & TEACHING, KAIST

- Outstanding work as a TA for Education4.0 Q Program at KAIST Spring 2022

## NRF Ph.D. Fellowship

BASIC SCIENCE RESEARCH PROGRAM, NATIONAL RESEARCH FOUNDATION OF KOREA (NRF)

- Project: Development and Evaluation of Interactive Visual Analytic Technologies for Supporting Causal Inference with Lifelogging Data (Jun. 2022 - May, 2024)
- **Total:** 40M KRW (Approx. 29K USD)

## Invited Talks

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### Unveiling Causal Relationships in Mobile Observational Data for Digital Health

*Daejeon, Republic of Korea*

DIGITAL THERAPEUTICS COURSE, CHUNGNAM NATIONAL UNIVERSITY

*Nov. 2024*

- Proposed a big picture combining mobile observational data, causal inference, counterfactual explanations, and digital therapeutics

### Supporting Stressful Context Sensemaking in Personal Informatics Systems Using a Quasi-experimental Approach

*Daejeon, Republic of Korea*

THE FIRST WORKSHOP ON UBIQUITOUS AFFECTIVE COMPUTING AND HEALTH INFORMATICS (UACHI)

*Oct. 2024*

- Introduced a recent study on personal informatics supporting causal analysis for stress management

### Exploring Causal Relationships in Digital Health Using Mobile Self-Tracking Data

*Sydney, Australia*

URBAN INTERFACES LAB., THE UNIVERSITY OF SYDNEY

*Oct. 2024*

- Introduced causal inference approaches for digital health based on individuals' mobile data

## Teaching Experiences

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### Lead Teaching Assistant

*KAIST*

SMART HEALTH - DATA-DRIVEN SERVICE DESIGN FOR HEALTH AND WELLBEING (CoE491)

*Fall 2022*

- Co-developed lecture materials and in-class activities
- Mentored team projects

### Teaching Assistant

*KAIST*

INTRODUCTION TO HUMAN-COMPUTER INTERACTION (CS374)

*Spring 2022*

- Co-developed lecture materials and in-class activities
- Mentored team projects
- Recognized as **the top TA in the Education 4.0 Q**

### Teaching Assistant

*KAIST*

ADVANCED HUMAN-COMPUTER INTERACTION (CS592)

*Spring 2021*

- Evaluated course assignments

### Teaching Assistant

*KAIST*

MOBILE AND PERVASIVE COMPUTING FOR KNOWLEDGE SERVICE (KSE624)

*Spring 2020*

- Co-developed lecture materials for utilizing JetBot (an open-source robot based on NVIDIA Jetson Nano)
- Mentored team projects
- Published a **domestic poster (2021)** and a **CSCW paper (2023)**

## Academic Services

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### Local Co-Chair

THE 1ST WORKSHOP ON UBIQUITOUS AFFECTIVE COMPUTING AND HEALTH INFORMATICS (2024)

- Served as a local co-chair (poster session) for the Ubiquitous Affective Computing and Health Informatics (UACHI) workshop

## Session Chair

THE 1ST WORKSHOP ON IoT BIG DATA FOR HEALTH AND WELLBEING (2023)

- Served as a session chair for the IoT Big Data for Health and Wellbeing workshop (IoTHealth 2023), part of the 2023 IEEE International Conference on Big Data and Smart Computing (BigComp 2023)

## Student Steering Committee

HCI@KAIST (2021)

- Served as a committee member of HCI@KAIST, a research community at KAIST composed of prominent HCI researchers
- Organized HCI research workshops and hosted seminars by inviting external speakers

## External Reviewer

ACADEMIC PEER REVIEW

- ACM CHI 2022, 2023, 2025, 2025 LBW
- ACM IMWUT 2025

# Leadership Experience

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## Lab Student Representative

INTERACTIVE COMPUTING LAB., KAIST

*Daejeon, Republic of Korea*

*Jan. 2023 - Dec. 2023*

- Organized lab events
- Held weekly meetings with the advisor

## Master Student Representative

DEPARTMENT OF KNOWLEDGE SERVICE ENGINEERING, KAIST

*Daejeon, Republic of Korea*

*Sep. 2017 - Aug. 2018*

- Organized department events
- Held regular meetings with professors

## Auxiliary Combat Police

MOBILE POLICE HEADQUARTERS, SEOUL METROPOLITAN POLICE AGENCY

*Seoul, Republic of Korea*

*Sep. 2012 - Jun. 2014*

- Military service in the Republic of Korea
- Crowd and event management in Seoul
- Squad leader, honorably discharged (21 months)