

Liu, Zhe

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EDUCATION

PhD of Computer Science, Human-Computer Interaction and Human-AI Interaction Vancouver, Canada
University of British Columbia Sep. 2022 - Present

Supervisor: Joanna McGrenere

Awards: Four Year Doctoral Fellowship (4YF)

Master of Science, Human-Computer Interaction (GPA 3.70 /4.0) Waterloo, Canada
University of Waterloo May. 2017 - Aug. 2019

THESIS - *Modeling Cumulative Arm Fatigue on Large Multi-touch Displays* [Thesis]

(Advisors: Prof. James Wallace, Prof. Daniel Vogel)

Relevant Courses: Computer Vision in Human-Computer Interaction, Machine Learning, Deep Learning

Bachelor of Science, Industrial Engineering (GPA 3.65 / 4.0) Beijing, China
Tsinghua University Sep. 2011 - Jul. 2015

Relevant Courses: Programming, Data Structures, Algorithm Analysis, Databases, User-Centered Design

RESEARCH EXPERIENCE

Enhancing Semi-Structured Interviews with AI-driven Interview Assistant Canada
University of British Columbia, Multimodal User eXperience group Sep. 2022 - Present

- Performed literature review on Human-CA collaboration, and semi-structured interview for user study
- Conducted a 2-session need-finding study with 9 researchers on experience with semi-structured interviews and desired supports from AI-driven interview assistants
- Summarized the paramilitary findings as concrete implications for the design of AI-driven Interview Assistant

Interacting with Remote Smart Devices with Hand-held Controllers in Smart Home Environment Canada
Huawei Technologies Canada, Human-Machine Interaction Lab Sep. 2020 - Dec. 2021

- Conducted literature review on pointing selection with smartphone and air mouse, and generated an internal report
- Designed the interaction including state diagram and transfer function, and implemented the high-fidelity demonstration
- Carried out an evaluation experiment with 30 participants with Fitts' Law protocol, and confirmed design parameters for hand-held controllers' hardware and software design
- Summarized the system designs into 2 patents, with the interaction design approved for the next generation products

A Fatigue Estimation Toolkit for Fatigue-Aware Interface for Large Touch Display [Paper] Canada
University of Waterloo, Human-Computer Interaction Lab Jun. 2017 - Apr. 2019

- Built a Fitts' Law experiment interface for touchscreen with body-tracking
- Generated and evaluated a toolkit for estimating real-time arm fatigue during large-display interaction

A Tablet-based System to Facilitate Visitor Interaction with People with Dementia [Paper][Video] Singapore
National University of Singapore, NUS-HCI LAB Oct. 2015 - May. 2016

- Developed a tablet-application recommendation framework to nursing home visitors
- Implemented a cross-platform profile management system for residents and visitors
- Conducted contextual interviews with visitor-resident pairs and evaluated their engagement

A Motion-based Tetris Game to Engage Students with Autism in Classroom Settings [Video] United State
Georgia Institute of Technology, School of Interactive Computing Jun. - Sep. 2014

- Designed and developed a motion-based Tetris game with C#
- Managed an observational study with 30 students with autism and interviews with 7 teachers and caregivers to test the impact on childrens' engagement, social behaviour and motor skills

An Online Instructive Platform for Self-Motivated Hand Rehabilitation [Paper][Video] China
Tsinghua University, Human Factors Engineering Lab (HFEL) Aug. 2012 - Jun. 2014

- Collaborated with a general hospital and interviewed 5 rehabilitation therapists for platform demand
- Established a hand rehabilitation platform with a gesture comparison function, which supports instant feedback, a record of recovery, and therapists' remote instructions

PUBLICATIONS

Papers

- **Zhe, Liu**, Daniel Vogel, and James R Wallace. Applying the cumulative fatigue model to interaction on large, multi-touch displays. In *Proceedings of the 7th ACM International Symposium on Pervasive Displays*, page 1. ACM, 2018. doi:<https://doi.org/10.1145/3205873.3205890>
- Pin Sym Foong, Shengdong Zhao, Kelsey Carlson, and **Zhe, Liu**. Vita: Towards supporting volunteer interactions with long-term care residents with dementia. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pages 6195–6207. ACM, 2017. doi:<https://doi.org/10.1145/3025453.3025776>
- **Zhe, Liu**, Yingzhi Zhang, Pei-Luen Patrick Rau, Pilsung Choe, and Tauseef Gulrez. Leap-motion based online interactive system for hand rehabilitation. In *International Conference on Cross-Cultural Design*, pages 338–347. Springer, 2015. doi:https://doi.org/10.1007/978-3-319-20934-0_32
- **Zhe, Liu**, Chen Liao, and Pilsung Choe. An approach of indoor exercise: Kinect-based video game for elderly people. In *International Conference on Cross-Cultural Design*, pages 193–200. Springer, 2014. doi:https://doi.org/10.1007/978-3-319-07308-8_19

Patents (Granted)

- Qiang Xu, **Zhe, Liu**, Wenhao Wu, and et al. A bi-manual separated text entry method based on stroke direction and distance. Number CN115914948A. URL:<https://patents.google.com/patent/CN115914948/>
- Yanshan He, Qiang Xu, **Zhe, Liu**, Xueyan Huang, and et al. A low-energy-consumption method for multi-device position detecting and updating. Number CN112637758A. URL:<https://patents.google.com/patent/CN112637758/>
- Qiang Xu, **Zhe, Liu**, Jiayu Long, and et al. Activating cross-device interaction with pointing gesture recognition. Number WO2022027435A1. URL:<https://patents.google.com/patent/WO2022027435A1/>
- Qiang Xu, **Zhe, Liu**, and Wei Li. Build a flexible local tracking system using one or multiple mobile devices. Number US20220395724A1. URL:<https://patents.google.com/patent/US20220395724A1/>
- Qiang Xu, Jiayu Long, **Zhe, Liu**, Wei Li, and Tong Yang. Activating cross-device interaction with pointing gesture recognition. Number EP4185939A4. URL:<https://patents.google.com/patent/EP4185939A4/>
- Zhida Sun, Qiang Xu, Wenhao Wu, **Zhe Liu**, and Chenhe Li. A method of automatically detecting headphone wearing condition. Number CN112637758A. URL:<https://patents.google.com/patent/CN112637758/>
- Junwei Sun, Jun Li, **Zhe Liu**, Qiang Xu, Wenhao Wu, and et al. Devices and methods for remote control and annotation associated with an electronic device. Number WO2023097573A1. URL:<https://patents.google.com/patent/WO2023097573A1/>

WORK EXPERIENCE

HCI Research Engineer

HUAWEI Technologies Canada

Markham, Canada
May. 2019 - Aug. 2022

- Designed and evaluated a bi-manual text entry method with 'eyes-free' situation for VR display
- Conducted experiment about free-hand gesture control with large distant display
- Investigated user behavior for pointing with IMU and UWB-driven devices in a real Smart Home environment

Full Stack Developer

Ecopia Tech

Toronto, Canada
May. - Aug. 2018

- Developed a web-based interface using REACT (**JavaScript** library) for stage-able project management
- Implemented a distributive system with AWS to pipeline programs, decreasing human effort by 92%

Research Assistant

National University of Singapore, NUS-HCI LAB

Singapore
Oct. 2015 - May. 2016

- Investigated the impact of tablet applications on the engagement of residents in nursing home
- Developed a haptic wristband that encodes information into spatiotemporal vibrations with Arduino

Research Intern

Georgia Institute of Technology, Ubiquitous Computing Group

Atlanta, United States
Jun. - Sep. 2014

- Explored the impact of motion-based activities on the social behavior of students with autism