Siyou **Pei**

Ph.D. student · Electrical And Computer Engineering

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Research Interests

Expressive interactions and sensing for Mixed Reality

Education

University of California, Los Angeles — *3.87/4.00*

M.S./Ph.D. Program in Electrical and Computer Engineering — *Sep. 2019 – Present*

- Advisor: Yang Zhang
- Human-Centered Computing & Intelligent Sensing Lab (HiLab)

Zhejiang University — *3.92/4.00*

B.Eng. in Electronic and Information Engineering (with Honors) — *Aug. 2015 – Jun. 2019*

National University of Singapore — *4.00/4.00*

Exchange Student in Electronic and Computer Engineering — *Aug. 2017 – Dec. 2017*

Research Experience

ForceSight: Non-Contact Force Sensing with Laser Speckle Imaging — *UIST '22, Bend, OR*

Siyou Pei, Pradyumna Chari, Xue Wang, Xiaoying Yang, Achuta Kadambi, Yang Zhang

- Developed a non-contact force sensing approach that leverages discernable laser speckle shifts caused by deformation at an applied force
- Evaluated the validity of the technologies with a set of materials and demonstrated example applications, e.g. projection-based Augmented Reality
- To promote its scalability, discussed the effect of various materials and summarized guidelines on how to calibrate the sensor for various surfaces

Hand Interfaces: Using Hands to Imitate Objects in AR/VR for Expressive Interactions — *CHI '22, New Orleans, LA*

Siyou Pei, Alexander Chen, Jaewook Lee, Yang Zhang

- Proposed the idea of using hands to imitate virtual objects for expressive interactions in AR/VR
- Created a wide array of interaction designs around this idea to demonstrate its applicability in object retrieval and interactivity
- Collected quantitative and qualitative feedback that shows Hand Interfaces are effective, expressive, and fun to use

AURITUS: An Open-Source Optimization Toolkit for Training and Development of Human Movement Models and Filters Using Earables — *IMWUT '22*

Swapnil Sayan Saha, Sandeep Singh Sandhaa, **Siyou Pei**, Vivek Jain, Ziqi Wang, Yuchen Li, Ankur Sarker, Mani Srivastava

- Developed a head-pose recognition system using earphones and the OptiTrack System for calibration and data collection
- Implemented binaural sound (e.g. Doppler effect) with IMU in Earables and in a VR headset, achieving a resolution of around 10°
- Improved system accuracy and robustness significantly with XGBoost

Quick Question: Interrupting Users for Microtasks with Reinforcement Learning — *ICML 2021 Workshop on HILL*

Bo-Jhang Ho, Bharathan Balaji, Mehmet Koseoglu, Sandeep Sandha, **Siyou Pei**, Mani Srivastava

- Employed a reinforcement learning solution in task allocation to minimize user annoyance with smartphone notifications
- Designed and optimized a Markov decision process model that effectively allocates tasks based on training from 41 real users data
- Achieved a more positive user experience with an RL algorithm A2C and proved better performance over a conventional supervised learning method

Work Experience & Awards

Student Researcher Intern at Google *Sep - Dec 2022*

Best Demo Honorable Mention Award *UIST '22, Bend, OR*

Best Paper Honorable Mention Award *CHI '22, New Orleans, LA*

Skills

Programming	C#, Python, JavaScript, C/C++, Verilog, MATLAB, Java, SQL, HTML, VB
Mixed Reality	Unity, Oculus Quest v1/v2; Lens Studio, Snap Spectacles
Computer Vision	PyTorch, OpenCV; Image segmentation, Classification, Optical flow, Face detection and recognition.
Design & Modeling	Fusion 360, Unity, Procreate, PS, PR, AE, Blender

Teaching Experience

ECE 100 Electrical and Electronic Circuits - Winter 2021 *120 students*

Designed and conducted discussions and review sessions *Dr. Farid Mesghali*

ECE 113 Digital Signal Processing - Spring 2021 *100 students*

Designed and conducted discussions and review sessions *Dr. Kambiz Shoarinejad*

ECE 102 Signals and Systems - Fall 2021 *120 students*

Designed assignments and exams. Designed and conducted discussions and review sessions *Prof. Jonathan Kao*

ECE 100 Electrical and Electronic Circuits - Winter 2022 *100 students*

Designed assignments and exams. Designed and conducted discussions and review sessions *Prof. Yang Zhang*

ECE 209 Engineering Interactive Systems - Spring 2022 *60 students*

Designed and conducted a 2-hour VR development workshop. Gave a guest lecture discussions and review sessions *Prof. Yang Zhang*

ECE 188 Engineering Interactive Systems - Fall 2022

Prof. Yang Zhang

Courses

CS 219 IoT Connectivity and Sensing
ECE 231A Information Theory
ECE 211A Digital Image Processing
ECE 209AS Special Topics in Circuits and Embedded Systems: Human-Computer Interaction
ECE M495 Teaching Preparation Seminar: Teaching and Writing Pedagogies for Electrical Engineers
ECE 239AS Special Topics in Signals and Systems: Reinforcement Learning Theory and Applications
ECE 233 Wireless Communications System Design, Modeling, and Implementation
ECE 219 Large-Scale Data Mining: Models and Algorithms
ECE C247 Neural Networks and Deep Learning
ECE 205A Matrix Analysis
ECEM202A Embedded Systems
ECE 236A Linear Programming