Yunzhi Li

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RESEARCH INTERESTS

My research interest lies in the broad intersection of **Human-Computer Interaction, Applied Machine Learning, Sensing, and Accessibility.** I am particularly passionate about designing and developing innovative sensing and interactive technologies that enhance usability, independence and improve quality of life. My recent work extends across inclusive human activity recognition algorithms, practical human pose estimation using sparse IMUs, wearable health sensing algorithms, and novel interaction techniques.

EDUCATION

Carnegie Mellon University
Ph.D. in Human-Computer Interaction *Aug. 2021 - Present*
Advisor: Dr. Patrick Carrington

Georgia Institute of Technology
M.S. in Computer Science *Aug. 2019 - May. 2021*
Advisors: Dr. Ashutosh Dhekne, Dr. Gregory Abowd

University of Chinese Academy of Sciences
B.Eng. in Computer Science and Technology *Sept. 2015 - June. 2019*
Advisors: Dr. Xiangmin Fan, Dr. Feng Tian

Carnegie Mellon University
Exchange Student in Computer Science *Aug. 2018 - Dec. 2018*

PUBLICATIONS

Conference & Journal Papers

[c.19] WheelPACE: Everyday Wheelchair Propulsion Tracking with Phones, Watches, and Earbuds.
Yunzhi Li, Catherine Tianhong Yu, Justin Chan, Patrick Carrington.
CHI 2027: ACM CHI Conference on Human Factors in Computing Systems
In submission

[c.18] ShoulderSense: In-the-Wild Recognition of Shoulder-Loading Activities for Wheelchair Users.
Sailin Zhong, **Yunzhi Li**, Ursina Arnet, Wiebe de Vries.
CHI 2027: ACM CHI Conference on Human Factors in Computing Systems
In submission

[c.17] Zero-shot Puncture Detection for Soft Robots with a Single IMU.
Tejonidhi R Deshpande, Rishabh Goel, **Yunzhi Li**, Xiaonan Huang, Yaman Sangar, Josiah Hester, Tingyu Cheng.
ICRA 2027: International Conference on Robotics and Automation
In submission

[c.16] Cross-Perception and Putting the Digits back in Digital: Rethinking Input Design Towards Blind Analytical Interaction.
Frank Elavsky, **Yunzhi Li**, JiWoong (Joon) Jang, Lucas Nadolskis, Patrick Carrington, Dominik Moritz.
IEEE TVCG 2026: IEEE Transactions on Visualization and Computer Graphics
In submission

[c.15] Not Just Pockets: Understanding Phone-Carrying Behaviors of Wheelchair Users for Mobile Context-Awareness.
Yunzhi Li, Patrick Carrington.
MobileHCI 2026: 28th International Conference on Mobile Human-Computer Interaction

[c.14] Measuring Multi-site Pulse Transit Time with an AI-enabled mmWave Radar
Jiangyifei Zhu, Kuang Yuan, Akarsh Prabhakara, **Yunzhi Li**, Gongwei Wang, Kelly Michaelsen, Justin Chan, Swarun Kumar.
Nature Communications

[c.13] Optimizing Biomarkers from Earbud Ballistocardiogram: Calibration and Calibration-Free Algorithms for Accelerometer Axis Selection and Fusion.
Yunzhi Li, Md Mahbubur Rahman, Mehrab Bin Morshed, Md Saiful Islam, Hao Zhou, Weinan Wang, Holland Ernst, Li Zhu, Jilong Kuang.
ICASSP 2025: International Conference on Acoustics, Speech, and Signal Processing

[c.12] Know Your Heart Better: Multimodal Cardiac Output Monitoring using Earbuds.
Hao Zhou, Md Mahbubur Rahman, Mehrab Bin Morshed, **Yunzhi Li**, Md Saiful Islam, Larry Zhang, Jungmok Bae, Christina Rosa, Wendy Berry Mendes, Jilong Kuang.
ICASSP 2025: International Conference on Acoustics, Speech, and Signal Processing

[c.11] BallistoBud: Heart Rate Variability Monitoring using Earbud Accelerometry for Stress Assessment.
Md Saiful Islam, Md Mahbubur Rahman, Mehrab Bin Morshed, David J Lin, **Yunzhi Li**, Hao Zhou, Wendy Berry Mendes, Jilong Kuang.
CHI 2025: ACM CHI Conference on Human Factors in Computing Systems

[c.10] WheelPoser: Sparse-IMU Based Body Pose Estimation for Wheelchair Users.
Yunzhi Li, Vimal Mollyn, Kuang Yuan, Patrick Carrington.
ASSETS 2024: ACM SIGACCESS Conference on Computers and Accessibility
🏆 **Best Student Paper Award (top 1%)**

[c.9] Privacy vs. Awareness: Relieving the Tension between Older Adults and Adult Children When Sharing In-home Activity Data.
Jiachen Li, Bingrui Zong, Tingyu Cheng, **Yunzhi Li**, Elizabeth D Mynatt, Ashutosh Dhekne.
CSCW 2023: ACM Conference on Computer Supported Cooperative Work and Social Computing

[c.8] Breaking the "Inescapable" Cycle of Pain: Supporting Wheelchair Users' Upper Extremity Health Awareness and Management with Tracking Technologies.
Yunzhi Li, Franklin Mingzhe Li, Patrick Carrington.
CHI 2023: ACM CHI Conference on Human Factors in Computing Systems

[c.7] A semantic-based approach to digital content placement for immersive environments.
Jingyang Liu, **Yunzhi Li**, Mayank Goel.
The Visual Computer (2022)

[c.6] "I Should Feel Like I'm In Control": Understanding Expectations, Concerns, and Motivations for the Use of Autonomous Navigation on Wheelchairs.
JiWoong Jang, **Yunzhi Li**, Patrick Carrington.
ASSETS 2022: ACM SIGACCESS Conference on Computers and Accessibility

[c.5] Travelogue: Representing Indoor Trajectories as Informative Art.
Yunzhi Li, Tingyu Cheng, Ashutosh Dhekne.
CHI 2022: ACM CHI Conference on Human Factors in Computing Systems Extended Abstracts

[c.4] Flexible computational photodetectors for self-powered activity sensing.
Dingtian Zhang, Canek Fuentes-Hernandez, Raaghesh Vijayan, Yang Zhang, **Yunzhi Li**, Jung Wook Park, Yiyang Wang, Yuhui Zhao, Nivedita Arora, Ali Mirzazadeh, Youngwook Do, Tingyu Cheng, Saiganesh Swaminathan, Thad Starner, Trisha L Andrew, Gregory D Abowd.
npj Flexible Electronics 6, Article number: 7 (2022)

[c.3] Duco: Autonomous Large-Scale Direct-Circuit-Writing (DCW) on Vertical Everyday Surfaces Using A Scalable Hanging Plotter.
Tingyu Cheng, Bu Li, Yang Zhang, **Yunzhi Li**, Charles Ramey, Eui Min Jung, Yepu Cui, Sai Ganesh Swaminathan, Youngwook Do, Manos Tentzeris, Gregory D. Abowd, and HyunJoo Oh.
IMWUT (UbiComp) 2021: ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies

[c.2] OptoSense: Towards Ubiquitous Self-Powered Ambient Light Sensing Surfaces.
Dingtian Zhang, Jung Wook Park, Yang Zhang, Yuhui Zhao, Yiyang Wang, **Yunzhi Li**, Tanvi Bhagwat, Wen-Fang Chou, Xiaojia Jia, Bernard Kippelen, Canek Fuentes-Hernandez, Thad Starner, and Gregory D. Abowd.
IMWUT (UbiComp) 2020: ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies
🏆 **Distinguished Paper Award**

[c.1] How Presenters Perceive and React to Audience Flow Prediction In-situ: An Explorative Study of Live Online Lectures.
Wei Sun*, **Yunzhi Li***, Xiangmin Fan, Feng Tian, Hongan Wang.
CSCW 2019: ACM Conference on Computer Supported Cooperative Work and Social Computing

* indicates equal contribution.

WORK EXPERIENCE

Human-Computer Interaction Institute, CMU, Pittsburgh, PA, USA *Aug. 2021 - Present*
Ph.D. Student
Advisor: Dr. Patrick Carrington.

- Research on inclusive physical health tracking applications using wearable devices.
- Research on sparse Inertial Measurement Unit (IMU) based human motion capture technologies.
- Research on generative models for human motion generation.

Accenture Labs, San Francisco, CA, USA *June 2026 - Aug. 2026*
Research Intern

- Researched multimodal synthetic personas grounded in physiological signals.
- Built an end-to-end pipeline spanning biosignal processing, persona construction, and LLM-based simulation, paired with a front-end demo envisioning the product experience.
- Preparing a paper submission for CUI 2027.

Meta Reality Labs, Redmond, WA, USA *May 2025 - Aug. 2025*
Research Scientist Intern
Manager: Dr. Roger Boldu.

- Researched ways to leverage sensors for non-invasive tactile sensing to enable the next generation of AR/VR and robotic applications.
- Designed and built a wearable prototype from scratch, developed a real-time machine learning model, and showcased the working system in internal demo events.

Digital Health Team, Samsung Research America, Mountain View, CA, USA *May 2024 - Aug. 2024*
Research Intern
Mentors: Dr. Md Mahbubur Rahman, Dr. Mehrab Bin Morshed, Dr. Jilong Kuang.

- Developed multimodal health monitoring systems using wearable devices to track digital biomarkers such as cardiac output, blood pressure, stress, and heart rate variability.
- Three papers accepted to IEEE ICASSP and ACM CHI conferences: one as the first author and two as co-authors.

School of Computer Science, Georgia Tech, Atlanta, GA, USA *June 2020 - May 2021*
Graduate Research Assistant
Advisor: Dr. Ashutosh Dhekne. Research on Ultra-wideband (UWB) based device-free indoor localization.

- Designed and prototyped an Ultra-Wideband (UWB) based system that achieves device-free indoor localization based on UWB channel impulse response (CIR).
- Designed four informative arts for visualizing human indoor trajectories and conducted a mixed-method evaluation study with 87 participants.

Institute of Software, Chinese Academy of Sciences, Beijing, China *June 2018 - April 2019*
Research Intern
Advisor: Dr. Xiangmin Fan and Dr. Feng Tian. Research on AI-generated teaching feedback in live online lectures.

- Designed and implemented a real-time user learning state recognition system based on the Flow theory.
- Developed a real-time web-based learning-state visualization system for live online lecturers.
- Conducted quantitative and qualitative evaluations with 8 lecturers and 31 students.

ACADEMIC SERVICES

ACM CHI Reviewer *2021, 2022, 2023, 2024, 2025, 2026*

ACM IMWUT Reviewer *2022, 2023, 2024, 2025, 2026*

ACM ASSETS Reviewer *2023*

ACM CHI Student Volunteer *2022*

AWARDS & HONORS

Asian Students Association Endowed Presidential Fellowship *2025*

ASSETS Best Student Paper Award *2024*
Project WheelPoser [c.10]

Center for Machine Learning and Health Fellowship *2022*
Carnegie Mellon University

Extension of Self Exhibit: Art at the Intersection of Science, Technology, and Accessibility *2022*
Project TechMyMoves [c.5] is exhibited at Georgia Tech Library

Fast Company's Innovation by Design Awards Finalist *2022*
Project Duco [c.3]

Annual Master Student Research Award *2020*
College of Computing, Georgia Institute of Technology

IMWUT Distinguished Paper Award *2020*
Project OptoSense [c.2]

Annual Academic Scholarship *2016, 2017, 2018*
University of Chinese Academy of Sciences

Technology Innovation Fellowship *2017*
Chinese Academy of Sciences

TEACHING EXPERIENCE

Teaching Assistant, Carnegie Mellon University *Fall 2026*
05-431/631 Software Structures for User Interfaces (Prof.Scott Hudson)

Teaching Assistant, Carnegie Mellon University *Spring 2022*
05-391 Designing Human-Centered Software (Prof.David Lindlbauer)

SKILLS

Programming: Python, C/C++, Java, C#, Verilog, Assembly on X86 and MIPS, MATLAB.

Framework and libraries: Android, iOS, Unity, PyTorch, TensorFlow, Processing, Firebase, MediaPipe.

Prototyping: FPGA, Arduino, Raspberry Pi, 3D Modeling, 3D Printing, Laser Cutting.

Research: Survey, Interview, Contextual Inquiry, Participatory Design, Affinity Diagram, Heuristic Evaluation.