Jiale Zhang

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RESEARCH INTEREST

My research focuses on modeling ***closed-loop vibration sensing systems*** that can adaptively perceive the environment through passive observation, and then through active excitation informed by what the system has already learned. I work at the intersection of physics-based modeling and data-driven inference, designing sensing frameworks where excitation, measurement, and analysis continuously refine one another. A central part of my approach is iterative validation between lab prototyping and real-world deployment. This cycle enables robust, scalable systems that transform everyday structures into reliable sensing platforms.

EDUCATION

Present — **Ph.D. in Electrical and Computer Engineering**, University of Michigan, Ann Arbor
Major GPA: 3.9/4.0
Advisor: Prof. Pei Zhang

Dec 2022 — **M.S. in Electrical and Computer Engineering**, University of Michigan, Ann Arbor
Major GPA: 3.9/4.0
Advisor: Prof. Alanson Sample

July 2020 — **B.E. in Electronic Information Engineering**, University of Michigan, Ann Arbor
Major GPA: 3.9/4.0

PUBLICATIONS

CONFERENCE PAPER:

2025 [C.2] Chang, Yen Cheng, Jesse Codling, Yiwen Dong, Jiale Zhang, Hae Young Noh, and Pei Zhang. **"ViLA: Leveraging General-Purpose Audio for Training Vibration-Based Stadium Crowd Monitoring Models."** In *Proceedings of the 12th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, pp. 96-106. 2025.

🏅 **Best Paper**

2025 [C.1] Codling, Jesse, Jeffrey Shulkin, Yen-Cheng Chang, Jiale Zhang, Hugo Latapie, Hae Young Noh, Pei Zhang, and Yiwen Dong. **"FloHR: Human Heart Rate Detection using Indirect Floor Vibration Sensing."** ACM| The 11th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 2024.

🏅 **Best Paper Runner-up**

JOURNAL PAPER:

2022 [J.3] Zhang, Jiale, Chenzhe Li, Weichao Jiang, Zhicheng Wang, Lejia Zhang, and Xiong Wang. **"Deep-learning-enabled microwave-induced thermoacoustic tomography based on sparse data for breast cancer detection."** *IEEE Transactions on Antennas and Propagation* 70, no. 8 (2022): 6336-6348.

2020 [J.2] Zhang, Dajun, Zhansong Lin, Ji Liu, Jiale Zhang, Zhengping Zhang, Zhang-Cheng Hao, and Xiong Wang. **"Broadband high-efficiency multiple vortex beams generated by an interleaved geometric-phase multifunctional metasurface."** Optical Materials Express 10, no. 7 (2020): 1531-1544.

2020 [J.1] Jiang, Weixiong, Heng Yu, Jiale Zhang, Jiaxuan Wu, Shaobo Luo, and Yajun Ha. "**Optimizing energy efficiency of CNN-based object detection with dynamic voltage and frequency scaling.**" *Journal of Semiconductors* 41, no. 2 (2020): 022406.

Extended Abstracts/Poster& Workshop Papers:

2025 [P.8] Gersey, Julia, Troy Zhong, Jiale Zhang, Jesse Codling, Jackelyn Hwang, and Pei Zhang. "**Human vs. Machine: Comparing Urban Condition Classification Methods from Vehicular Vision.**" In *Proceedings of the 12th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, pp. 427-430. 2025.

2025 [P.7] Gersey, Julia, Jatin Aggarwal, Jiale Zhang, Jesse Codling, and Pei Zhang. "**Sniffing Out the City-Vehicular Multimodal Sensing for Environmental and Infrastructure Analysis.**" In *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*, pp. 632-633. 2025.

Best Poster

2025 [P.6] Chang, Yen Cheng, Jesse Codling, Yiwen Dong, Jiale Zhang, Jiasi Chen, Hae Young Noh, and Pei Zhang. "**Leveraging General-Purpose Audio Datasets for Vibration-based Crowd Monitoring in Stadiums.**" In *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*, pp. 590-591. 2025.

2024 [P.5] Codling, Jesse R., Jeffrey D. Shulkin, Yen-Cheng Chang, Jiale Zhang, Hugo Latapie, HaYoung Noh, Pei Zhang, and Yiwen Dong. "**Flohr: ubiquitous heart rate measurement using indirect floor vibration sensing.**" In *Proceedings of the 11th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, pp. 44-54. 2024.

2024 [P.4] Fernandez, Tomas, Yen Cheng Chang, Jesse Codling, Yiwen Dong, Jiale Zhang, Carlee Joe-Wong, Hae Young Noh, and Pei Zhang. "**Poster: Drive-by City Wide Trash Sensing for Neighborhood Sanitation Need.**" In *Proceedings of the 22nd Annual International Conference on Mobile Systems, Applications and Services*, pp. 704-705. 2024.

2024 [P.3] Chang, Yen Cheng, Jesse Codling, Yiwen Dong, Jiale Zhang, Jeffrey Shulkin, Hugo Latapie, Carlee Joe-Wong, Hae Young Noh, and Pei Zhang. "**Listen and Then Sense: Vibration-based Sports Crowd Monitoring by Pre-training with Public Audio Datasets.**" In *2024 23rd ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN)*, pp. 285-286. IEEE, 2024.

2023 [P.2] Zhang, Jiale, Shweta Pati, Jesse Codling, Adeola Bannis, Carlos Ruiz, Hae Young Noh, and Pei Zhang. "**Vibration-Based Object Classification with Structural Response of Ambient Music.**" In *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks*, pp. 314-315. 2023.

2021 [P.1] Zhang, Jiale. "**Directly Controlling the Perceived Difficulty of a Shooting Game by the Addition of Fake Enemy Bullets.**" In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*, pp. 1-5. 2021.

Preprints/Under Review:

2025 [U.3] Wu, Yuyan, Jiale Zhang, Moon Lee, Cherrelle Smith, Xinyi Li, Ankur Senapati, Pei Zhang, and Hae Young Noh. "**Human Body Weight Estimation Through Music-Induced Bed Vibrations.**" *arXiv preprint arXiv:2509.06257* (2025).

2025 [U.2] Wang, David, Derek Goh, and Jiale Zhang. "**Material Identification Via RFID For Smart Shopping.**" *arXiv preprint arXiv:2504.17898* (2025).

2025 [U.1] Zhang, Jiale, Yuyan Wu, Jesse R. Codling, Yen Cheng Chang, Julia Gersey, Pei Zhang, Hae Young Noh, and Yiwen Dong. "**WeVibe: Weight Change Estimation Through Audio-Induced Shelf Vibrations In Autonomous Stores.**" *arXiv preprint arXiv:2502.12093* (2025).

WORK EXPERIENCE

May-Aug 2025 **PhD Research Intern,** Dolby Laboratories, San Francisco, CA
Project: **Intrinsic and Extrinsic Feedback Design for Vocal Training System on Glasses**
Advisor: Mark Thomas

May-Aug 2024 **AI Engineer Intern,** Aifi Inc., Ann Arbor, MI
Project: **Item-Customer Association by Camera-RFID Fusion in Autonomous Stores**
Advisor: Andrew Merrow

TEACHING EXPERIENCE

2025 [T.3] **EECS507: Introduction to Embedded System Research.** GSI. EECS, Umich.

2024 [T.2] **EECS215: Introduction to Circuit Basics.** GSI. EECS, Umich.

2022 [T.1] **EECS507: Introduction to Embedded System Research.** GSI. EECS, Umich.

HONORS AND AWARDS

2023 **Qualcomm Innovation Fellowship**

2022 **Rackham International Student Fellowship**

2018 **First Prize in Second Shanghai Maker Contest**

SKILLS

Programming Language: Python, C/C++, C#, Verilog/System Verilog/VHDL, MATLAB

Development Kit: PyTorch, Quartus, Vitis, ESP32, STM32, Labview, Fusion360