

Jesse R Codling

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EDUCATION

PhD, Electrical and Computer Engineering

University of Michigan

Ann Arbor, MI

Expected August 2025

- Advised by Dr. Pei Zhang
- Thesis Title: *Structural Vibration Sensing System for Ubiquitous Occupant Heartbeat Monitoring using Structural Property Adaptation*

MS, Electrical and Computer Engineering

University of Michigan

Ann Arbor, MI

Dec. 2024

- Advised by Dr. Pei Zhang

PhD Credit, Electrical and Computer Engineering

Carnegie Mellon University

Pittsburgh, PA

Aug. 2019-Apr. 2021

- advised by Dr. Pei Zhang
- moved with advisor

BS, Electrical Engineering

Brigham Young University

Provo, UT

May 2019

AWARDS AND RECOGNITION

- Best Paper Award Runner-Up, ACM BuildSys 2024 [Cod+24]
- ACM SIGEnergy Student Travel Grant, BuildSys 2024
- NSF Student Travel Grant, ACM SenSys 2023
- Best Presentation Award, ECPLF 2022 [Cod+22b]
- Exemplary Qualifying Exam Performance Distinction, Carnegie Mellon University, 2021
- Carnegie Mellon University Dean's Fellowship, 2019

PUBLICATIONS

- [Cod+24] Jesse R. Codling et al. "FloHR: Ubiquitous Heart Rate Measurement Using Indirect Floor Vibration Sensing". en. In: *Proceedings of the 11th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*. BuildSys '24: The 11th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation. BuildSys '24. Hangzhou China: Association for Computing Machinery, Oct. 29, 2024, pp. 44–54. ISBN: 979-8-4007-0706-3. DOI: 10.1145/3671127.3698170. URL: <https://dl.acm.org/doi/10.1145/3671127.3698170> (visited on 11/06/2024).

- [Don+23a] Yiwen Dong et al. “GameVibes: Vibration-based Crowd Monitoring for Sports Games through Audience-Game-Facility Association Modeling”. en. In: *Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*. BuildSys ’23: The 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation. BuildSys ’23. Istanbul Turkey: Association for Computing Machinery, Nov. 15, 2023, pp. 177–188. ISBN: 979-8-4007-0230-3. DOI: 10.1145/3600100.3623750. URL: <https://dl.acm.org/doi/10.1145/3600100.3623750> (visited on 04/15/2024).
- [Bon+21] Amelie Bonde et al. “PigNet: Failure-tolerant Pig Activity Monitoring System Using Structural Vibration”. en. In: *Proceedings of the 20th International Conference on Information Processing in Sensor Networks (Co-Located with CPS-IoT Week 2021)*. IPSN ’21: The 20th International Conference on Information Processing in Sensor Networks. Nashville TN USA: ACM, May 18, 2021, pp. 1–13. ISBN: 978-1-4503-8098-0. DOI: 10.1145/3412382.3458902. URL: 10.1145/3412382.3458902 (visited on 05/15/2021).
- [Cha+25] Yen Cheng Chang et al. “Poster Abstract: Leveraging General-Purpose Audio Datasets for Vibration-based Crowd Monitoring in Stadiums”. en. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*. SenSys ’25: 23rd ACM Conference on Embedded Networked Sensor Systems. UC Irvine Student Center. Irvine CA USA: ACM, May 6, 2025, pp. 590–591. ISBN: 979-8-4007-1479-5. DOI: 10.1145/3715014.3724022. URL: <https://dl.acm.org/doi/10.1145/3715014.3724022> (visited on 05/07/2025).
- [Cod+25] Jesse R Codling et al. “Poster Abstract: Multiscale Vibration Sensing for Activity and Vital Signs Monitoring in Pig Pens”. en. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*. SenSys ’25: 23rd ACM Conference on Embedded Networked Sensor Systems. UC Irvine Student Center. Irvine CA USA: ACM, May 6, 2025, pp. 650–651. ISBN: 979-8-4007-1479-5. DOI: 10.1145/3715014.3724052. URL: <https://dl.acm.org/doi/10.1145/3715014.3724052> (visited on 05/07/2025).
- [Ger+25] Julia Gersey et al. “Poster Abstract: Sniffing Out the City - Vehicular Multimodal Sensing for Environmental and Infrastructure Analysis”. en. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*. SenSys ’25: 23rd ACM Conference on Embedded Networked Sensor Systems. UC Irvine Student Center. Irvine CA USA: ACM, May 6, 2025, pp. 632–633. ISBN: 979-8-4007-1479-5. DOI: 10.1145/3715014.3724043. URL: <https://dl.acm.org/doi/10.1145/3715014.3724043> (visited on 05/07/2025).
- [Zha+25] Jiale Zhang et al. “Poster Abstract: On-Shelf Weight Difference Estimation Through Active Vibration Sensing”. en. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*. SenSys ’25: 23rd ACM Conference on Embedded Networked Sensor Systems. UC Irvine Student Center. Irvine CA USA: ACM, May 6, 2025, pp. 640–641. ISBN: 979-8-4007-1479-5. DOI: 10.1145/3715014.3724047. URL: <https://dl.acm.org/doi/10.1145/3715014.3724047> (visited on 05/07/2025).

- [Cha+24] Yen Cheng Chang et al. “Poster Abstract: 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)*. 2024 23rd ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). Hong Kong: IEEE, May 13, 2024, pp. 285–286. ISBN: 979-8-3503-6201-5. DOI: 10.1109/IPSN61024.2024.00043. URL: <https://ieeexplore.ieee.org/document/10577402/> (visited on 11/07/2024).
- [Don+24a] Yiwen Dong et al. “Ambient Floor Vibration Sensing Advances the Accessibility of Functional Gait Assessments for Children with Muscular Dystrophies”. en. In: *Scientific Reports* 14.1 (May 11, 2024), p. 10774. ISSN: 2045-2322. DOI: 10.1038/s41598-024-60034-5. URL: <https://www.nature.com/articles/s41598-024-60034-5> (visited on 06/10/2024).
- [Don+24b] Yiwen Dong et al. “Context-Aware Crowd Monitoring for Sports Games Using Crowd-Induced Floor Vibrations”. en. In: *Data-Centric Engineering* 5 (Jan. 2024), e25. ISSN: 2632-6736. DOI: 10.1017/dce.2024.28. URL: <https://www.cambridge.org/core/journals/data-centric-engineering/article/contextaware-crowd-monitoring-for-sports-games-using-crowdinduced-floor-vibrations/64C1AB62A8309A74B1E8C55DDF50> (visited on 11/07/2024).
- [Fer+24] Tomas Fernandez et al. “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*. MOBISYS ’24. New York, NY, USA: Association for Computing Machinery, June 4, 2024, pp. 704–705. ISBN: 979-8-4007-0581-6. DOI: 10.1145/3643832.3661431. URL: <https://dl.acm.org/doi/10.1145/3643832.3661431> (visited on 06/06/2024).
- [Cod+23] Jesse R Codling et al. “Demo Abstract: FreePulse Heart Rate Monitoring System Using Ambient Structural Vibrations”. en. In: *The 22nd International Conference on Information Processing in Sensor Networks*. IPSN ’23: The 22nd International Conference on Information Processing in Sensor Networks. IPSN ’23. San Antonio TX USA: Association for Computing Machinery, May 9, 2023, pp. 364–365. ISBN: 979-8-4007-0118-4. DOI: 10.1145/3583120.3589812. URL: <https://dl.acm.org/doi/10.1145/3583120.3589812> (visited on 05/12/2023).
- [Don+23b] Yiwen Dong et al. “PigSense: Structural Vibration-Based Activity and Health Monitoring System for Pigs”. In: *ACM Transactions on Sensor Networks* (June 15, 2023). ISSN: 1550-4859. DOI: 10.1145/3604806. URL: <https://dl.acm.org/doi/10.1145/3604806> (visited on 06/21/2023).
- [Don+23c] Yiwen Dong et al. “PigV2: Monitoring Pig Vital Signs through Ground Vibrations Induced by Heartbeat and Respiration”. In: *Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems*. SenSys ’22. New York, NY, USA: Association for Computing Machinery, Jan. 24, 2023, pp. 1102–1108. ISBN: 978-1-4503-9886-2. DOI: 10.1145/3560905.3568416. URL: <https://doi.org/10.1145/3560905.3568416> (visited on 03/06/2023).

- [Zha+23] Jiale Zhang et al. “Poster Abstract: Vibration-based Object Classification with Structural Response of Ambient Music”. In: *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks*. IPSN ’23. New York, NY, USA: Association for Computing Machinery, May 9, 2023, pp. 314–315. ISBN: 979-8-4007-0118-4. DOI: 10.1145/3583120.3589825. URL: <https://dl.acm.org/doi/10.1145/3583120.3589825> (visited on 05/12/2023).
- [Cod+22a] Jesse R Codling et al. “Poster Abstract: SeatBeats Heart Rate Monitoring System Using Structural Seat Vibrations”. In: *2022 21st ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN)*. 2022 21st ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). May 2022, pp. 511–512. DOI: 10.1109/IPSN54338.2022.00056.
- [Cod+22b] Jesse R Codling et al. “Sow Posture and Feeding Activity Monitoring in a Farrowing Pen Using Ground Vibration”. In: *ECPLF 2022 - 10th European Conference on Precision Livestock Farming*. 10th European Conference on Precision Livestock Farming. Vienna, Austria, Aug. 30, 2022.
- [Cod+21] Jesse R Codling et al. “MassHog: Weight-sensitive Occupant Monitoring for Pig Pens Using Actuated Structural Vibrations”. In: *Adjunct Proceedings of the 2021 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2021 ACM International Symposium on Wearable Computers*. UbiComp ’21. New York, NY, USA: Association for Computing Machinery, Sept. 21, 2021, pp. 600–605. ISBN: 978-1-4503-8461-2. DOI: 10.1145/3460418.3480414. URL: <https://doi.org/10.1145/3460418.3480414> (visited on 09/28/2021).
- [Cod+20] Jesse R Codling et al. “Demo Abstract: Active Structural Occupant Detector”. In: *2020 19th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN)*. 2020 19th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). Sydney, Australia: IEEE, Apr. 2020, pp. 353–354. ISBN: 978-1-7281-5497-8. DOI: 10.1109/IPSN48710.2020.00–10. URL: 10.1109/IPSN48710.2020.00–10 (visited on 04/07/2021).
- [Hen+18] Andrew Henrie et al. “Hardware and Software Improvements to a Low-Cost Horizontal Parallax Holographic Video Monitor”. en. In: *Applied Optics* 57.1 (Jan. 1, 2018), A122. ISSN: 1559-128X, 2155-3165. DOI: 10.1364/ao.57.00a122. URL: <https://www.osapublishing.org/abstract.cfm?URI=ao-57-1-A122> (visited on 01/23/2018).

In Preparation

- [Cod+25] Jesse R Codling et al. “PulseVibes: Ubiquitous Heart Rate and Variability Measurements Using Indirect Floor Vibrations”. en. In: *Data-Centric Engineering* (2025).
- [Zha+25] Jiale Zhang et al. “JiggyWeight: Weight Estimation through Audio-Induced Shelf Vibrations in Autonomous Stores”. en. In: *Proceedings of the ACM on Interactive, Mobile, Wearable, and Ubiquitous Technologies* (2025).

In Review

OTHER RESEARCH EXPERIENCE

Battelle Memorial Institute

Columbus, OH

RF/Photonics Engineering Intern

Summers 2018-2019

- Advised by Jon Gluck, Dr. Chase Schueler, Dr. Thomas Kent, and Dr. Richard Ridgway
- Collaborated with DARPA PM and Industry Partners on federally-funded research projects
- Investigated techniques for RF-Photonic System Modelling and mitigating optical beating interference

BYU ElectroHolography Lab

Brigham Young University, Provo, UT

Undergrad Research Assistant

Sep 2016-Dec 2018

- Advised by Dr. Daniel Smalley
- Redesigned key optical components, digital, and RF circuits, reducing future assembly time
- Managed the writing and publication of a journal article on our advances as a group

BYU MAGICC Lab

Brigham Young University, Provo, UT

Undergrad Research Assistant

Summer 2017

- Advised by Dr. Randy Beard
- Reassembled a drone-based camera system to enable automated target tracking

TEACHING

University of Michigan

Student Instructor, EECS 215 - Intro. to Circuits

FA 2022

Carnegie Mellon University

Teaching Assistant, 18-756 - Packet Switched and Computer Networks

FA 2020

Brigham Young University

Teaching Assistant, ECEn 240 - Circuits

2017-2019

Brigham Young University

Teaching Assistant, CS 142 - Intro. to Programming

WN 2016

SERVICE AND MEMBERSHIPS

- ACM Student Member
- IEEE Student Member
- Session Chair - The Second International Workshop on Human-centered Sensing, Networking, and Multi-Device Systems (HumanSys 2024)
 - part of ACM SenSys and BuildSys 2024
- Artifact Evaluation TPC Member - ACM International Conference on Mobile Systems, Applications, and Services (2024)
- Reviewer - ACM Transactions on Sensor Networks (2023-2024)
- TPC member - European Conference on Precision Livestock Farming (2024)
- Student Volunteer - CPS-IoT Week 2022

REFERENCES

Prof. Pei Zhang

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Associate Professor, University of Michigan

Prof. Hae Young Noh

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Associate Professor, Stanford University

Dr. Richard Ridgway

ridgway.57@osu.edu

Research Scientist, The Ohio State University ElectroScience Laboratory