

Huanghe Zhang

Associate Professor, Shandong University

Taishan Scholar Young Expert

Shandong Province Excellent Young Scientist (Overseas)

National Excellent Postdoctoral Fellow in Innovation and Entrepreneurship

Stevens Excellent Doctoral Fellow

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Education

Stevens Institute of Technology

Ph.D. in Mechanical Engineering (GPA: 3.74 / 4.00)

May 2021

Hoboken, NJ

- **Doctoral Fellowship:** Stevens Excellence Doctoral Fellowship (1%), Innovation & Entrepreneurship Doctoral Fellowship, Research Assistant Fellowship

Columbia University

Master of Science in Mechanical Engineering (GPA: 3.67 / 4.00)

Dec 2016

New York, NY

Huazhong University of Science and Technology

Bachelor of Engineering in Naval Architecture & Ocean Engineering (GPA: 85.64 / 100.00)

June 2014

Wuhan, China

- **Scholarship:** Self-improvement Scholarship, Outstanding Student Leader, Learning Merit Scholarship, Merit Student

Experience

Shandong University

Associate Professor

July 2023 – present

Jinan, China

- Wearable Robotics for Rehabilitation.
- Human-Robot Interaction.

Stevens Institute of Technology

Postdoc

May 2021 – May 2023

Hoboken, NJ

- Transductive Learning Models for Gait Analysis.
- Reinforcement Learning-based Biofeedback Engine for Gait Training.

Professional Appointments

Wearable Technologies | Guest Editor

Biomimetic Intelligence and Robotics | Guest Editor

Healthcare and Rehabilitation | Guest Editor

2024 International Conference on Intelligent Robotics and Applications | Session Chair

2024 3rd International Symposium on Intelligent Unmanned Systems and Artificial Intelligence | Session Chair

2024 National Conference on Flexible Electronics | Session Committee

Projects

PI of Taishan Scholar Young Expert Program | Jan 2025 - Dec 2027

PI of Shandong Excellent Young Scientists Fund Program (Overseas), No.2024HWYQ-019 | Jan 2024 - Dec 2026

PI of Young Scientists Fund of the National Natural Science Foundation of China, No.62403281 | Jan 2025 - Dec 2027

Co-PI of National Key R&D Program of China, No.2023YFB4706104 | Jan 2024 - Dec 2026

Participation of National Science Foundation, IIS 1838799 | Jan 2019 - Sep 2024

Teaching

Introduction to Artificial Intelligence | Feb 2024 - May 2024, Feb 2025 - May 2025

Robot Operating System | Feb 2024 - May 2024, Feb 2025 - May 2025

Wearable Robotics and Sensors | Estimated 2025

Publications

Journals:

- **H. Zhang**, C. Wu, Y. Huang, R. Song, D. Zanotto and S. Agrawal. Fall Risk Prediction Using Instrumented Footwear in Institutionalized Older Adults. **IEEE Transactions on Neural Systems and Rehabilitation Engineering**. 2024 Dec 02.
- **H. Zhang**, Wu C, Huang Y, Li X, Ma X, Song R, Agrawal SK. 2D Deep Convolutional Neural Networks for Estimating Stride Length and Velocity in Institutionalized Older Adults. **IEEE Sensors Journal**. 2024 Jun 18.
- **H. Zhang**, S. Li, Q. Zhao, A. Rao, Y. Guo and D. Zanotto. "Reinforcement Learning-Based Adaptive Biofeedback Engine for Overground Walking Speed Training", **IEEE Robotics and Automation Letters**, 2022, June 30
- **H. Zhang**, T. Duong, A. Rao, P. Mazzoni, S. Agrawal, Y. Guo and D. Zanotto. "Transductive Learning Models for Accurate Ambulatory Gait Analysis in Elderly Residents of Assisted Living Facilities", **IEEE Transactions on Neural Systems and Rehabilitation Engineering** 30 (2022): 124-134.
- **H. Zhang**, Y. Guo and D. Zanotto. "Accurate Ambulatory Gait Analysis in Walking and Running Using Machine Learning Models", **IEEE Transactions on Neural Systems and Rehabilitation Engineering** (TNSRE).2020, 28, 191-202.
- **H. Zhang**, D. Zanotto and S.K. Agrawal. "Estimating CoP Trajectories and Kinematic Gait Parameters in Walking and Running Using Instrumented Insoles", **IEEE Robotics and Automation Letters**. 2017, 2, 2159-2165.
- **H. Zhang**, Y. Yin, Z. Chen, Y. Zhang, A. K. Rao, Y. Guo and D. Zanotto. (2020). "Wearable Biofeedback System to Induce Desired Walking Speed in Overground Gait Training", **MDPI Sensors**. 20 (14).
- Z. Chen, **H. Zhang**, A. Zaferiou, D. Zanotto, and Y. Guo. "Mobile Robot Assisted Gait Monitoring and Dynamic Margin of Stability Estimation." **IEEE Transactions on Medical Robotics and Bionics** (2022).
- Wu C, Lin B, **H. Zhang**, D. Xu, R. Gao, R. Song, Z. Liu and Y. Marinis. "GCNPMDA: Human microbe-disease association prediction by hierarchical graph convolutional network with layer attention." **Biomedical Signal Processing and Control** (2025).

Conferences:

- J. Wang, Z. Guan, J. Cai, X. Li, C. Wu, X. Ma, Y. Li, R. Song and **H. Zhang**. "Deep Neural Networks for Gait Cycle Percentage Prediction in Frail Older Adults Using a Foot-mounted IMU," **IEEE-ROBIO 2024**. Accept.
- Z. Feng, Z. Jiang, H. Liu, W. Wang, Y. Wang, C. Lu, X. Ma, Y. Li, R. Song and **H. Zhang** . "Machine Learning Models for Gait Phases Detection Using Surface Electromyography Signals" 17th International Conference on Intelligent Robotics and Applications (ICIRA2024), Springer. Accept.
- Y. Zhang, J. Cai, X. Li, C. Wu, X. Ma, R. Song and **H. Zhang**. "End-to-End Deep Learning Models for Estimating Stride Length in Frail Older Adults", **CFIMA 2024: The 2nd International Conference on Frontiers of Intelligent Manufacturing and Automation**, August 9-11, Baotou, China, 2024.
- Y. Sun, J. Wang, Z. Wang, J. Li, Y. Li, R. Song and **H. Zhang**. "Gait Phase Detection and Prediction with Machine Learning Models Based on sEMG", **The International Conference on Artificial Intelligence, Human-Computer Interaction and Robotics**, Accept.
- **H. Zhang**, Z. Chen, D. Zanotto and Y. Guo. "Robot-Assisted and Wearable Sensor-Mediated Autonomous Gait Analysis", **IEEE International Conference on Robotics and Automation (ICRA)**, Paris, 2020.
- **H. Zhang**, M. Tay, Z. Suar, M. Kurt and D. Zanotto. "Regression Models for Estimating Kinematic Gait Parameters with Instrumented Footwear", **7th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics**, Enschede, 2018.

- T. Duong, **H. Zhang**, T. S. Lynch and D. Zanutto. "Improving the Accuracy of Wearable Sensors for Human Locomotion Tracking Using Phase-Locked Regression Models", IEEE 16th International Conference on Rehabilitation Robotics (ICORR), Toronto, ON, Canada, 2019, pp. 145-150.
- T. Duong, S. Goldman, **H. Zhang**, R. Salazar, S. Beenders, K. M. Cornett, J. M. Bain, J. Montes and D. Zanutto. "Validation of Insole-based Gait Analysis System in Young Children with a Neurodevelopmental Disorder and Autism Traits", 8th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, New York City, 2020.

Patents

United States:

- Damiano Zanutto, Sunil K. Agrawal, and **Huanghe Zhang**. Wireless and Retrofittable in-Shoe System for Real-time Estimation of Kinematic and Kinetic Gait Parameters, Patent Number: 16/457730. 2020.01.02
- Damiano Zanutto, Ton Duong, and **Huanghe Zhang**. Accurate Ambulatory Gait Analysis with Wearable Sensors Using Transductive Learning, Patent Application No. 63/182,723, Filed April 30, 2021

Awards

- **Excellent Presentation Award**, "Machine Learning Approaches to Predicting Fall Risk in Older Adults Through Video-Analyzed Gait Data", *2024 3rd International Symposium on Intelligent Unmanned Systems and Artificial Intelligence*, Qingdao, China, May 17-19, 2024
- **Excellent Award**, "Tri-Co Robot: An Integrated Gait Analysis and Rehabilitation", *The 2nd China Postdoctoral Innovation & Entrepreneurship Competition*, Oct 26-28, 2023
- **Third Prize (5th)**, "Multifunctional Intelligent Insole for Integrated Gait Assessment and Intervention", *2023 Lishui Economic and Technological Development Zone 'Phoenix Cup' Innovation and Entrepreneurship Competition*, Dec 8, 2023
- **Selected Speaker**, "SportSole: Instrumented Footwear for Portable Gait Analysis", *2018 Johnson & Johnson Engineering Showcase*
- **Winner (5th Place)**, "Wireless In-Shoe System for Real-Time Gait Estimation", *I&E Doctoral Fellowship Conference Competition*, April 26, 2019
- **Third Prize**, "Shandong Province Postdoctoral Innovation and Entrepreneurship Competition", November, 26, 2024

Invited Talks

- **Invited Speaker**, "End-to-End Deep Learning Models for Estimating Stride Length in Frail Older Adults", *2024 2nd International Conference on Frontiers of Intelligent Manufacturing and Automation (CFIMA 2024)*, August 11, 2024
- **Guest Speaker**, "Human Lower Limb Function Assessment and Rehabilitation System", *2024 China Medical Equipment Conference & Medical Medical Equipment Exhibition*, March 28-31, 2024