HAO ZHOU

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RESEARCH INTERESTS

AI-powered Mobile and Wearable Systems · Internet-of-Things and Cyber-Physical Systems · Human-Centric and Biomedical Sensing · Multimodal Foundation Models for Scalable Health

EDUCATION

The Pennsylvania State University — State College, PA, USA
Doctor of Philosophy in Computer Science and Engineering — *2021 - 2026 May (Expected)*
Advisor: Prof. Mahanth Gowda

The University of Mississippi — Oxford, MS, USA
Master of Science in Computer Science — *2019 - 2021*
Bachelor of Science in Computer Science — *2016 - 2019*

SELECTED PUBLICATIONS

[MobiCom 26] **Hao Zhou** and Mahanth Gowda. *"Exploring the Feasibility of Full-Body Muscle Activation Sensing with Insole Pressure Sensors."*

[NeurIPS 2026] TS4H — Simon Lee, Cyrus Tanade, **Hao Zhou**, Juhyeon Lee, Megha Thukral, Minji Han, Baiying Lu, and Sharanya Desai. *"Towards On-device Foundation Models for Wearable Signals."*

[Under Review] **Hao Zhou**, and collaborators at Samsung Research America. *"Physiology-aware Wearable Health Foundation Model via Cross-Reconstruction."*

[Under Review] Simon Lee, Cyrus Tanade, **Hao Zhou**, and collaborators at Samsung Research America. *"HiMAE: Hierarchical Masked Autoencoders Discover Resolution Specific Structure in Wearable Time Series."*

[Under Review] Megha Thukral, Cyrus Tanade, Simon Lee, Juhyeon Lee, **Hao Zhou**, and collaborators at Samsung Research America. *"Wavelet-Driven Masked Multiscale Reconstruction for PPG Foundation Models."*

[Under Review] **Hao Zhou**, and collaborators at Samsung Research America. *"A Personalized Real-time Proactive Voice Memory Assistant."*
☑ **One A1 patent with Samsung Research America**

[MobiSys 25] Rising Star Forum — **Hao Zhou**. *"Rethinking Inexpensive Wearables in the Era of AI: From Motion Analytics to Mobile Health."*

[ICASSP 25] **Hao Zhou**, Md Mahbubur Rahman, Mehrab Bin Morshed, Yunzhi Li, Md Saiful Islam, Larry Zhang, Jungmok Bae, Christina Rosa, Wendy Berry Mendes, and Jilong Kuang. *"Know Your Heart Better: Multimodal Cardiac Output Monitoring Using Earbuds."*
☑ **One A1 patent with Samsung Research America**

[UbiComp 25] Kuang Yuan, Dong Li, **Hao Zhou**, Zhehao Li, Lili Qiu, Swarun Kumar, and Jie Xiong. *"WindDancer: Understanding Acoustic Sensing under Ambient Airflow."*

[UIST 25] Yongxiang Cai, Taiting Lu, Zhenghao Li, **Hao Zhou**, Kenneth DeHaan, Xuhai Xu, Mahanth Gowda, and Yincheng Jin. *"SignGlass: First-Person View Comprehensive and Generalizable ASL Translation Using Wearable Glasses."*
🎗 **Special Recognition for Belonging and Inclusion Award**

[CHI 25] Md Saiful Islam, Md Mahbubur Rahman, Mehrab Bin Morshed, David J. Lin, Yunzhi Li, **Hao Zhou**, Wendy Berry Mendes, and Jilong Kuang. *"BallistoBud: Heart Rate Variability Monitoring Using Earbud Accelerometry for Stress Assessment."*

[ICCV 25] Yusen Zhang, Wenliang Zheng, Aashrith Madasu, Peng Shi, Ryo Kamoi, **Hao Zhou**, Zhuoyang Zou, Shu Zhao, Sarkar Snigdha Sarathi Das, Vipul Gupta, Xiaoxin Lu, Nan Zhang, Ranran Haoran Zhang, Avitej Iyer, Renze Lou, Wenpeng Yin, and Rui Zhang. *"HRScene: How Far Are VLMs from Effective High-Resolution Image Understanding?."*

[ICASSP 25] Yunzhi Li, Md Mahbubur Rahman, Mehrab Bin Morshed, Md Saiful Islam, **Hao Zhou**, Weinan Wang, Holland Ernst, Li Zhu, and Jilong Kuang. *"Optimizing Biomarkers from Earbud Ballistocardiogram: Calibration and Calibration-Free Algorithms for Accelerometer Axis Selection and Fusion."*

[MobiCom 24] **Hao Zhou**, Kuang Yuan, Mahanth Gowda, Lili Qiu, and Jie Xiong. *"Rethinking Orientation Estimation with Smartphone-Equipped Ultra-Wideband Chips."*

[IoTDI 24] **Hao Zhou**, Taiting Lu, Kenneth DeHaan, and Mahanth Gowda. *"ASLRing: American Sign Language Recognition with Meta-Learning on Wearables."*

[UbiComp 24] Runze Liu, Taiting Lu, Shengming Yuan, **Hao Zhou**, and Mahanth Gowda. *"SmartDampener: An Open Source Platform for Sport Analytics in Tennis."*

[MobiCom 23] **Hao Zhou**, Taiting Lu, Kristina Mckinnie, Joseph Palagano, Kenneth DeHaan, and Mahanth Gowda. *"SignQuery: A Natural User Interface and Search Engine for Sign Languages with Wearable Sensors."*

[IoTDI 23] **Hao Zhou**, Taiting Lu, Yilin Liu, Shijia Zhang, Runze Liu, and Mahanth Gowda. *"One Ring to Rule Them All: An Open Source SmartRing Platform for Finger Motion Analytics and Healthcare Applications."*
🎗 **Best Paper Award for Edge IoT AI**
🗞 **Media Coverage: [Hackster], [DeepTech – CN]**

[**TIOT 23**] Shijia Zhang, Taiting Lu, **Hao Zhou**, Yilin Liu, Runze Liu, and Mahanth Gowda. *"I Am an Earphone and I Can Hear My User's Face: Facial Landmark Tracking Using Smart Earphones."*

[**UbiComp 22**] **Hao Zhou**, Taiting Lu, Yilin Liu, Shijia Zhang, and Mahanth Gowda. *"Learning on the Rings: Self-Supervised 3D Finger Motion Tracking Using Wearable Sensors."*

INDUSTRIAL (RESEARCH) EXPERIENCE

Samsung Research America, hosted by Digital Health Lab 05-24 – 08-24 & 06-25 – 03-26

- Developed foundation models on large-scale wearable signals to provide health insights for blood pressure, cardiovascular conditions, and sleep stages.
- Developed an end-to-end proactive voice memory aid on Samsung earbuds, serving people with potential memory loss.
- Developed multimodal health monitoring systems for digital biomarkers (e.g., cardiac output, stress levels, heart rate variability) with Samsung devices.

Microsoft Research Asia (Shanghai), hosted by Prof. Jie Xiong 05-23 – 08-23

- Leveraged ultra-wideband technology in consumer-grade electronics for device orientation estimation and respiration monitoring.