HAO ZHOU

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RESEARCH INTERESTS

Multimodal Machine Learning for Time-Series · AI-powered Mobile and Wearable Systems · Human-Centric and Biomedical AI · Digital Health · Internet-of-Things and Cyber-Physical Systems

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
Thesis: Rethinking Everyday Wearables in the Era of AI: From Motion Analytics to Mobile Health

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

PUBLICATIONS (FIRST-AUTHORED PAPERS ARE HIGHLIGHTED BY †)

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

[ICASSP 26†] **Hao Zhou**, and collaborators at Samsung Research America. *"A Personalized Real-time Proactive Voice Memory Assistant."*
☑ **One patent with Samsung Research America**

[ICLR 26] Simon Lee, Cyrus Tanade, **Hao Zhou**, Juhyeon Lee, Megha Thukral, Minji Han, Rachel Choi, Md Sazzad Hissain Khan, Baiying Lu, Migyeong Gwak, Mehrab Bin Morshed, Viswam Nathan, Md Mahbubur Rahman, Li Zhu, Subramaniam Venkatraman, and Sharanya Arcot Desai. *"HiMAE: Hierarchical Masked Autoencoders Discover Resolution Specific Structure in Wearable Time Series."*

[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."*

[ICML 26†] Under Review **Hao Zhou**, and collaborators at Samsung Research America. *"Physiology-aware Wearable Health Foundation Model via Cross-Reconstruction."*
☑ **One patent with Samsung Research America**

[ICML26] 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."*

[**MobiSys 25**†]
Rising Star

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."*

[**NeurIPS 23**] Workshop Xi Li, Songhe Wang, Chen Wu, **Hao Zhou**, and Jiaqi Wang. *"Backdoor Threats from Compromised Foundation Models to Federated Learning."*

[**UbiComp 22**†] **Hao Zhou**, Taiting Lu, Yilin Liu, Shijia Zhang, 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. ***Received SRA's President Award***
- Developed an end-to-end proactive voice memory aid, 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 device for orientation and vital sign estimation.