Dong Ma

Assistant Professor, Singapore Management University

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Education

University of New South Wales, Australia *Oct 2016 – Nov 2019*
Ph.D. in Computer Science and Engineering

Central South University, China *Sept 2014 – June 2016*
M.Sc. in Information and Communication Engineering

Central South University, China *Sept 2010 – June 2014*
B.Eng. in Communication Engineering

Academic and Research Experience

Assistant Professor *Singapore*
Singapore Management University *Jan 2022 – present*

Research Associate *United Kingdom*
University of Cambridge *Jan 2020 – Dec 2021*

Research Assistant *Australia*
DATA61, CSIRO *Jan 2017 – Nov 2019*

Research Interests

Wearable Sensing: Exploring innovative schemes, principles, and modalities that can enable accurate, efficient, resilient, and accessible human behavioral and physiological sensing applications in real-world scenarios.

Wearable Signal Analysis: Developing effective and lightweight signal processing and machine learning techniques for analyzing wearable signals to enable accurate understanding of human behaviors/states in real world.

On-device Computation: Designing advanced frameworks and strategies that can facilitate efficient and adaptive machine learning execution on resource-constrained wearable devices.

Selected Publications

Full publication list is available at Google Scholar and my Homepage.
* indicates co-primary authors, † indicates corresponding author, ___ indicates students under my supervision at Singapore Management University.

- [**ICML'25**] Hung Manh Pham, Aaqib Saeed, **Dong Ma**†. "Boosting Masked ECG-Text Auto-Encoders as Discriminative Learners".
- [**MobiCom'25**] Yetong Cao, **Dong Ma**, Wentao Xie, Qian Zhang, Jun Luo. "ESPIRO: Natural Pulmonary Function Monitoring via Earphone-Acquired Speech".
- [**CHI'25**] Qiang Yang, Yang Liu, Jake Stuchbury-Wass, Kayla-Jade Butkow, Emeli Panariti, **Dong Ma**, Cecilia Mascolo. "SmarTeeth: Augmenting Manual Toothbrushing with In-ear Microphones".
- [**PerCom'25**] Yang Liu, Kayla-Jade Butkow, Jake Stuchbury-Wass, Adam Pullin, **Dong Ma** and Cecilia Mascolo. "RespEar: Earable-Based Robust Respiratory Rate Monitoring". (**Best Paper Award)**

- [**PerCom'25**] Jake Stuchbury-Wass, Yang Liu, Kayla-Jade Butkow, Josh Carter, Qiang Yang, Mathias Ciliberto, Ezio Preatoni, **Dong Ma**, and Cecilia Mascolo. "WalkEar: Holistic Gait Monitoring using Earables".
- [**Nature Scientific Data'25**] Matthew Yiwen Ho, Hung Manh Pham, Aaqib Saeed, **Dong Ma**†. "WF-PPG: A Wrist-finger Dual-Channel Dataset for Studying the Impact of Contact Pressure on PPG Morphology".
- [**IMWUT'24**] Changshuo Hu, Xiao Ma, Xinger Huang, Yiran Shen, **Dong Ma**†. "LR-Auth: Towards Practical Implementation of User Authentication on Earbuds".
- [**IMWUT'24**] Changshuo Hu, Thivya Kandappu, Yang Liu, Cecilia Mascolo, **Dong Ma**†. "BreathPro: Monitoring Breathing Mode during Running with Earables".
- [**PerCom'24**] Xiao Ma, Shengfeng He, Hezhe Qiao, **Dong Ma**†. "DiTMoS: Delving into Diverse Tiny-Model Selection on Microcontrollers". (**Best Paper Award)**
- [**PerCom'23**] Kayla-Jade Butkow, Ting Dang, Andrea Ferlini, **Dong Ma**, Cecilia Mascolo. "hEARt: Motion-resilient Heart Rate Monitoring with In-ear Microphones".
- [**IMWUT'23**] **Dong Ma**†, Ting Dang, Ming Ding, Rajesh Balan. "ClearSpeech: Improving Voice Quality of Earbuds Using Both In-Ear and Out-Ear Microphones".
- [**MobiCom'22**] Nhat Pham, Hong Jia, Minh Tran, Tuan Dinh, Nam Bui, Young Kwon, **Dong Ma**, VP Nguyen, Cecilia Mascolo, Tam Vu. "PROS: an Efficient Pattern-Driven Compressive Sensing Framework for Low-Power Biopotential-based Wearable with On-chip Intelligence".
- [**MobiSys'21**] **Dong Ma**, Andrea Ferlini, and Cecilia Mascolo. "OESense: Employing Occlusion Effect for In-ear Human Sensing".
- [**MobiCom'21**] Andrea Ferlini*, **Dong Ma***, Robert K. Harle, and Cecilia Mascolo. "EarGate: Gait-based User Identification with In-ear Microphones".
- [**INFOCOM'20**] **Dong Ma**, Yuezhong Wu, Ming Ding, Mahbub Hassan, and Wen Hu. "Skin-MIMO: Vibration-based MIMO Communication over Human Skin".
- [**TMC'20**] **Dong Ma**, Guohao Lan, Weitao Xu, Mahbub Hassan, and Wen Hu. "Simultaneous Energy Harvesting and Gait Recognition using Piezoelectric Energy Harvester".
- [**MobiCom'19**] **Dong Ma**, Guohao Lan, Mahbub Hassan, Wen Hu, Mushfika Baishakhi Upama, Ashraf Uddin, Moustafa Youssef. "SolarGest: Ubiquitous and Energy-free Gesture Recognition using Solar Cells".
- [**COMST'19**] **Dong Ma**, Guohao Lan, Mahbub Hassan, Wen Hu, and Sajal K. Das. "Sensing, Computing,and Communication for Energy Harvesting IoTs: A Survey".
- [**PerCom'18**] Guohao Lan, **Dong Ma**, Mahbub Hassan, and Wen Hu. "HiddenCode: Hidden Acoustic Signal Capture with Vibration Energy Harvesting".

Research Grants

- "*Unleashing the Potential of Photoplethysmography for Wearable Healthcare*", **Principle Investigator**, Singapore Ministry of Education Tier 2, 2025/01-2028/01, 1,001,652 SGD (On-going)
- "*On-device Signal Processing in Knitted Wearables*", **Principle Investigator**, Singapore Ministry of Education Tier 1, 2024/11-2026/10, 200,000 SGD (On-going)
- "*Context-aware Human Vital Signs Monitoring Using Wearable Devices*", **Principle Investigator**, Singapore Ministry of Education Tier 1, 2022/04-2023/03, 100,000 SGD (Completed)
- "*Enhancing Senior Community Engagement and Mobility with Generative AI and Digital Twin*", **Principle Investigator**, Singapore A*STAR and Japan JST Joint Call, 2025/01-2028/01, 370,000 SGD (Under Review)
- "*Enhancing Situated Learning with Mixed-Reality Avatars Driven by mmWave Motion Capture*", **Co-Principle Investigator**, Singapore Ministry of Education Tier 1, 2023/10-2025/09, 125,000 SGD (On-going)

- "*Enhancing Adult Learning: Evaluation-based Adaptive Support with Generative AI*", **Co-Principle Investigator**, Singapore Ministry of Education Science of Learning (SoL) Grant, 2025/04-2028/04, 1,978,899 SGD (Under Review)
- "*MAGIC: Multimodal Assistants that Guide Individuals' Comprehension*", **Co-Principle Investigator**, Singapore Ministry of Education Tier 2, 2025/07-2028/07, 1,258,562 SGD (Under Review)
- "*Generative Active Learning Experiences for At-Home Asynchronous Learners*", **Co-Principle Investigator**, Singapore Ministry of Education Tier 1, 2025/01-2027/01, 250,000 SGD (Under Review)
- "*Leveraging Mobile Sensing to Provide Early Detection of Meltdowns in Children with Autism*", **Collaborator**, Singapore Ministry of Education Tier 1, 2024/01-2025/07, 120,000 SGD (On-going)

Awards and Honors

- Google South Asia & Southeast Asia Research Awards, Google, 2024 (30,000 USD)
- Mark Weiser Best Paper Award, IEEE PerCom, 2024 (1/158)
- EPFL Engineering Ph.D. Summit, Switzerland, 2019 (1/11 worldwide)
- Google Ph.D. Fellowship Nominee, Australia, 2019 (1/2 from UNSW)
- Best Demo Runner-up, ACM/IEEE IoTDI 2018

Professional Activities

Editorial Service

- Associate Editor: IMWUT
- TPC Chair: AIoTSys'25
- TPC Member (Main Conference): MobiCom'25, PerCom'25, MobiCom'24, MobiSys'24, EWSN'24, WWW'23, EWSN'23, MASS'22
- TPC Member (Workshop/Poster): HumanSys@CPS-IoT Week'25, HumanSys@SenSys'24, Poster@IPSN'24, AdaAIoTSys@MobiSys'24, EarComp @UbiComp'23, IASA@CPS-IoT'23, EarComp@UbiComp'21
- Workshop Chair: BodySys@MobiSys'24, SmartWear@MobiCom'23, EarComp@UbiComp'22
- Publication Chair: PerCom'25, HotMobile'22
- PhD Forum Chair: WOWMOM'25
- Session Chair: UbiComp'24
- Video Chair: MobiSys'22

Review Service

- 2025: MobiCom, IMWUT, TMC, CHI
- 2024: MobiCom, MobiSys, EWSN, IMWUT, TMC, CHI, Nature Electronics
- 2023: WWW, EWSN, IMWUT, Earcomp, TOSN
- 2022: TMC, TOSN, IMWUT, ISWC
- 2021: TMC, TPDS, TII, MASS, IMWUT
- 2020: JSAC, IMWUT, ICC, Comnets

Invited Talks

- "*In-ear Intelligence - From Sensing To Deployment*", at Mobile AI System Workshop@MobiSys, 2024 (**Keynote**)
- "*In-ear Microphone –Beyond Active Noise Cancellation*", at Nanyang Technological University, Central South University, Hunan University, Shenzhen University, 2023
- "*Towards Practical, Efficient, and Resilient Human Sensing Systems*", at Singapore Management University, 2021
- "*Transformative Context Sensing for Energy Harvesting IoTs*", at EPFL Engineering PhD Summit, 2019

Teaching Experience

CS462: IoT - Technology and Applications (Lecturer) — *Undergraduate*
Singapore Management University — *2022/23/24 Term1*

IS614: IoT - Technology and Applications (Lecturer) — *Graduate*
Singapore Management University — *2023/24 Term1*

CS480: Computer Science Project Experience (Lecturer) — *Undergraduate*
Singapore Management University — *2022 Term1*

Part II Course: Mobile Sensor Systems (Supervisor) — *Undergraduate*
University of Cambridge — *2021 Term1*

MPhil Projects (Supervisor) — *Graduate*
University of Cambridge — *2020 - 2021*

Mobile Data Networking (Tutor) — *Undergraduate/Graduate*
University of New South Wales — *2018/19 Term2*

Internet of Things Experimental Design Studio (Tutor) — *Undergraduate*
University of New South Wales — *2018 Term2*