Dong Ma | Curriculum Vitae

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Research Interests

My research interests rotate around cyber-physical systems, including ubiquitous computing, pervasive sensing, vibration communication, energy harvesting, and mobile and wearable healthcare, covering the ene-to-end system design, implementation, and evaluation. Recently, I am particularly centred on robust human behaviour analysis and health monitoring with wearable technology and tiny machining learning on embedded devices.

Education

- **Ph.D.** **University of New South Wales, Australia**
  Computer Science and Engineering, *2016/10–2019/11*
  Advisor: Prof. Mahbub Hassan and Prof. Wen Hu
- **M.Sc.** **Central South University, China**
  Information and Communication Engineering *2014/09–2016/06*
  Advisor: Prof. Jun Peng
- **B.Eng.** **Central South University, China**
  Communication Engineering *2010/09–2014/06*
  Advisor: Prof. Xiaoheng Deng

Research Experience

- **Research Associate** **2020/01–Present**
  Mobile System Group, University of Cambridge,
  Concentrations: working on an ERC advanced project - 'Audio-based Mobile Health Diagnostics (EAR)', with particular focus on developing in-ear microphone based wearable systems for human signs (e.g., heartbeat, breathing, dietary activities, motions, gestures) detection and monitoring.
- **Research Assistant** **2016/10–2019/11**
  Networked Systems and Security Group, University of New South Wales,
  Concentrations: energy-efficient human activity/gesture/gait recognition using energy harvesters (e.g., kinetic energy harvester and solar cell)

- **Research Assistant** **2017/01–2019/11**
  Networks Research Group, DATA61, CSIRO,
  Concentrations: vibration communication over human skin
- **Research Assistant** **2014/09–2016/06**
  Rail Transit Network Communication and Control Laboratory, Central South University,
  Concentrations: device-to-device communication

Honors and Awards

- EPFL Engineering Ph.D. Summit, Switzerland, 2019. (1/11 worldwide)
- Google Ph.D. Fellowship Nominee, Australia, 2019. (1/2 from University of New South Wales)
- Student Travel Grant, ACM MobiCom 2018.
- Best Demo Runner-up, ACM/IEEE IoTDI 2018.
- DATA61 & CSIRO Top-up Scholarship, Australia, 2016 - 2020.
- University International Postgraduate Award, University of New South Wales, 2016-2020.
- Outstanding Graduate, Central South University, 2014.
- National Scholarship of China, 2013.

Publications

Publication list also available at Google Scholar.

Journals

* indicates co-primary authors, † indicates corresponding author.

- [1] **Dong Ma**, Guohao Lan, Changshuo Hu, Mahbub Hassan, Wen Hu, Mushfika Baishakhi Upama, Ashraf Uddin, and Moustafa Youssef. "Recognizing Hand Gestures using Solar Cells," *IEEE Transaction on Mobile Computing* (**TMC**), 2021. (**Under Review**)
- [2] **Dong Ma**, Guohao Lan, Weitao Xu, Mahbub Hassan, and Wen Hu. "Simultaneous Energy Harvesting and Gait Recognition using Piezoelectric Energy Harvester," *IEEE Transaction on Mobile Computing* (**TMC**), 2020. (**IF=5.11**) (PDF)
- [3] **Dong Ma**†, Guohao Lan, Mahbub Hassan, Wen Hu, and Sajal K. Das. "Sensing, Computing, and Communication for Energy Harvesting IoTs: A Survey," *IEEE Communications Surveys & Tutorials* (**COMST**), 2019. (**IF=29.83**) (PDF)
- [4] Guohao Lan, **Dong Ma**†, Weitao Xu, Mahbub Hassan, and Wen Hu. "Capacitor Based Activity Sensing for Kinetic Powered Wearable IoTs," *ACM Transactions on Internet of Things* **(TIOT)**, 2019. (PDF)
- [5] Guohao Lan, Weitao Xu, **Dong Ma**, Sara Khalifa, Mahbub Hassan, and Wen Hu. "EnTrans: Leveraging Energy Harvesting Signal for Transportation Mode Detection," *IEEE Transactions on Intelligent Transportation Systems* **(TITS), 2014**. (**IF=5.74**) (PDF)

Conference Proceedings

- [6] **Dong Ma***, Andrea Ferlini*, Robert Harle, and Cecilia Mascolo. "EarGate: Gait-based User Authentication with Earables," *The 27th Annual International Conference on Mobile Computing and Networking* **(MobiCom)**, 2021. (**Under Review**)
- [7] **Dong Ma**, Andrea Ferlini, and Cecilia Mascolo. "OESense: Employing Occlusion Effect for In-ear Human Sensing," *The 19th ACM International Conference on Mobile Systems, Applications, and Services* **(MobiSys)**, 2021. (**Accepted**) (PDF) (Dataset)
- [8] **Dong Ma**, Yuezhong Wu, Ming Ding, Mahbub Hassan, and Wen Hu. "Skin-MIMO: Vibration-based MIMO Communication over Human Skin," *IEEE International Conference on Computer Communications* **(INFOCOM)**, 2020. **(Acceptance Rate: 19.8%)** (PDF)
- [9] Changshuo Hu, **Dong Ma**, Mahbub Hassan, and Wen Hu. "NLC: Natural Light Communication using Switchable Glass," *IEEE Workshop on Pervasive Systems in the IoT era* **(Persist-IoT, INFOCOM Workshop)**, 2020. (PDF)
- [10] Bo Wei, Weitao Xu, Chengwen Luo, Guillaume Zoppi, **Dong Ma**, and Sen Wang. "SolarSLAM: Battery-free Loop Closure for Indoor Localisation," *In the Proceedings of the 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems* **(IROS)**, 2020. (PDF)
- [11] **Dong Ma**, Ming Ding, and Mahbub Hassan. "Enhancing Cellular Communications for UAVs via Intelligent Reflective Surface," *IEEE Wireless Communications and Networking Conference* **(WCNC)**, 2020.(PDF)
- [12] **Dong Ma**, Guohao Lan, Mahbub Hassan, Wen Hu, Mushfika Baishakhi Upama, Ashraf Uddin, and Moustafa Youssef. "SolarGest: Ubiquitous and Battery-free Gesture Recognition using Solar Cells," *The 25th Annual International Conference on Mobile Computing and Networking* **(MobiCom)**, 2019. (**Acceptance Rate: 19%**) (Simulator code at Github)(PDF)
- [13] **Dong Ma**, Guohao Lan, Mahbub Hassan, Wen Hu, Mushfika Baishakhi Upama, Ashraf Uddin, and Moustafa Youssef. "Gesture Recognition with Transparent Solar Cells: A Feasibility Study," *The 12th ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation & Characterization* **(WiNTECH, MobiCom Workshop)**, 2018. (PDF)
- [14] **Dong Ma**, Guohao Lan, Weitao Xu, Mahbub Hassan, and Wen Hu. "SEHS: Simultaneous Energy Harvesting and Sensing using Piezoelectric Energy Harvester," *The 3rd ACM/IEEE International Conference on Internet-of-Things Design and Implementation* **(IoTDI)**, 2018. (**Acceptance Rate: 23%**) (PDF)
- [15] Guohao Lan, **Dong Ma**, Mahbub Hassan, and Wen Hu. "HiddenCode: Hidden Acoustic Signal Capture with Vibration Energy Harvesting," *The 16th IEEE International Conference on Pervasive Computing and Communications* **(PerCom)**, 2018. (**Acceptance Rate: 13%**) (PDF)

- [16] Guohao Lan, **Dong Ma**, Weitao Xu, Mahbub Hassan, and Wen Hu. "CapSense: Capacitor-based Activity Sensing for Kinetic Energy Harvesting Powered Wearable Devices," *Proceedings of the 14th EAI International Conference on Mobile and Ubiquitous Systems* **(MobiQuitous)**, 2017. (PDF)
- [17] **Dong Ma**, Jun Peng, Heng Li, Weirong Liu, Zhiwu Huang, and Xiaoyong Zhang. "Energy Efficient Video Streaming over Wireless Networks with Mobile-to-mobile Cooperation," *IEEE Pacific Rim Conference on Communications, Computers and Signal Processing* **(PACRIM)**, 2015. (PDF)

Poster & Demo

- [18] Changshuo Hu, **Dong Ma**, Mahbub Hassan, and Wen Hu. "Poster: Data Communication using Switchable Privacy Glass," *The 19th ACM/IEEE Conference on Information Processing in Sensor Networks* **(IPSN)**, 2020.
- [19] **Dong Ma**, Guohao Lan, Weitao Xu, Mahbub Hassan, and Wen Hu. "Demo Abstract: Simultaneous Energy Harvesting and Sensing using Piezoelectric Energy Harvester," *The 3rd ACM/IEEE International Conference on Internet-of-Things Design and Implementation* **(IoTDI)**, 2018. (**Best Demo Runner-up Award**)
- [20] **Dong Ma**, Guohao Lan, Weitao Xu, Mahbub Hassan, and Wen Hu. "Poster: Unobtrusive User Verification using Piezoelectric Energy Harvesting," *Proceedings of the 14th EAI International Conference on Mobile and Ubiquitous Systems* **(MobiQuitous)**, 2017.

Teaching Experience

- **Supervisor for Part II, and MPhil Projects** **2020 Term 3, 2021 Term 1**
  Department of Computer Technology, University of Cambridge,
  Role: supervising research-oriented projects including (1) investigating accurate and efficient detection of teeth clenching through in-ear wearables, (2) wind noise removal for robust human speech acquisition.
- **Supervisor for Mobile Sensor Systems** **2021 Term 1**
  Department of Computer Science and Technology, University of Cambridge,
  Role: supervising course tutorials
- **Head Tutor for Mobile Data Networking** **2018 Term 2, 2019 Term 2**
  School of Computer Science & Engineering, UNSW,
  Role: tutoring lab tutorials and final assignment, marking
- **Tutor for Internet of Things Experimental Design Studio** **2018 Term 2**
  School of Computer Science & Engineering, UNSW,
  Role: tutoring lab tutorials

Professional Activities

Editorial Service:

- Program Committee Member at *Earcomp 2021*
- Topic Editor of 'AI-Powered Smart Healthcare in Smart Cities' at *Frontiers in Sustainable Cities*

Review Service:

- 2021: IEEE TMC, TPDS, TII, MASS, ACM IMWUT
- 2020: IEEE JSAC, ACM IMWUT, IEEE ICC, IEEE Comnets
- 2019: ACM SenSys, ACM/IEEE IPSN, IEEE PerCom, IEEE IoTJ, IEEE WCNC, ACM SigGraph
- 2018: ACM SenSys, IEEE ICDCS, IEEE PerCom, IEEE ICCCN, EAI Mobiquitous

Presentations and Talks

- **Keynote**: OESense: Employing Occlusion Effect for In-ear Human Sensing, *Research Students Symposium at University of Cambridge*, May 2021, Online
- **Talk**: Activity Recognition Through In-ear Microphone Sensing, *Mini Workshop at Nokia Bell Lab*, May 2021, Online
- **Conference Presentation**: Skin-MIMO: Vibration-based MIMO Communication over Human Skin, *INFOCOM*, July 2020, Online
- **Conference Presentation**: Enhancing Cellular Communications for UAVs via Intelligent Reflective Surface, *WCNC*, May 2020, Online
- **Conference Presentation**: SolarGest: Ubiquitous and Battery-free Gesture Recognition using Solar Cells, *MobiCom*, Octorber 2019, Los Cabos, Mexico
- **Talk**: Transformative Context Sensing for Energy Harvesting IoTs, *EPFL Engineering PhD Summit*, Octorber 2019, Lausanne, Switzerland
- **Conference Presentation**: Gesture Recognition with Transparent Solar Cells: A Feasibility Study, *WiNTECH, MobiCom Workshop*, November 2018, New Delhi, India
- **Conference Presentation**: SEHS: Simultaneous Energy Harvesting and Sensing using Piezoelectric Energy Harvester, *IoTDI*, April 2018, Orlando, USA
- **Conference Presentation**: CapSense: Capacitor-based Activity Sensing for Kinetic Energy Harvesting Powered Wearable Devices, *MobiQuitous*, November 2017, Melbourne, Australia