

# Dr. Wang, Zihan

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## Professional Experience

University of California, Berkeley, USA

2024/07 – Today

*Postdoctoral Fellow*

Advisor: [Prof. Liwei Lin](#)

Research Topics: Microrobots, Robotic Tactile Sensors, Microelectromechanical Systems

## Education Background

Tsinghua University, China

2019/09 – 2024/06

*Ph.D. candidate in Data Science and Information technology*

Advisor: [Assoc. Prof. Wenbo Ding](#)

Ph.D. Thesis: Key Technologies of Flexible Triboelectric Sensors for Robotic Applications

University of California, Berkeley, USA

2023/02 – 2024/06

*Visiting Scholar*

Advisor: [Prof. Liwei Lin](#)

Research Topics: Liquid Metal Actuator

Herriot-Watt University, UK

2015/08 - 2019/06

*B.Eng., Telecommunications Engineering*

with **First Class Honors**

Advisor: Prof. Mustafa Suphi Erden

Research Topics: Robotic minimally invasive surgery training platform

Xidian University, China

2015/08 - 2019/06

*B.Eng., Telecommunications Engineering*

with **Outstanding Graduates**

Boston University, USA

2018/07 - 2018/08

*Visiting Student*

## Selected Awards & Honors

Outstanding Doctoral Graduates of Beijing

2024/06

2<sup>nd</sup> Prize of National Outstanding Graduate Students Workshop (CUHK, Shenzhen)

2024/04

ICRA 2023 RAS Travel Grant

2023/04

University Scholarship of the First Class (Tsinghua University)

2022/11

National Scholarship for Graduates (The Ministry of Education)

2021/12

Deputy Principal's Award (Herriot-Watt University)

2019/06

## Academic Service

Teaching Assistant of TBSI Course Nanogenerator & Self-powered System

2020/09 – 2023/01

Web Chair of ACM Ubicomp 2021 CPD Workshop

2021/05 - 2021/09

## Invited Talks and Conference Presentations

- STEV: Stretchable Triboelectric E-skin enabled Proprioceptive Vibration Sensing for Soft Robot* at The Soft Robotics Forum 2023/09/18
- Triboelectric-nanogenerator-enabled mechanical modulation for infrared wireless communications at BINN CAS, Virtual 2022/07/08

## Full List of Publication

### As first and co-first author

- [1] **Zihan Wang**, Kai-Chong Lei, Huaze Tang, Yang Luo, Hongfa Zhao, Peisheng He, Wenbo Ding, Liwei Lin. "Stretchable Liquid Metal E-skin for Soft Robot Proprioceptive Vibration Sensing," *IEEE Sensors Journal*, 2024, 24, 18327-18335.
- [2] Shoujie Li, **Zihan Wang**, Changsheng Wu, Xiang Li, Shan Luo, Bin Fang, Fuchun Sun, Xiao-Ping Zhang, Wenbo Ding. "When Vision Meets Touch: A Contemporary Review for Visuotactile Sensors From the Signal Processing Perspective." *IEEE Journal of Selected Topics in Signal Processing*, 2024, 18, 267-287.
- [3] Xiaohang Chen, **Zihan Wang**, Wei Yue, Peisheng He, Liwei Lin. "A Non-Volatile Surface Tension-Driven Electrochemical Liquid Metal Actuator." *IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, 2024, 705-708.
- [4] **Zihan Wang**, Kai-Chong Lei, Huaze Tang, Shoujie Li, Yuan Dai, Wenbo Ding, Xiao-Ping Zhang. "STEV: Stretchable Triboelectric E-skin enabled Proprioceptive Vibration Sensing for Soft Robot," *IEEE International Conference on Robotics and Automation (ICRA)*, 2023, 588-593.
- [5] Ziyi Zhao, Zhentan Quan, Huaze Tang, Qinghao Xu, Hongfa Zhao, **Zihan Wang**, Ziwu Song, Shoujie Li, Ishara Dharmasena, Changsheng Wu, and Wenbo Ding. "A Broad Range Triboelectric Stiffness Sensor for Variable Inclusions Recognition." *Nano-Micro Letters*, 2023, 15, 233.
- [6] Mu, Shilong, Shoujie Li, Hongfa Zhao, **Zihan Wang**, Xiao Xiao, Xiao Xiao, Zenan Lin, Ziwu Song, Huaze Tang, Qinghao Xu, Dongkai Wang, Wang Wei Lee, Changsheng Wu, Wenbo Ding. "A platypus-inspired electro-mechanosensory finger for remote control and tactile sensing." *Nano Energy*, 2023, 116, 108790.
- [7] Li Su, **Zihan Wang**, Chengyue Lu, Wenbo Ding, Yong Zhao, and Yunlong Zi, "Persistent triboelectrification-induced electroluminescence for self-powered all-optical wireless user identification and multi-mode anti-counterfeiting," *Materials Horizons*, 2023, 10, 2445-2454.
- [8] Han Wu, **Zihan Wang**, Boyu Zhu, Hanqing Wang, Chengyue Lu, Meicun Kang, Shenglin Kang, Wenbo Ding, Lijun Yang, Ruijin Liao, Jiyu Wang, Zhong Lin Wang "All-in-One Sensing System for Online Vibration Monitoring via IR Wireless Communication as Driven by High-Power TENG," *Advanced Energy Materials*, 2023, 13, 2300051.
- [9] Jiarong Li, Zixuan Xie, **Zihan Wang**, Zenan Lin, Chengyue Lu, Zihao Zhao, Yuchao Jin, Jihong Yin, Shilong Mu, Chaobo Zhang, Weihua Gui, Xiaojun Liang, Jiyu Wang, Wenbo Ding "A triboelectric gait sensor system for human activity recognition and user identification," *Nano Energy*, 2023, 112, 108473.
- [10] **Zihan Wang**, Yuchao Jin, Chengyue Lu, Jiyu Wang, Ziwu Song, Xu Yang, Yidan Cao, Yunlong Zi, Zhong Lin Wang, Wenbo Ding, "Triboelectric Nanogenerator enabled Mechanical Modulation for Infrared Wireless

Communications,” *Energy & Environmental Science*, 2022, 15, 2983-2991.

- [11] Jiangfeng Lu, Zicong Miao, **Zihan Wang**, Ying Liu, Dekuan Zhu, Jihong Yin, Fei Tang, Xiaohao Wang, Wenbo Ding, Min Zhang, “Piezoelectric soft robot driven by mechanical energy,” *Nano Research*, 2022, 16, 4970-4979.
- [12] Ziwu Song, Jihong Yin, **Zihan Wang**, Chengyue Lu, Ze Yang, Zihao Zhao, Zenan Lin, Jiyu Wang, Changsheng Wu, Jia Cheng, Yuan Dai, Yunlong Zi, Shao-Lun Huang, Xinlei Chen, Jian Song, Gang Li, Wenbo Ding, “A flexible triboelectric tactile sensor for simultaneous material and texture recognition,” *Nano Energy*, 2022 93, 106798.
- [13] Keyu Meng, Xiao Xiao, Zixiao Liu, Sophia Shen, Trinny Tat, **Zihan Wang**, Chengyue Lu, Wenbo Ding, Ximin He, Jun Yang, and Jun Chen, “Kirigami-Inspired Pressure Sensors for Wearable Dynamic Cardiovascular Monitoring,” *Advanced Materials*, 2022, 34, e2202478.
- [14] Hongfa Zhao, Mingrui Shu, Zihao Ai, Zirui Lou, Kit Wa Sou, Chengyue Lu, Yuchao Jin, **Zihan Wang**, Jiyu Wang, Changsheng Wu, Yidan Cao, Xiaomin Xu, and Wenbo Ding, “A Highly Sensitive Triboelectric Vibration Sensor for Machinery Condition Monitoring,” *Advanced Energy Materials*, 2022, 12, 2201132.  
**(FRONT COVER HIGHLIGHTED)**
- [15] **Zihan Wang**, Jiarong Li, Yuchao Jin, Jiyu Wang, Fang Yang, Gang Li, Xiaoyue Ni, Wenbo Ding, “Sensing beyond itself: Multi-functional use of ubiquitous signals towards wearable applications,” *Digital Signal Processing*, 2021, 116, 103091.
- [16] Yang Luo, **Zihan Wang**, Jiyu Wang, Xiao Xiao, Qian Li, Wenbo Ding, Hongyan Fu, “Triboelectric bending sensor based smart glove towards intuitive multi-dimensional human-machine interfaces,” *Nano Energy*, 2021, 89, 106330. **(FRONT COVER HIGHLIGHTED)**
- [17] Xiao Xiao, Xiao Xiao, Yihao Zhou, Xun Zhao, Guorui Chen, Zixiao Liu, **Zihan Wang**, Chengyue Lu, Menglei Hu, Ardo Nashalian, Sophia Shen, Kedi Xie, Weiwei Yang, Yongji Gong, Wenbo Ding, Peyman Servati, Chao Han, Shi Xue Dou, Weijie Li, and Jun Chen, “An ultrathin rechargeable solid-state zinc ion fiber battery for electronic textiles,” *Science Advances*, 2021, 7, eabl3742. **(FRONT COVER HIGHLIGHTED)**
- [18] Chengyue Lu, **Zihan Wang**, Wenbo Ding, Gang Li, Sicong Liu, and Ling Cheng, “MARVEL: Multi Agent Reinforcement Learning for VANET Delay Minimization,” *China Communications*, 2021, 18, 1-11.
- [19] Xu Yang, Jihong Yin, **Zihan Wang**, Ziwu Song, Jian Song, and Wenbo Ding, “HTPad: Hexagon-fractal TENG Pad for Scalable Touch Control,” *ACM Ubicomp*, 2021, 697-702.
- [20] Jiarong Li, **Zihan Wang**, Zihao Zhao, Yuchao Jin, Jihong Yin, Shao-Lun Huang, and Jiyu Wang, “TriboGait: A deep learning enabled triboelectric gait sensor system for human activity recognition and individual identification,” *ACM Ubicomp*, 2021, 643-648.
- [21] Jiarong Li, Changsheng Wu, Ishara Dharmasena, Xiaoyue Ni, **Zihan Wang**, Haixu Shen, Shao-Lun Huang, and Wenbo Ding, “Triboelectric nanogenerators enabled internet of things: A survey,” *Intelligent and Converged Networks*, 2020, 1, 115-141.
- [22] Jianing Zhang, Tianyi Zhu, Anke Zhang, Xiaoyun Yuan, **Zihan Wang**, Sebastian Beetschen, Lan Xu, Xing Lin, Qionghai Dai, and Lu Fang, “Multiscale-VR: Multiscale gigapixel 3d panoramic videography for virtual reality,” *IEEE ICCP*, 2020, 1-12.

## Skill Set

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|-----------------------------------|--|
| Soft Sensor                       | EGaIn conductive ink fabrication and circuit/electrode patterning<br>Fabrication of ionic self-healing hydrogel<br>Chemical / Physical treatment of polymer materials<br>Electrical, mechanical, and material characterization<br>Design of high-performance triboelectric sensors |
| Soft Robot                        | Design and fabrication of PenuNets soft actuator with pneumatic controller<br>3D printing and injection molding  |
| Signal acquisition and processing | NI LabVIEW for signal acquisition, processing, and user control interface.<br>NI DAQ signal IO modules selection<br>Design of signal conditioning circuit  |
| Programming                       | MATLAB, Python   |
| Software                          | 3D Max, Autodesk Fusion 360, AutoCAD, Origin Pro   |
| Other academia skills             | LaTeX, Signal processing, Machine learning   |