

# Zi-Han WANG

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## Educations

**Tsinghua University**, P. R. China

2019/09 - Today

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

Advisor: Dr. Wenbo Ding

Research Topics: Triboelectric Nanogenerators, Soft Electronics, Soft Robots, HMI & HRI

**University of California, Berkeley**, USA

2023/03 - 2024/02

*Visiting Research Student*

Advisor: Prof. Liwei Lin

Research Topics: Self-Healing Materials for Sensing and Energy Harvesting

**Herriot-Watt University**, UK

2015/08 - 2019/06

*B.Eng., Telecommunications Engineering*

with **First Class Honors**

Advisor: Prof. Mustafa Suphi Erden

**Xidian University**, P. R. China

2015/08 - 2019/06

*B.Eng., Telecommunications Engineering*

with **Outstanding Graduates**

**Boston University**, USA

2018/07 - 2018/08

*Visiting Student*

## Selected Awards & Honors

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 - Today

Web Chair of ACM Ubicomp 2021 CPD Workshop

2021/05 - 2021/09

Journal Reviewer of *DSP*, *EUSIPCO*, *ICN*, and *Nano Energy*

## Invited Talks and Conference Presentations

*Smart wearable systems for smart life* at X-institute, Shenzhen

2023/01/13

*STEV: Stretchable Triboelectric E-skin enabled Proprioceptive Vibration Sensing for Soft*

2023/03/04

*Robot* at University of California, Berkeley

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, 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.
- [2] 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.
- [3] 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, 2300051.
- [4] 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.
- [5] **Zihan Wang\***, Yuchao Jin\*, Chengyue Lu\*, Jiyu Wang#, Ziwu Song, Xu Yang, Yidan Cao, Yunlong Zi, Wenbo Ding#, Zhong Lin Wang#, “Triboelectric Nanogenerator enabled Mechanical Modulation for Infrared Wireless Communications,” *Energy & Environmental Science*, 2022, 15 (7): 2983-2991.
- [6] 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.
- [7] 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)**
- [8] **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: 103091.

### Others

- [9] 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.
- [10] 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 (37): 2201132.
- [11] 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: 2445-54.
- [12] 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.

- [13] 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.
- [14] Xu Yang, Jihong Yin, **Zihan Wang**, Ziwu Song, Jian Song, and Wenbo Ding, “HTPad: Hexagon-fractal TENG Pad for Scalable Touch Control,” In *Adjunct Proceedings of the 2021 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2021 ACM International Symposium on Wearable Computers(Ubicomp)*, 2021, 697-702. ACM.
- [15] 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,” In *Adjunct Proceedings of the 2021 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2021 ACM International Symposium on Wearable Computers (Ubicomp)*, 2021, 643-48. ACM.
- [16] 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: 115-41.
- [17] 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,” In *2020 IEEE International Conference on Computational Photography (ICCP)*, 2020, 1-12. IEEE.

## Skill Set

Soft Sensor	Design of triboelectric sensor Liquid-Metal conductive ink fabrication Conductive trace patterning Fabrication of self-healing materials Chemical / Physical treatment of polymer materials Electrical, mechanical, and material characterization
Soft Robot	Design of PenuNets soft actuator 3D printing and injection molding Pneumatic regulating system
Signal acquisition and processing	NI LabVIEW programming for signal acquisition, processing, and pneumatic control interface. NI DAQ signal IO modules selection Design of signal conditioning circuit
Software and Programming	Signal processing and MATLAB Toolbox Python and Machine Learning COMSOL FEM simulation
2D and 3D design	3D Max Adobe Illustrator AutoCAD
Other academia skills	LaTeX