Xin Li

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Bibliography

Xin is now an **Associate Professor** with the Guangzhou Institute of Technology, **Xidian University**, China. He received the Ph.D. degree from a joint program of the Shanghai Institute of Microsystem and Information Technology, **Chinese Academy of Sciences**, and **Nanyang Technological University**, Singapore. His research supervisors were **Prof. Junrui Liang** and **Prof. Yaowen Yang**.
With the vision of building an Internet of Moving Things free from batteries, less polluting, and sustainable, his research focuses on designing effective, reliable, and scalable battery-free IoT solutions based on kinetic energy harvesting. His research interests include **energy harvesting**, **intermittent computing**, **ubiquitous computing**, and **battery-free IoT system**.

Educations

Nanyang Technological University Singapore
Ph.D. (Joint Training) in Information and Communication Engineering *Sept. 2021 – Jul.2022*
***Research supervisor**: Prof. Yaowen Yang*

University of Chinese Academy of Sciences Shanghai, China
Ph.D. in Information and Communication Engineering *Sept. 2018 – Jun.2022*
***Research supervisor**: Prof. Junrui Liang*

University of Chinese Academy of Sciences Shanghai, China
M.Sc in Information and Communication Engineering *Sept. 2017 – Jun. 2018*
***Research supervisors**: Prof. Jianming Wei and Dr. Xiaoyuan Ma*

North University of China Taiyuan, China
B.E. in Weapon System Engineering *Sept. 2012 – Jul. 2016*
***Research supervisor**: Prof. Qiang Li*

Research Honors

- **Best Paper** of the International Conference on Vibration and Energy Harvesting Applications (VEH) in 2021.
- **Best Student Hardware Competition Finalist** of the ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS) in 2020.
- **1st Runner Up** of the IEEE Industrial Electronics Society (IES) Inter-Chapter Paper Competition in 2019.
- **1st Place** at the ACM/IEEE International Conference on Embedded Wireless Systems and Networks (EWSN) Dependability Competition – Category "Data Collection" in 2019.
- **3rd Place** at the ACM/IEEE International Conference on Embedded Wireless Systems and Networks (EWSN) Dependability Competition in 2018.

Research Projects

KPID: a kinetic-powered IDentification system Jan. 2021 – Present
Xidian University *Guangzhou, China*
- Battery-free BLE mesh system.

ViPSN and ViPSN++: a vibration-powered IoT platform Jan. 2019 – Jan. 2020
Xidian University *Guangzhou, China*
- ViPSN: an open-source development platform specified for vibration-powered IoT devices.
- ViPSN-cam: a vibration-powered ubiquitous camera.
- ViPSN-gameboy: a transient-motion-powered gameboy.

- ViPSN-pluck: a transient-motion-powered motion detector.
- 1st Runner Up of the IEEE Industrial Electronics Society (IES) Inter-Chapter Paper Competition in 2019.
- Best Student Hardware Competition Finalist of the ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS) in 2020.
- Best Paper of the 3rd International Conference on Vibration and Energy Harvesting Applications (VEH) in 2021.

Energy Informatization for Sustainable ICT Dec. 2021 – Present
Tsinghua University and ShanghaiTech University *Shanghai, China*

- Network resource allocation based on the fusion of energy flow and information flow under the condition of energy uncertainty.

DeCot and DeCot++: dependable MAC protocols for IEEE 802.15.4 Mar. 2017 – Jan. 2019
Shanghai Advanced Research Institute, Chinese Academy of Sciences *Shanghai, China*

- Proposed a dependable concurrent transmission-based WSN to stand against interference.
- D-Cube: a large-scale wireless sensor network testbed.
- MoteScatter: a noise-modulation-based backscatter communication under harsh interference.
- 3rd place at the EWSN Dependability Competition in 2018.
- 1st place at the EWSN Dependability Competition – Category "Data Collection" in 2019.

Publications

Journal Papers (* corresponding author, + co-first author, underline: supervised students)

1. **Xin Li**, Guobiao Hu, Chaoyang Zhao, Yaowen Yang*, and Junrui Liang*, "A Paradigm Shift Battery-free Flexible Motion Sensing Solution Enabled by Triboelectric Nanogenerator and Backscatter Communication," Advanced Science, under review.

2. **Xin Li**, Guobiao Hu, Yaowen Yang*, and Junrui Liang* "Dynamic Analysis of A Plucking Energy Harvester for Transient-motion-powered IoT Applications," IEEE/ASME Transactions on Mechatronics, under review. (**VEH 2021 Best Paper**)

3. Shiyi Liu, **Xin Li**, Li Teng, Guobiao Hu, and Junrui Liang*, "Energy and dynamic analysis of quasi-static toggling mechanical energy harvester," Nano Energy, 2022.

4. Qiang Liu, **Xin Li+**, Hao Zhang, Jing Ren*, Shuo Yang, Leitao Cao, Junrui Liang*, Shengjie Ling*, "IntelliSense silk fibroin ionotronic batteries for wildfire detection and alarm," Nano Energy, 2022.

5. **Xin Li**, Guobiao Hu, Zhenkun Guo, Junlei Wang, Yaowen Yang*, and Junrui Liang*, "Frequency Up-conversion based Vibration Energy Harvesting Technology: A Review (invited paper)," Symmetry, 2022.

6. Jianjun Wang*, Yalei Cao, Hongjun Xiang, Zhiwei Zhang, Junrui Liang, **Xin Li**, Deyun Ding, Teng Li, Lihua Tang, "A Piezoelectric Smart Backing Ring for High-performance Power Generation Subject to Train Induced Steel-spring Fulcrum Forces," Energy Conversion and Management, 2022.

7. **Xin Li**, Hong Tang, Guobiao Hu, Bao Zhao, and Junrui Liang*, "ViPSN-pluck: A Transient-motion-powered Motion Detector," IEEE Internet of Things Journal, 2021.

8. **Xin Li**, Li Teng, Hong Tang, Haoyu Wang, Yu Liu, Minfan Fu, and Junrui Liang*, "ViPSN: A Vibration-powered IoT Platform," IEEE Internet of Things Journal, 2021.

9. Junrui Liang*, **Xin Li**, and Hailiang Yang, "Kinetic Energy Harvesting toward Battery-free IoT: Opportunities and Challenges (invited paper)," ZTE Communications, 2021.

10. Guobiao Hu, Chaoyang Zhao, Yaowen Yang*, **Xin Li**, and Junrui Liang*, "Triboelectric Energy Harvesting Using An Origami-inspired Structure," Applied Energy, 2021.

11. Zhenkun Guo, Guobiao Hu, Jingchao Jiang, Liuding Yu, **Xin Li**, and Junrui Liang*, "Theoretical and Experimental Study of The Vibration Dynamics of A 3D-printed Sandwich Beam with Hourglass Lattice Truss Core (invited paper)," Frontiers in Mechanical Engineering, 2021.

12. Jinxi Zhang, Shaobo Gong, **Xin Li**, Junrui Liang, Zhonglin Wang*, and Kailiang Ren*, "A Wind-driven Poly (tetrafluoroethylene) Electret and Polylactide Polymer-based Hybrid Nanogenerator for Self-powered Temperature Detection System," Advanced Sustainable Systems, 2020.

13. Xiaoyuan Ma*, Peilin Zhang, **Xin Li**, Weisheng Tang, Jianming Wei*, and Oliver Theel, "DeCoT: A Dependable Concurrent Transmission-based Protocol for Wireless Sensor Network," IEEE Access, 2018.

Conference Papers (* corresponding author, + co-first author, underline: supervised students)

1. Yue Zhu, **Xin Li***, and Junrui Liang, "Live Demo of Motion-powered Gameboy," Proceedings of the 7th International Workshop on Real-World Embedded Wireless Systems and Networks, in conjunction with the 20th ACM Conference on Embedded Networked Sensor Systems, Boston, United States, 2022. (Sensys 2022)

2. **Xin Li**, "Opportunities of Motion-powered IoT Systems," Proceedings of the 2021 International Conference on Embedded Wireless Systems and Networks, Delft, Netherlands, 2021. (EWSN 2021)

3. **Xin Li**, Hong Tang, Guobiao Hu, and Junrui Liang*, "Live Demo of A Transient-motion-powered Human Motion Detector," Proceedings of the 2021 IEEE International Symposium on Circuits and Systems, Daegu, Korea, 2021. (ISCAS 2021)

4. **Xin Li**, Hong Tang, Bao Zhao, and Junrui Liang*, "System Design and Implementation of A Transient-motion-powered IoT Sensor Node," Proceedings of the ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, Irvine, CA, USA, 2020. (SMASIS 2020) (**Finalist of Best Student Hardware Competition**)

5. **Xin Li**, Hong Tang, Yiyao Zhu, and Junrui Liang*, "Power Solution of A Vibration-powered Sensing Node," Proceedings of the 9th International Power Electronics and Motion Control Conference, Nanjing, China, 2020. (ECCE Asia 2020)

6. **Xin Li**, Hong Tang, Junrui Liang*, and Lihua Tang, "Exploring The Magnetic Plucking Motion towards A Transient-motion-powered IoT Sensor Node," Proceedings of SPIE Conference, Active and Passive Smart Structures and Integrated Systems IX, 2020. (SPIE SS/NDE 2020)

7. Xiaoyuan Ma, Peilin Zhang, Ye Liu, **Xin Li**, Weisheng Tang, Pei Tian, Jianming Wei, Lei Shu, and Oliver Theel, "Competition: Using DeCot+ to Collect Data under Interference," Proceedings of the 2019 International Conference on Embedded Wireless Systems and Networks, Beijing, China, 2019. (EWSN 2019) (**1st place of Dependability Competition**)

8. **Xin Li**, Xiaoyuan Ma*, Peilin Zhang, Pei Tian, and Jianming Wei*, "Escape or Exploit? A Noise-modulation-based Communication under Harsh Interference," Proceedings of the 7th International Workshop on Real-World Embedded Wireless Systems and Networks, in conjunction with the 16th ACM Conference on Embedded Networked Sensor Systems, Shenzhen, China, 2018. (SenSys 2018)

9. Xiaoyuan Ma*, Peilin Zhang, Weisheng Tang, **Xin Li**, Wangji He, Fuping Zhang, Jianming Wei*, and Oliver Theel, "Using Enhanced OF∋COIN to Monitor Multiple Concurrent Events under Adverse Conditions," Proceedings of the 2018 International Conference on Embedded Wireless Systems and Networks, Madrid, Spain, 2018. (EWSN 2018) (**3rd place of Dependability Competition**)