Xin Li

+86 18916106107 | lixin1@shanghaitech.edu.cn | www.lixin.wiki | linkedin | github

Bibliography

Xin is now a Ph.D. candidate at ShanghaiTech University. He is also with the Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, and University of Chinese Academy of Sciences. His research interests include kinetic energy harvesting, intermittent computing, ubiquitous computing, and battery-free IoT. His research advisor is Professor **Junrui Liang**.

Educations

ShanghaiTech University/University of Chinese Academy of Sciences — Shanghai, China
Ph.D. in Electronic and Information Engineering — *Sep. 2018 – Present*
***Research advisor**: Prof. Junrui Liang*

University of Chinese Academy of Sciences — Shanghai, China
M.Sc in Information and Communication Engineering — *Sep. 2017 – Jul. 2018*
***Research advisors**: Prof. Jianming Wei and Xiaoyuan Ma*

North University of China — Taiyuan, China
B.E. in System Engineering — *Sep. 2012 – Jul. 2016*
***Research advisor**: Prof. Qiang Li*

Research Honors

- 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 EWSN Dependability Competition – Category "Data Collection" in 2019.
- 3rd place at the EWSN Dependability Competition in 2018.

Publications

1. **Xin Li**, Li Teng, Hong Tang, Jingying Chen, Haoyu Wang, Yu Liu, Minfan Fu, and Junrui Liang*, "ViPSN: a vibration-powered IoT platform," IEEE Internet of Things Journal, doi: 10.1109/JIOT.2020.3016993.
2. 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, Dec. 2020.
3. **Xin Li**, Hong Tang, Guobiao Hu, and Junrui Liang*, "ViPSN-E: A Transient-Motion-Powered Human Motion Detector," IEEE Internet of Things Journal, under review.
4. **Xin Li**, Guobiao Hu, Hong Tang, and Junrui Liang*, "Design and Analysis of a Transient Plucking Energy Harvester towards Battery-free Motion-Sensing System," IEEE/ASME Transactions on Mechatronics, under review.
5. Junrui Liang*, **Xin Li**, and Hailiang Yang, "Kinetic Energy Harvesting toward Battery-free IoT: Opportunities and Challenges," ZTE Communications, under review.
6. 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," Frontiers in Mechanical Engineering, under review.
7. Hong Tang, **Xin Li**, Junrui Liang*, "Software Assisted MPPT Strategy for Vibration Energy Harvesting System," IEEE Internet of Things Journal, to be submitted soon.

8. 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, vol. 6, pp. 73130–73146, Oct. 2018.

9. **Xin Li**, "PhD Forum Abstract: Opportunities of Motion-Powered IoT Systems," Proceedings of the 2021 International Conference on Embedded Wireless Systems and Networks, Delft, Netherlands, Feb 17-19, 2021. (EWSN 2021)

10. **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, May 23-26, 2021. (ISCAS 2021)

11. **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, September 14–16, 2020. (SMASIS 2020) (**Finalist of Best Student Hardware Competition**)

12. **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, May 31-June 3, 2020. (IPEMC - ECCE Asia 2020)

13. **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 11376, Active and Passive Smart Structures and Integrated Systems IX, 113761U, April 22, 2020. (SPIE SS/NDE 2020)

14. 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, pp. 290–291. (EWSN 2019) (**1st place of Dependability Competition**)

15. **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 (RealWSN 2018), in conjunction with the 16th ACM Conference on Embedded Networked Sensor Systems (SenSys 2018), Shenzhen, China, 2018, pp. 31–36.

16. 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, pp. 211–212. (EWSN 2018) (**3rd place of Dependability Competition**)

Research Experiences

Assistant of Undergraduate Supervision (Prof. Junrui Liang) Jan. 2019 – Present
ShanghaiTech University *Shanghai, China*

- Mechanical backscatter tag using 2.4GHz RF signal (Yang Zhang, 2019)
- Energy harvesting insole design based on hydraulic generator (Shijie Shen, 2019)
- Design and implementation of modular intelligent IoT floor network (Ruifang Liu, 2020)
- ViPSN-Eink: a motion-powered E-ink HCI system (Yue Zhu, 2021)

Teaching Assistant of Embedded System (Prof. Junrui Liang) Mar. 2020 – Jul.2020
ShanghaiTech University *Shanghai, China*

- Assisted Prof. Liang in preparing homework solutions.
- Assisted in guiding course projects.
- Taught one lesson about battery-free IoT and ubiquitous computing.
- Q&A session.

Teaching Assistant of Computer Network (Prof. Zhice Yang) Sept. 2018 – Jan.2019
ShanghaiTech University *Shanghai, China*

- Assisted Prof. Yang in preparing homework solutions.
- Guided course projects.
- Q&A session.

Research Assistant in SeLab of CAS (Prof. Jianming Wei) Mar. 2017 – Sep. 2018
Shanghai Advanced Research Institute, Chinese Academy of Sciences *Shanghai, China*
- Built a network testbed for power-line-communication.
- Built a complete-system wireless personal area network platform (original version of ChirpBox).
- Participated in 973 sub-project and National Key R&D Program of China.

Research Projects

ViPSN-Eink: a Motion-Powered E-ink HCI system Aug. 2020 – Present
ShanghaiTech University *Shanghai, China*
- Built a motion-powered E-ink used to achieve battery-free HCI system.

ViPSN-E: a Transient-Motion-Powered Motion Detector Oct. 2019 – Nov. 2020
ShanghaiTech University *Shanghai, China*
- Represented a pioneer work to harvest energy from transient motions.
- Provided a robust energy harvesting solution via a proper mechanical modulation strategy, i.e., potential energy precharging, to support the execution of systemlevel tasks.
- Employed a novel sensing architecture for motion detector, based on cyber-electro-mechanically synergistic co-design.
- Best Student Hardware Competition Finalist of the ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS) in 2020.

ViPSN-Cam: a Vibration-Powered Ubiquitous Camera Sep. 2019 – Present
ShanghaiTech University *Shanghai, China*
- Built a battery-free camera based on vibration energy harvesting.
- Proposed a dynamic energy management solution for heavy load energy consumption. It can maintain the optimal power input and robustly perform image acquisition, processing, and wireless transmission.

ViPSN: a Vibration-Powered IoT Platform Jan. 2019 – Jan.2020
ShanghaiTech University *Shanghai, China*
- First open-source development platform specified for vibration-powered IoT devices.
- Proposed a reliable energy management solution.
- 1st Runner Up of the IEEE Industrial Electronics Society (IES) Inter-Chapter Paper Competition in 2019.

ChirpBox and Battery-free ChirpBox: WSN Platform Mar. 2017 – Present
Shanghai Advanced Research Institute, Chinese Academy of Sciences *Shanghai, China*
- ChirpBox is a large-scale IoT platform serving smart city.
- I built the original version of ChirpBox by myself, including all system elements, from Mar. 2017 to Mar. 2018.
- I am assisting SeLab from CAS to realize battery-free Chirpbox.

DeCot and DeCot+: Dependable MAC Protocol for IEEE 802.15.4 Mar. 2017 – Sep. 2018
Shanghai Advanced Research Institute, Chinese Academy of Sciences *Shanghai, China*
- Proposed a dependable Concurrent Transmission-based WSN to stand against interference.
- 1st place at the EWSN Dependability Competition – Category "Data Collection" in 2019.
- 3rd place at the EWSN Dependability Competition in 2018.

MoteScatter: a Noise-Modulation-Based Backscatter Communication Mar. 2017 – Feb. 2018
ShanghaiTech University, Shanghai Advanced Research Institute *Shanghai, China*
- Proposed a reliable approach to communicate under interference via exploiting interference.
- **Only one course project (CS210, SIST of ShanghaiTech) published at an international conference.**