

Xianjin XIA

The Hong Kong Polytechnic University
Hung Hom, Kowloon, Hong Kong, China
E-mail: jinchenxia@gmail.com; xianjin.xia@polyu.edu.hk
Phone: (852)9600-3729

RESEARCH INTERESTS

- Internet of Things (IoT): LPWAN, LoRa, Localization, Wireless Sensing
- Mobile Networking and Wireless Communication: Wi-Fi, WSN

WORK EXPERIENCE

The Hong Kong Polytechnic University, Hong Kong *Mar 2021 – Present*
Research Assistant Professor

EDUCATION

The Hong Kong Polytechnic University, Hong Kong *Aug 2018 – Feb 2021*
Postdoc (Supervisor: Dr. Yuanqing Zheng)

Northwestern Polytechnical University, Xi'an, China *Sep 2013 – Jun 2018*
Ph.D, Computer Science (Supervisor: Prof. Shining Li)

RMIT University, Melbourne, Australia *Jan 2015 – Jan 2016*
Visiting Student (Supervisor: Prof. Tao Gu)

Northwestern Polytechnical University, Xi'an, China *Sep 2010 – Jul 2013*
M.Sc., Computer Science (Supervisor: Prof. Shining Li)

Northwestern Polytechnical University, Xi'an, China *Sep 2006 – Jul 2010*
B.Sc., Software Engineering

RESEARCH EXPERIENCE

Internet of Things and LPWAN *Sep 2018 – Present*

- Studied the scalability problem and packet collisions in LoRa networking; Proposed a PHY-layer collision recovery method which allows parallel decoding of collided LoRa packets and improves the network throughput by 3 times
- Explored the possibility of downclocking LoRa radio to sub-Nyquist sampling rate yet without impairing the communication functionality; Developed and implemented a new "light-sleep" receive mode for LoRa radio, which can reduce the operating clock-rate by up to 8 times and reduce 50% of the power consumption for LoRa reception

Smartphone Power Consumption Optimization *Jan 2015 – Jun 2018*

- Identified two energy inefficiency issues of smartphone background WiFi communication
- Built an out-of-band side channel to exchange traffic-coordinating information among WiFi clients without occupying the WiFi communication band
- Developed, implemented and tested a new WiFi power-saving strategy on Android phones, obtained 20%~40% energy gains when phones are screen-off

WSN Load Balancing and Lifetime Optimization *Sep 2013 – Dec 2014*

- Investigated and concluded four main causes of the energy imbalance problem in WSNs

- Proposed to exploit transmission power control for energy balancing, studied the energy balancing capability and determinant factors of the proposed scheme
- Revealed the fundamental relationships between energy balancing and lifetime optimization

TEACHING EXPERIENCE

Department of Computing, HK PolyU

Jan 2022 – May 2022

Subject lecturer for first year college course “Introduction to Computer Systems”

School of Computer Science, NPU

Mar 2015 – Jun 2015

Teaching Assistant for first year college course “Introduction to Programming”

School of Computer Science, NPU

Mar 2015 – Jun 2015

Teaching Assistant for first year college course “Introduction to Programming”

School of Computer Science, NPU

Mar 2011 – Jun 2011

Teaching Assistant for second year college course “User Interface Design”

School of Software and Microelectronics, NPU

Sep 2009 – Dec 2009

Teaching Assistant for third-year college course “Data Structure and Algorithms”

PUBLICATIONS

• Journal Papers

- [1] Ningning Hou, **Xianjin Xia**, Yuanqing Zheng, “Don’t Miss Weak Packets: Boosting LoRa Reception with Antenna Diversities”, in *ACM Transactions on Sensor Networks (ToSN)*, Early Access (Aug 2022), DOI: 10.1145/3563698.
- [2] Ningning Hou, **Xianjin Xia**, Yuanqing Zheng, “CloakLoRa: A Covert Channel over LoRa PHY”, in *IEEE/ACM Transactions on Networking (ToN)*, Early Access (Aug 2022), DOI: 10.1109/TNET.2022.3209255.
- [3] **Xianjin Xia**, Yuanqing Zheng and Tao Gu, "PCube: Scaling LoRa Concurrent Transmissions with Reception Diversities", in *ACM Transactions on Sensor Networks (ToSN)*, Early Access (Jun 2022), DOI: 10.1145/3545571.
- [4] **Xianjin Xia**, Yuanqing Zheng and Tao Gu, "LiteNap: Downclocking LoRa Reception," in *IEEE/ACM Transactions on Networking (ToN)*, Pages: 1-14, Jul 2021.
- [5] **Xianjin Xia**, Yuanqing Zheng and Tao Gu, "FTrack: Parallel Decoding for LoRa Transmissions," in *IEEE/ACM Transactions on Networking (ToN)*, Pages: 1-14, Aug 2020.
- [6] **Xianjin Xia**, Shining Li, Yu Zhang, Tao Gu, and etc., “Enabling Out-of-band Coordination of WiFi Communication on Smartphones”, in *IEEE/ACM Transactions on Networking (ToN)*, Vol. 27, Issue 2, Pages: 518–531, Apr 2019.
- [7] **Xianjin Xia**, Shining Li, Yu Zhang, and etc., “Energy Balance of Mixed Data Transmission in 1D Sensor Networks”, *Ruan Jian Xue Bao/Journal of Software*, Vol. 26, Issue 8, Pages: 1983-2006, Aug 2015.

• Conference Papers

- [1] **Xianjin Xia**, Qianwu Chen, Ningning Hou, Yuanqing Zheng, “HyLink: Towards High Throughput LPWANs with LoRa Compatible Communication”, in proc. of *ACM SenSys’22*, Boston, MA, USA, Nov 2022.
- [2] Ningning Hou, **Xianjin Xia**, Yuanqing Zheng. “Don’t Miss Weak Packets: Boosting LoRa Reception with Antenna Diversities”, in proc. of *IEEE INFOCOM’22*, London, UK, May 2022.
- [3] **Xianjin Xia**, Ningning Hou, Yuanqing Zheng, Tao Gu. “PCube: Scaling LoRa Concurrent Transmissions with Reception Diversities”, in proc. of *ACM MobiCom’21*, New Olean, USA,

Oct 2021.

- [4] Ningning Hou, **Xianjin Xia**, Yuanqing Zheng, “Jamming of LoRa PHY and Countermeasure”, in proc. of *IEEE INFOCOM’21*, Vancouver, Canada, Apr 2021.
- [5] **Xianjin Xia**, Yuanqing Zheng, Tao Gu, “LiteNap: Downclocking LoRa Reception”, in proc. of *IEEE INFOCOM’20*, Beijing, China, pp. 2321–2330, Jul 2020.
- [6] **Xianjin Xia**, Yuanqing Zheng, Tao Gu, “FTrack: Parallel Decoding for LoRa Transmissions”, in proc. of *ACM SenSys’19*, New York, USA, pp. 192–204, Nov 2019.
- [7] **Xianjin Xia**, Shining Li, Yu Zhang, Lin Li, Tao Gu, and etc., “Surviving Screen-off Battery through Out-of-band Wi-Fi Coordination”, in *IEEE INFOCOM’17*, Atlanta, USA, pp. 1-9, May 2017.
- [8] **Xianjin Xia**, Shining Li, Yu Zhang, Tao Gu, Yan Pan, “Towards Energy-Balanced Data Transmission for Lifetime Optimization in Wireless Sensor Networks”, *IEEE ICC’16*, Kuala Lumpur, Malaysia, May 2016.
- [9] Qianwu Chen, **Xianjin Xia**, Zhigang Li, Yuanqing Zheng. “Collaborative Transmission over Intermediate Links in Duty-Cycle WSNs”, in proc. of *IEEE ICPADS’21*, Beijing, China, Dec 2021.

- **Workshop and Posters**

- [1] **Xianjin Xia** and Yuanqing Zheng. “Poster Abstract: Connecting LoRaWANs Deep Inside a Building”. In Proc. of *ACM BuildSys ’20*. ACM, New York, NY, USA, pp. 312–313, Nov 2020.
- [2] **Xianjin Xia**, Shining Li, Yu Zhang, Lin Li, and etc., “Poster Abstract: ToneSense: Communication across Technologies through Power-channel”, in *ACM MobiCom’16 (Poster)*, New York, USA, Oct 2016.
- [3] **Xianjin Xia**, Shining Li, Yu Zhang, Zhe Yang, “Poster: Energy Balance Bounds of Mixed Data Transmission in Wireless Sensor Networks”, *IEEE INFOCOM’14*, Toronto, Canada, Apr 2014.
- [4] Yan Pan, Shining Li, **Xianjin Xia**, Zhigang Li, Zhe Yang, Yu Zhang and etc., “Poster: Using typing pattern to save energy: adaptive notification mechanism in MIM APPs”, *IEEE INFOCOM’16*, San Francisco, USA, May 2016.

PROFESSIONAL SERVICES

- Reviewer for conferences IEEE INFOCOM 2019~2021, ACM EWSN 2021, IPSN 2021, IoTDI 2021
- Reviewer for journals IEEEACM ToN, IEEE TMC, ACM TOSN, IoT-J, TWC, etc.
- TPC member for IEEE MASS 2021

AWARDS

- National Scholarship of China (2008, 2009)
- Outstanding Graduates & Dissertation Award of Northwestern Polytechnical University (2010)
- First Prize Scholarship of Northwestern Polytechnical University (2011 – 2014)
- First Prize Huawei Scholarship (2007)
- Outstanding Individual Award of the Embedded System Key Laboratory of Shaanxi Province (2013, 2014, 2017)