

# Xiaoxuan LU

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RESEARCH INTERESTS	<b>Core:</b> Cyber-Physical Systems, Internet of Things <b>Applications:</b> Autonomous Systems, Mobile Computing, Security and Privacy	
CURRENT POSITION	<b>Postdoc Researcher</b> , Cyber Physical Systems Group Department of Computer Science, University of Oxford	
EDUCATION	<b>University of Oxford, UK</b> PhD in Computer Science, 2015 ~ 2019 <ul style="list-style-type: none"><li>- Google-DeepMind PhD Scholarship</li><li>- Thesis: <i>Robustly Inferring Identity across Digital and Physical Spaces</i></li><li>- PhD Committee: Prof. Niki Trigoni (advisor), Dr. Andrew Markham (advisor), Dr. Thomas Ploetz and Dr. Nic Lane</li><li>- Citation: 447, h-index: 9, 10-index: 9</li></ul> <b>Nanyang Technological University (NTU), Singapore</b> M.Eng in Electrical and Electronic Engineering, 2013 ~ 2015 <ul style="list-style-type: none"><li>- 1st graduate in the same-year group</li><li>- Thesis: <i>Development of Non-intrusive WiFi Based Indoor Positioning Systems</i></li><li>- Advisor: Prof. Lihua Xie (IEEE Fellow)</li></ul> <b>Nanjing University of Aeronautics and Astronautics (NUAA), P.R. China</b> B.Eng. in Automation Engineering, 2009 ~ 2013 <ul style="list-style-type: none"><li>- Ranked top 1% (2nd out of 203)</li><li>- Outstanding Graduate Award</li></ul>	
FELLOWSHIPS AND AWARDS	Chinese Outstanding PhD Student Abroad Award	2019
	Oxford Christ Church Junior Research Fellowship (Runner-up)	2019
	Best Paper Nominee - DCOSS'19	2019
	Google-Deepmind PhD Scholarship	2015 ~ 2018
	Oxford-Keble Association Study Awards ×3	2016 ~ 2018
	Microsoft Indoor Localization Competition 4th Place Award	2015
	NTU Master of Engineering Award ×3	2013 ~ 2015
	NUAA Chancellor Gold Medal in Academics (1/16000 students)	2012
	CASC Scholarship (2/16000 students)	2012
	CATIC Scholarship (7/4000 students)	2011
	National Scholarship of China (Top 1%)	2010
	Grand Prize of National Electrical Control and Design Contest	2012
	Excellent Student Cadre of Jiangsu Province	2012
	NUAA First-class Honour Scholarship (Top 2%) ×3	2010-2013

TRAVEL GRANTS	Faith Ivens-Franklin Travel Grant	2018
	SIGCOMM Travel Grant @ ACM IMC	2019
	SIGCHI Travel Grant @ ACM Ubicomp	2018
	SIGMOBILE Travel Grant @ ACM SenSys	2017
	IEEE ComSoc Travel Grant @ WiMob	2016

RESEARCH EXPERIENCE	<b>University of Oxford, UK</b>	
	<i>Postdoc Researcher</i>	March 2019 ~ present
	<ul style="list-style-type: none"> <li>– <i>mLaser</i>: Prototyped a low-cost millimeter wave based mapping and localization system for challenging environments.</li> <li>– <i>mID</i>: Prototyped a non-intrusive millimeter wave based human tracking systems in domestic scenarios. → [DCOSS'19 (Best Paper Nominee)]</li> </ul>	
	<i>Research Student</i>	Oct. 2015 ~ Dec. 2018
	<ul style="list-style-type: none"> <li>– <i>Human Identification across Cyber and Physical Spaces</i>: Proposed a generic framework that automatically label biometrics in the wild from ambient digital breadcrumbs. → [IPSN'17, IoT-J'19, WWW'19]</li> <li>– <i>Cyber-Physical Attacks and Defenses</i>: Discovered a new threat of motion sensors on smartwatches through deep sequential learning. Proposed a novel cyber-physical countermeasure. → [UbiComp'18, ISWC'18]</li> <li>– <i>Multi-modal SLAM</i>: Identified a new positioning modality of powerline radiations and proposed novel multi-modal fusion methods for autonomous systems. → [MobiCom'18, THMS'18, CVPR'19]</li> <li>– <i>Neural Inertial Tracking</i>: Designed a novel framework of inertial odometry with deep recurrent neural networks to enable drift-less and attachment-agnostic inertial tracking. → [AAAI'18, AAAI'19]</li> </ul>	
	<b>Nanyang Technological University, Singapore</b>	
	<i>Research Student</i>	Aug. 2013 - Jun. 2015
	<ul style="list-style-type: none"> <li>– <i>Passive Human Localization</i>: Prototyped a WiFi based non-intrusive human localization systems in smart spaces (<b>demo</b>). [TWC'16, TC'16, WiMob'16]</li> </ul>	

PUBLICATIONS	<b>Conference Papers:</b>	
	16. <b>Xiaoxuan Lu</b> , Xuan Kan, Bowen Du, Changhao Chen, Hongkai Wen, Andrew Markham, Niki Trigoni and John Stankovic. "Autonomous Learning for Face Recognition in the Wild via Ambient Wireless Cues" In <i>ACM International World Wide Web Conference (WWW'2019)</i> . Core Rank: A*	
	15. <b>Xiaoxuan Lu</b> , Yang Li, Peijun Zhao, Changhao Chen, Linhai Xie, Hongkai Wen, Rui Tan and Niki Trigoni. "Simultaneous Localization and Mapping with Power Network Electromagnetic Field." In <i>ACM International Conference on Mobile Computing and Networking (MobiCom'2018)</i> . Core Rank: A*	
	14. <b>Xiaoxuan Lu</b> , Bowen Du, Hongkai Wen, Sen Wang, Andrew Markham, Ivan Marinovic, Yiran Shen and Niki Trigoni. "Snoopy: Sniffing Your Smartwatch Passwords via Deep Sequence Learning." In <i>ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp'2018)</i> . Core Rank: A*	
	13. <b>Xiaoxuan Lu</b> , Bowen Du, Peijun Zhao, Hongkai Wen, Yiran Shen and Niki Trigoni. "DeepAuth: In-situ Authentication for Smartwatches via Deeply Learned Behavioural Biometrics." In <i>International Symposium on Wearable Computers (ISWC'2018)</i> . Core Rank: A*	

12. **Xiaoxuan Lu**, Hongkai Wen, Sen Wang, Andrew Markham and Niki Trigoni. "SCAN: Learning Speaker Identity From Noisy Sets of Sensor Data" In *International Conference on Information Processing in Sensor Networks (IPSN'2017)*, Core Rank: A\*
11. **Xiaoxuan Lu**, Chenpu Yu, Han Zou, Hao Jiang, Lihua Xie. "Extreme Learning Machine with Dead Zone and its Application to WiFi Based Indoor Positioning." In *13th International Conference on Control, Automation, Robotics and Vision (ICARCV'2014)*. Core Rank: A
10. Bing Wang, Changhao Chen, **Xiaoxuan Lu**, Peijun Zhao, Niki Trigoni and Andrew Markham. "AtLoc: Attention Guided Camera Localization." In *AAAI Conference on Artificial Intelligence (AAAI'2020)*. Core Rank: A\*
9. Changhao Chen, Stefano Rosa, Yishu Miao, **Xiaoxuan Lu**, Wei Wu, Andrew Markham and Niki Trigoni. "Selective Sensor Fusion for Neural Visual Inertial Odometry." In *Conference on Computer Vision and Pattern Recognition (CVPR'2019)*. Core Rank: A\*
8. Changhao Chen, Yishu Miao, **Xiaoxuan Lu**, Linhai Xie, Andrew Markham and Niki Trigoni. "MotionTransformer: Transferring Physical Motion Between Domains For Neural Inertial Tracking." In *AAAI Conference on Artificial Intelligence (AAAI'2019)*. Core Rank: A\*
7. Changhao Chen, **Xiaoxuan Lu**, Andrew Markham and Niki Trigoni. "IONet: Learning to Cure the Curse of Drift in Inertial Odometry." In *AAAI Conference on Artificial Intelligence (AAAI'2018)*. Core Rank: A\*
6. Peijun Zhao, **Xiaoxuan Lu**\*, Jianan Wang, Changhao Chen, Wei Wang, Niki Trigoni and Andrew Markham. "mID: Tracking and Identifying People with Millimeter Wave Radar." In *International Conference on Distributed Computing in Sensor Systems (DCOSS'2019)*. [Best Paper Nominee]
5. Bowen Du, **Xiaoxuan Lu**, Xuan Kan, Kai Wu, Man Luo, Jianfeng Hou, Kai Li, Salil Kanhere, Yiran Shen, Hongkai Wen. "HydraDoctor: Real-time Liquids Intake Monitoring by Collaborative Sensing." In *International Conference on Distributed Computing and Networking (ICDCN'2018)*.
4. **Xiaoxuan Lu**, Hongkai Wen, Han Zou, Hao Jiang, Lihua Xie and Niki Trigoni. "Robust Occupancy Inference with Commodity WiFi." In *International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'2016)*.
3. Han Zou, Baoqi Huang, **Xiaoxuan Lu**, Hao Jiang and Lihua Xie. "Standardizing Location Fingerprints Across Heterogeneous Mobile Devices for Indoor Localization." In *14th Wireless Communications and Networking Conference (WCNC'2016)*.
2. Han Zou, Yiwen Luo, **Xiaoxuan Lu**, Hao Jiang and Lihua Xie. "A Mutual Information based Online Access Point Selection Strategy for WiFi Indoor Localization." In *11th International Conference on Automation Science and Engineering (CASE'2015)*.
1. Han Zou, Hao Jiang, **Xiaoxuan Lu**, and Lihua Xie. "An Online Sequential Extreme Learning Machine Approach to WiFi Based Indoor Positioning". In *1st World Forum on the Internet of Thing (WF-IoT'14)*.

### Journal Articles:

7. **Xiaoxuan Lu**, Yuanbo Xiangli, Peijun Zhao, Changhao Chen, Niki Trigoni, Andrew Markham. "Autonomous Learning of Speaker Identity and WiFi Geofence from Noisy Sensor Data.", *IEEE Internet of Things Journal*, 2019. (impact factor: 9.515)

6. **Xiaoxuan Lu**, Han Zou, Hongming Zhou, Lihua Xie, Guangbin Huang. "Robust Extreme Learning Machine with Its Application to Indoor Positioning.", IEEE Transactions on Cybernetics, 2015. (**impact factor: 10.387**)
5. Changhao Chen, **Xiaoxuan Lu\***, Johan Wahlstrom, Andrew Markham and Niki Trigoni. "Deep Neural Network Based Inertial Odometry Using Low-cost Inertial Measurement Units.", IEEE Transactions on Mobile Computing, 2019. (**impact factor: 4.474**)
4. Hongkai Wen, Ronald Clark, Sen Wang, **Xiaoxuan Lu**, Bowen Du, Wen Hu and Niki Trigoni. "Efficient Indoor Positioning with Visual Experiences via Lifelong Learning.", IEEE Transactions on Mobile Computing, 2018. (**impact factor: 4.474**)
3. Stefano Rosa, Andrea Patanè, **Xiaoxuan Lu**, Niki Trigoni, "Semantic Place Understanding for Human-Robot Cooperation - Towards Intelligent Workplaces", IEEE Transactions on Human-Machine Systems, 2018. (**impact factor: 3.332**)
2. Han Zou, Baoqi Huang, **Xiaoxuan Lu**, Hao Jiang and Lihua Xie. "A Robust Indoor Positioning System based on the Procrustes Analysis and Weighted Extreme Learning Machine.", IEEE Transactions on Wireless Communications, 2014. (**impact factor: 6.394**)
1. Han Zou, **Xiaoxuan Lu**, Hao Jiang and Lihua Xie. "A Fast and Precise Indoor Localization Algorithm based on Online Sequential Extreme Learning Machine.", Sensors, 2015. (**impact factor: 3.031**)

#### **Demos & Posters:**

4. **Xiaoxuan Lu**, Peijun Zhao, Bowen Du, Hongkai Wen, Andrew Markham, Stefano Rosa and Niki Trigoni "Demo: Automatic Face Recognition Adaptation via Ambient Wireless Identifiers" In *International Conference on Embedded Networked Sensor Systems (SenSys'18)*, ACM, 2018.
3. **Xiaoxuan Lu**, Xuan Kan, Stefano Rosa, Bowen Du, Hongkai Wen, Andrew Markham and Niki Trigoni "Poster: Towards Self-supervised Face Labeling via Cross-modality Association." In *International Conference on Embedded Networked Sensor Systems (SenSys'17)*, ACM, 2017.
2. Stefano Rosa, **Xiaoxuan Lu**, Hongkai Wen and Niki Trigoni. "Poster: Leveraging User Activities and Mobile Robots for Semantic Mapping and User Localization." In *International Conference on Human Robot Interaction (HRI'17)*, ACM/IEEE, 2017.
1. Han Zou, Hao Jiang, **Xiaoxuan Lu** and et al. "Demo: An Accurate and Reliable WiFi-based Indoor Localization and Navigation System." In *the 13th International Conference on Information Processing in Sensor Network (IPSN'15)*, ACM/IEEE, 2015.

#### **TEACHING EXPERIENCE**

*Embedded Software and Systems*

Role: Course Tutor and Demonstrator

Graduate course, University of Oxford, Department of Computer Science, 2019

*Introduction of Human Computer Interaction*

Role: Lecturer

Graduate/Undergraduate course, ViaX Online Seminar, 2019

*Sensor and Actuator Networks*

Role: Course Co-Designer and Tutor

Graduate/Undergraduate course, University of Oxford, Department of Engineering, 2019

*Internet of Things*

Role: Course Co-Designer and Tutor

Graduate course, University of Oxford, Department of Computer Science, 2018

*Mobile and Sensor Networks*

Role: Co-lecturer and Tutor

Graduate course, University of Oxford, Department of Computer Science, 2017

*Introduction to Programming with Python*

Role: Teaching Assistant

Undergraduate course, Nanyang Technology University, School of Electrical and Electronic Engineering, 2014

## STUDENT MENTORING

### • PhD Students

- Peijun Zhao, University of Oxford
- Changhao Chen, University of Oxford

### • Master Students

- Amber Xiangli, University of Oxford (now PhD student at CUHK)
- Yang Li, New York University

### • Undergraduate Students

- Xuan Kan, Tongji University (now PhD student at Emory University)
- Zihang Lai, University of Oxford
- Haotian Yin, Purdue University

### • High-school Students

- Elizaveta Sheremetyeva, Oxford High School GDST

## INVITED TALKS

*Title: Towards Autonomous and Trustworth Cyber Physical Systems*

- University of Liverpool (June 2019)
- Cardiff University (June 2019)
- Chinese Academy of Science (August 2019)

*Title: Robust Perception for Firefighting Drones in Smoke-Filled Environments*  
College Talk @ University of Oxford (May 2019)

*Title: Robustly Inferring Identity across Digital and Physical Worlds*  
7<sup>th</sup> East Lake International Forum for Outstanding Overseas Young Scholars @  
Huazhong University of Science and Technology (December 2018)

*Title: Autonomous Identity Inference across Cyber and Physical Worlds*  
Department Seminar Talk @ University of Cambridge (November 2018)

## PROFESSIONAL SERVICE

### • Technical Program Committee (TPC):

- The Web Conference (WWW) 2020
- International Workshop on FAILSAFE @ EWSN 2020
- ACM IMC 2019 (Shadow PC)

- International Workshop on Deep Learning for HAR @ IJCAI 2019
- International Workshop on Data Acquisition to Analysis @ SenSys 2019
- International Workshop on Multimodal Learning for IoT @ UbiComp 2019
- International Workshop on Device-Free Human Sensing @ BuildSys 2019
- Ph.D Forum @ MobiSys 2019
- ACM EWSN 2019 - Demo/Poster
- **External Conference Reviewer:**
  - ACM UbiComp 2019
  - IJCAI 2019
  - ACM CHI 2019
  - IEEE ICC 2019
- **Journal Reviewer:**
  - ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)
  - IEEE Transactions on Mobile Computing (TMC)
  - ACM Transactions on Sensor Networks (TOSN)
  - IEEE Internet of Things Journal (IoT-J)
  - ACM Transactions on Intelligent Systems and Technology
  - ACM Transactions on Computing for Healthcare
  - IEEE Computational Intelligence Magazine
  - IEEE Transactions on Cybernetics
  - Elsevier Neurocomputing
  - Springer Autonomous Robots

## REFERENCES

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|--|---|
| <p><b>Prof. Niki Trigoni</b> (advisor)<br/>Department of Computer Science<br/>University of Oxford</p>                         | <p>Email: niki.trigoni@cs.ox.ac.uk<br/>Oxford, OX1 3PR, UK</p>            |
| <p><b>Dr. Andrew Markham</b> (co-advisor)<br/>Department of Computer Science<br/>University of Oxford</p>                      | <p>Email: andrew.markham@cs.ox.ac.uk<br/>Oxford, OX1 3PR, UK</p>          |
| <p><b>Dr. Nic Lane</b><br/>Department of Computer Science<br/>University of Oxford</p>   | <p>Email: nicholas.lane@cs.ox.ac.uk<br/>Oxford, OX1 3PR, UK</p>           |
| <p><b>Dr. Rui Tan</b><br/>School of Computer Science<br/>Nanyang Technological University</p>                                  | <p>Email: tanrui@ntu.edu.sg<br/>50 Nanyang Ave, Singapore</p>             |
| <p><b>Prof. Lihua Xie</b> (Fellow of IEEE)<br/>School of Electronic Engineering<br/>Nanyang Technological University</p>       | <p>Email: elhxie@ntu.edu.sg<br/>50 Nanyang Avenue, Singapore</p>          |
| <p><b>Prof. John A. Stankovic</b> (Fellow of ACM &amp; IEEE)<br/>Department of Computer Science<br/>University of Virginia</p> | <p>Email: jas9f@virginia.edu<br/>Charlottesville, Virginia 22904, USA</p> |