PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, Suzhou, China
School	School of Advanced Technology
Supervisors	Principal Supervisor: Dr. Wanxin Li - 西交利物浦大学 Co-Supervisor: Dr. Jie Zhang - 西交利物浦大学 Co-Supervisor: Dr. Chao Long - 英国利物浦大学 Co-Supervisor: Dr. Hao Guo - 西北工业大学
Application Deadline	Open until the position is filled.
Funding Availability	Funded PhD project (world-wide students)
Project Title	Blockchain-Enhanced Federated Learning for Dynamic Traffic Prediction
Contact	Please email wanxin.li@xjtlu.edu.cn with a subject line of the PhD project title. The principal supervisor's profile is linked here: https://scholar.xjtlu.edu.cn/en/persons/WanxinLi

Requirements:

The candidate should have a first-class or upper second-class honours degree, or a master's degree (or equivalent qualification), in Computer Science, Cybersecurity, Artificial intelligence, Computer Networking, Software Engineering or related. Candidates who have backgrounds in blockchain technology and publication records are preferred.

Evidence of good spoken and written English is essential. The candidate should have an IELTS score of 6.5 or above, if the first language is not English. This position is open to all qualified candidates irrespective of nationality.

Degree:

The student will be awarded a PhD degree from the University of Liverpool (UK) upon successful completion of the program.

Funding:

The PhD studentship is available for three years subject to satisfactory progress by the student. The award covers tuition fees for three years (currently equivalent to RMB 99,000 per annum). It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. The scholarship holder is expected to carry out the major part of his or her

research at XJTLU in Suzhou, China. However, he or she is eligible for a research study visit to the University of Liverpool up to six months, if this is required by the project.

Project Description:
This study explores a blockchain-enhanced architecture for training online models using federated learning (FL) in various interdisciplinary fields. For example, managing urban traffic dynamics is crucial within intelligent transportation systems (ITS), where short-term traffic prediction plays a vital role in effective congestion management and vehicle routing. While centralized deep learning (DL) models have achieved high accuracy in prediction, their applicability is limited in decentralized ITS environments. The proliferation of connected vehicles and mobile sensors has led to decentralized data generation in ITS, offering an opportunity to enhance traffic prediction through collaborative machine learning. Recently, blockchain technology has shown the potential to enhance ITS efficiency, security, and reliability. When combined with blockchain, FL emerges as a suitable approach to harness online data streams in ITS.

The PhD student will receive comprehensive training through the structured project, hands-on research activities, and mentorship from experienced faculty members. Training will include seminars, workshops, and one-on-one sessions to enhance research skills, technical expertise, and academic proficiency. Additionally, the student will have access to resources such as online courses, conferences, and research publications to support their intellectual growth and development. Regular progress assessments and feedback mechanisms will ensure continuous improvement and alignment with research goals.

Furthermore, the research project will involve collaborations with other research institutes and industrial partners, providing the student with opportunities to engage in interdisciplinary research and gain exposure to real-world applications.

Supervisor Profiles:
Dr. Wanxin Li is an Assistant Professor in the Department of Communications and Networking at Xian Jiaotong-Liverpool University. He received his bachelor's degree from Chongqing University in China and both master's and doctoral degrees from University of Delaware in the United States. His research interests include blockchain, cryptography, distributed AI, and smart transportation. He was a recipient of IEEE ITSS Best Dissertation Award and IEEE TEMS Outstanding PhD Dissertation Award in 2022. He is a Fellow of UK Higher Education Academy and a Member of IEEE, ACM, and IET.

Dr. Jie Zhang is an Associate Professor in Xian Jiaotong-Liverpool University. She received the Ph.D. degree from University of Liverpool in 2018, and the M.S. degree from Nanjing Normal University in 2013. Her research interest is theory and application of public-key cryptography, in particular, key management, leakage-resilient cryptography, IoT security, and blockchain.

Dr. Chao Long is a Lecturer in Digital Energy Systems at University of Liverpool. He is with Energy and Power Group of Department of Electrical Engineering and Electronics in School of Electrical Engineering, Electronics and Computer Science. His research focuses on modelling, analysis and optimisation of smart power distribution grids and community energy systems. These include management of local energy from solar photovoltaic (PV) systems, batteries and electric vehicles using a combination of novel concepts and techniques, including peer to peer (P2P) energy trading, V2X, V2G and V2V technologies, using AI/machine learning and Blockchain distributed ledger technology. Chao is a Senior Member of IEEE.

Dr. Hao Guo is an Assistant Professor in the School of Software at Northwestern Polytechnical University. He received the B.S. and M.S. degrees from the Northwest University, Xi'an, China in 2012, and the Illinois Institute of Technology, Chicago, United States in 2014, and his Ph.D. degree from the University of Delaware, Newark, United States in 2020, all in computer science. His research interests include blockchain and distributed ledger technology, privacy-preserving computing, applied cryptography, and the Internet of Things (IoT). He is a member of IEEE, ACM and CCF.

How to Apply:

Interested applicants are advised to email wanxin.li@xjtlu.edu.cn the following documents for initial review and assessment (please put the project title in the subject line).

- CV
- Two formal reference letters
- Personal statement outlining your interest in the position
- Certificates of English language qualifications (IELTS or equivalent)
- Full academic transcripts in both Chinese and English (for international students, only the English version is required)
- Verified certificates of education qualifications in both Chinese and English (for international students, only the English version is required)
- PDF copy of Master Degree dissertation (or an equivalent writing sample) and examiners reports available

For more information about doctoral scholarship and PhD programme at Xi'an Jiaotong-Liverpool University (XJTLU), please visit

https://www.xjtlu.edu.cn/en/admissions/global/entry-requirements/

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