XJTLU-XJTU-UoL Joint Doctoral Supervision Project (Full-time)

Reference No.	SFXJTU2608
XJTLU School	School of Internet of Things
PhD Programme	Electrical and Electronic Engineering
Supervisors	XJTLU supervisor: Professor/Dr Muhammad Ateeq XJTU supervisor: Professor/Dr Ma Lu……... UoL supervisor: Professor/Dr Baoru Huang
Project Title	A multiphase flowmeter based on comparison and cross-validation of dual Microwave sensing and Electromagnetic higher order imaging measurements techniques for the cross-section of oil-gas-water hold up and multiphase flow velocity 一种基于双微波传感与电磁高阶成像测量技术比较和交叉验证的多相流量计，用于油气水截面持率及多相流速测量
Application Deadline	Open until the position is filled

Requirements:

A UK first-class or upper second-class honours Bachelor's degree and a UK Master's degree with Merit (or their equivalent) are required for PhD admissions. Exceptional candidates holding only a Bachelor's degree may be considered on an individual basis.

Evidence of good spoken and written English is essential. The candidate should have an IELTS (or equivalent) score of 6.5 or above, if the first language is not English.

For more information about entry requirements and admission procedures of PhD programme at XJTLU, please visit:

Entry Requirement - Xi'an Jiaotong-Liverpool University

How to Apply - Xi'an Jiaotong-Liverpool University

Other Requirements (if any):

In addition to the above, the candidates is also required to have demonstrated the following Essential (E) or Desirable (D) criteria to be considered:

- **E:** Bachelors' degree in Electronics/Electrical, Communication Engineering, Physics, Computer Science, Internet of Things (IoT), Mechatronics or Instrumentation Engineering, Microwave Technologies, Artificial Intelligence, Chemical or Petroleum Engineering (only if combined with substantial coursework or research experience in multiphase flow measurement, process tomography, or advanced sensing technologies), or similar, with Master degree in one of the stated fields.
- **E:** Hands-on experience with some of the programming languages such as Python

(including NumPy, SciPy, Pandas, and Matplotlib), MATLAB, or C/C++, R Studio, LabVIEW, OpenCL, Microsoft Office.

- **E:** Experience or strong interest in artificial intelligence and machine learning techniques, especially in the context of sensor data cross-validation, pattern recognition, or predictive modeling.
- **E:** Excellent problem-solving and analytical skills, with the ability to work independently on complex experimental setups, troubleshoot instrumentation issues, and critically evaluate measurement and experimental/data uncertainties.
- **E:** Good communication and teamwork skills, with the ability to collaborate with industrial partners and present research findings clearly in written and oral formats.
- **D:** Possess a strong background in the design and development of sensors, electromagnetic theory, microwave sensing, electromagnetic imaging techniques.
- **D:** Knowledge of multiphase flow mechanics and fluid dynamics, with a good understanding of oil-gas-water flow regimes, hold-up calculations, and velocity measurement principles.
- **D:** Proficiency in signal processing and data analysis, including hands-on experience with time-series data, frequency-domain analysis, and interpretation of complex measurement signals.
- **D:** A track record of peer-reviewed publications (or equivalent research outputs) in relevant fields such as sensors, fluid mechanics, or applied electromagnetics.

Programme Structure:

Doctoral students in the joint programme are registered with both XJTLU and the UoL. Upon successful completion of the programme, the students will be awarded a PhD degree from University of Liverpool.

During their doctoral studies at XJTLU, students are expected to conduct research at XJTU as visiting students. Additionally, students have the opportunity to apply for a three to six-month research visit to UoL.

Project Description:

This project proposes the development of a dual microwave sensor and electromagnetic higher order imaging technique integrated into one package to overcome the drawbacks of existing techniques to measure and monitor and cross-validate the cross-section holdup and velocities of multiphase oil-gas-water system. It is crucial in oil and gas industry to measure these parameters to get insights into reservoir condition, production capability, phase variation, maximum flow information and so on. Existing techniques are complex, time consuming, expensive, inaccurate and do not provide timely information.

This project thus proposes the development of a dual measurement system along with integrated AI to fully evaluate, measure and monitor the above parameters more accurately and precisely by capitalizing upon individual capabilities of the techniques and integrating them together to get a more effective, innovative and novel solution.

Joint Supervisory Team:

XJTLU supervisor: Professor/Dr Muhammad Ateeq

XJTU supervisor: Professor/Dr Ma Lu

UoL supervisor: Professor/Dr Baoru Huang

How to Apply:

Interested applicants are advised to email muhammad.ateeq@xjtlu.edu.cn the following documents for initial review and assessment (Please include 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