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

Reference No.	SFXJTU2538
XJTLU School	Academy of AI and Advanced Technology
PhD Programme	Electrical and Electronic Engineering
Supervisors	XJTLU supervisor: Dr Xuchen Wang XJTLU co-supervisor: Dr Tianru Zhang XJTU supervisor: Prof. Sen Yang UoL supervisor: Dr Ian Sandall
Project Title	Precision Dynamic Magnetic Field Control of Three-Dimensional Reconfigurable Smart Optical Materials 基于动态磁场精确控制的三维可重构智能光学材料研究
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):

Applicants should have a background in electrical or electronic engineering, control engineering, materials science, applied physics, or a related discipline.
Experience in programming, laboratory experimentation, power electronics, optoelectronic characterisation, or computational modelling is desirable.
Applicants should be interested in interdisciplinary research. Prior expertise in all areas of the project is not required.

Programme Structure and Fees:

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 short-term research visit to the UoL if the project requires it.

The joint doctoral programme is offered on a full-time basis, with a typical duration of three to four years. The tuition fee is RMB 99,000 per year.

Project Description:

To cultivate research talents with global leadership, interdisciplinary innovation capabilities, and international research collaboration capabilities, Xi'an Jiaotong-Liverpool University (XJTLU) fully leverages its characteristics of international education and builds upon the long-established strategic cooperation among XJTLU, Xi'an Jiaotong University (XJTU), and the University of Liverpool (UoL). This initiative integrates top-tier research resources to launch a Joint Doctoral Supervision Programme across the three institutions.

This interdisciplinary project will investigate magnetically responsive three-dimensional optical materials whose geometry, transparency, and thermal radiation can be programmed in real time. Inspired by origami and kirigami, the material platform will integrate components with different magnetic responses to enable coordinated control of structural deformation and internal optical units. Potential applications include smart windows, adaptive optical devices, and energy-efficient thermal management.
A multi-axis electromagnetic actuation platform will be developed using programmable power converters and sensor feedback. The system will precisely control magnetic-field magnitude, direction, and temporal waveforms. Experiments will establish how electrical excitation and magnetic-field characteristics affect material motion and optical behaviour across visible and infrared wavelengths. The student will develop coupled models linking electrical excitation, magnetic fields, structural motion, and optical response.
Physics-informed learning and edge AI will be explored for embedded state estimation and adaptive control. Prototype experiments will assess switching speed, repeatability, and energy consumption against conventional approaches. The project combines XJTLU expertise in motor drives, power electronics, embedded intelligent control, and edge AI; XJTU expertise in magnetic materials and magnetically responsive optical systems; and UoL expertise in semiconductor materials, optoelectronic devices, device characterisation, photodetectors, and nanowires.

Joint Supervisory Team:

XJTLU supervisor: Dr Xuchen Wang

XJTLU co-supervisor: Dr Tianru Zhang

XJTU supervisor: Prof. Sen Yang

UoL supervisor: Dr Ian Sandall

How to Apply:

Interested applicants are advised to email Dr Xuchen Wang at Xuchen.Wang@xjtlu.edu.cn with the following documents for initial review and assessment. Please include the project reference number SFXJTU2538 and 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