PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	School of Advanced Technology
Supervisors	Principal supervisor: Dr. Nan Xiang (XJTLU) Co-supervisor: Dr. Yushan Pan (XJTLU) Co-supervisor: Dr. Yi Dong (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	An Accurate 3D Tracking Framework for Virtual Surgery Simulation
Contact	Please email Nan.Xiang@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title. The principal supervisor's profile is linked here: https://scholar.xjtlu.edu.cn/en/persons/NanXiang/

Requirements:

The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification) in in Computer Science, Applied Mathematics, Biomedical Engineering, Digital Media Technology, or a related field from an accredited university. Applicants holding a degree from 985/211/Double First-Class Universities and those with publications are particularly encouraged.

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. 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 holders are expected to conduct the majority of their research at XJTLU in Suzhou, China. However, they may apply for a short-term research visit to the University of Liverpool if the project requires it.

Project Description:

Virtual surgery is an important component of the international trend toward the reform of "digital medicine" education, promoting the integration of computer simulation with clinical medicine. However, 3D tracking and virtual-real mapping of surgical instruments in open surgery simulation remain challenging, with current tracking technologies facing significant bottlenecks. This project will focus on research questions and key technologies related to multimodal region-based pose estimation and kinematic structure construction of surgical instruments, and aims to overcome critical technological challenges, greatly improving tracking accuracy and stability. The outcomes have strong potential for broad applications and will significantly advance research on virtual-real fusion interaction of complex motion structures in extended reality environments, offering both theoretical and practical significance.

This project aims to establish a markerless, accurate 3D tracking framework for basic surgical instruments, eliminating the need for additional markers, and thus complement existing virtual surgery interaction and navigation methods. To achieve this, the following two specific objectives are set:

OB1. Establish a motion model based on local kinematic structure constraints to accurately track and 3D reconstruct the complex spatial motion postures of basic surgical instruments.

OB2. Explore the non-rigid motion mechanism of surgical instruments and expand the paradigm of instrument-tissue interaction based on the proposed algorithms and models.

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/

https://www.xjtlu.edu.cn/en/admissions/global/fees-and-scholarship

How to Apply:

Interested applicants are advised to email Nan.Xiang@xjtlu.edu.cn (XJTLU principal supervisor's email address) 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