

## PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	Academy of Pharmacy
Supervisors	<p><i>Please list all the names in the supervisory team. It should be consistent with the information on your approved PGRS proposal.</i></p> <p>Principal supervisor: Professor/Dr Tenglong Li (XJTLU)  Co-supervisor: Professor/Dr Mu Wang (XJTLU)  Co-supervisor: Professor/Dr Sarah Donegan(UoL)  Co-supervisor: Professor/Dr Ying Chen (XJTLU)</p>
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	<b>Investigation of Appropriate Models and Design Strategies for TB household contact studies</b>
Contact	<p>Please email Tenglong.Li@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title.</p> <p>The principal supervisor's profile is linked here:  <a href="https://www.xjtlu.edu.cn/en/study/departments/academy-of-pharmacy/academy-staff/academic-staff/staff/tenglong-li">https://www.xjtlu.edu.cn/en/study/departments/academy-of-pharmacy/academy-staff/academic-staff/staff/tenglong-li</a></p>

### **Requirements:**

The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification), in statistics, biostatistics, epidemiology, data science or similar fields.

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 80,000 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:**

Aim 1: To develop a random directed graph model (RDM) suitable for tuberculosis household contact studies. RDM should be adapted to incorporate key epidemiological features of TB, specifically long latency and the fact that only TB cases are infectious. There are four specific tasks to be completed:

Aim 1.1: To formalize the rules of drawing random directed graphs (RDG) for enrolled households. An appropriate RDG should reflect the temporal order of the transmission chain for each household and is consistent with the infection statuses of all individuals in a household.

Aim 1.2: To establish a generic form of the models for household and extra-household transmissions, which will be used to quantify the likelihood of a plausible transmission path for drawing RDG.

Aim 1.3: To construct a Markov Chain Monte Carlo (MCMC) algorithm for the implementation of the RDM.

Aim 1.4: To address the potential non-identifiability issue due to the lack of appropriate community controls for RDM parameters.

Aim 2: To investigate the bias associated with TB household contact study design for popular epidemiological estimators. A simulation study is used to check whether there is bias associated with SAR, OR, annual rate of infection, prevalence of LTBI individuals and TB cases as well as the proportions of infection due to household and extra-household transmissions. Empirical recommendations shall be made based on findings of the simulation study and demonstrated with a real dataset from a Ugandan household contact study.

Aim 3: To build a R package that simulates household and extra-household transmissions for TB household contact study. The simulation function will take a number of risk factors associated with Mtb infections and the corresponding RR as key inputs and output a dataset contains individual infection statuses and the underlying RDGs based on RDM.

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 [Tenglong.Li@xjtlu.edu.cn](mailto:Tenglong.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