

PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
Department	Department of Civil Engineering
Supervisors	Principal supervisor: Dr Guobin Gong (XJTLU, Department of Civil Engineering) Co-supervisor: Dr Jun Xia (XJTLU, Department of Civil Engineering) Co-supervisor: Dr Charles Loo (XJTLU, Department of Civil Engineering) Co-supervisor: Dr Sergio Andres Galindo Torres (UoL, School of Engineering)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Chinese title: 结构混凝土三轴行为的离散元模拟 <i>English title: DEM simulations of triaxial behaviour of structural concrete</i>
Subject Areas	<i>Civil and structural engineering</i>
Contact	Please email guobin.gong@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title

Requirements:

Academic qualification: The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification), in civil engineering or related disciplines. Former experiences in finite element analysis of engineering structures and/or discrete element modelling would be a bonus.

Language qualification: 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) and provides a monthly stipend of 5,000 RMB as a contribution to living expenses. It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. It is a condition of the award that holders of XJTLU PhD scholarships carry out 300-500 hours of teaching or research assistance work per year. 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 of up to three months, if this is required by the project.

Project Description:

The response of concrete at a material level is characterised by a distinctly non-linear stress-strain behaviour. Such a characteristic is already evident in the early portion of the stress-strain relations, becoming more pronounced as the ultimate state is approached. Such concrete behaviour is an important constituent of the overall input required for the structural analysis of concrete structures. Information on the strength and deformational properties of concrete is usually obtained by testing cylinder or prism specimens under 1-D uniaxial compression, and then an elastic-plastic 3-D model is proposed to match the 1-D case without actually performing triaxial testings under generalized 3-D stress states. Such a practice is not always reliable, since using the artificial constitutive elastic-plastic continuum based 3-D model to represent a discontinuous material like concrete is always questionable. In an attempt to reduce laboratory expenses, one would make predictions of a material's behavior through numerical simulations, with the primary goal being to accelerate a normally trial and error experimental processes. The recent dramatic increase in computational power available for mathematical modelling and simulation raises the possibility that modern numerical methods, such as discrete element method (DEM), can play a significant role in the analysis of granular materials including concrete. The generalized 3-D stress states will be simulated using DEM along different stress paths for a concrete specimen, with a focus on the softening and failure stages due to the presence of flaws and how the bond at the contact affects these.

For more information about doctoral scholarships and PhD programmes at Xi'an Jiaotong-Liverpool University (XJTLU), please go to <https://www.xjtlu.edu.cn/en/> and Click **Study with Us**.

How to Apply:

Interested applicants are advised to email guobin.gong@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 reference letters with company/university letterhead
- Personal statement outlining your interest in the position
- Proof of English language proficiency (an IELTS score of 6.5 or above)
- Verified school 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)

Informal enquiries may be addressed to Dr Guobin Gong (guobin.gong@xjtlu.edu.cn), whose personal profile is linked below,
<https://www.xjtlu.edu.cn/en/departments/academic-departments/civil-engineering/staff/guobin-gong>