PhD studentship   (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
Department	Department of Applied Mathematics
Supervisors	Principle supervisor: Professor/Dr Jie Chen (XJTLU, Department of Applied Mathematics)
	Co-supervisor: Professor/Dr Fei Ma (XJTLU, Department of Applied Mathematics)
	Co-supervisor: Professor/Dr Frans Coenen (UoL, Department of Computer Science)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Machine Learning-based Generalized Multiscale Finite Element Method and Its Application in Reservoir Simulation
Contact	Please email Jie.Chen01@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title

Requirements:

The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification), in Mathematics or Computer Science. 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 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:

Generalized multiscale finite element method (GMsFEM) can handle the multiscale phenomena efficiently, which extensively exist in reservoir simulation. Multiple scales in permeabilities (subsurface properties) can span a large range and the variations in the permeability can be of several orders of magnitude. To capture the multiscale property of heterogeneous media, standard polynomial basis functions are replaced by some solutions of local cell problems, which are called multiscale basis functions. To construct these bases, we traditionally need to solve a series of partial differential equations (PDE) locally. In this project, we try to replace these PDE solvers with some data-driven approaches. The objective of this project is to design novel multi-layer neural network architectures for multiscale simulations of flows taking into account the observed data and physical modeling concepts.

For more information about doctoral scholarship and PhD programme at Xi'an Jiaotong-Liverpool University (XJTLU): Please visit

http://www.xjtlu.edu.cn/en/study-with-us/admissions/entry-requirements

http://www.xjtlu.edu.cn/en/admissions/phd/feesscholarships.html

How to Apply:

Interested applicants are advised to email Jie.Chen01@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)
- PDF copy of Master Degree dissertation (or an equivalent writing sample) and examiners reports available

Informal enquiries may be addressed to Professor/Dr. Jie Chen (Jie.Chen01@xjtlu.edu.cn), whose personal profile is linked below,
https://www.xjtlu.edu.cn/en/departments/academic-departments/mathematical-sciences/staff/jie-chen