PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	School of advanced technology
Supervisors	Principal supervisor: Professor/Dr Chen Xuan (XJTLU) Co-supervisor: Professor/Dr Yuwen Cui (JITRI) Co-supervisor: Professor/Dr Charles Loo (XJTLU) Co-supervisor: Professor/Dr William Christian (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project
Project Title	AI-based Materials Design and Development of Advanced Metals and Alloys
Contact	Please email chenxuan@liverpool.ac.uk (XJTLU principal supervisor's email address) or ycui@njtech.edu.cn 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 materials, mechanics, metallurgy or informatics, etc.

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.

Please note that the joint PhD project is industry-based and the candidate is expected to undertake part of the research at the partner organization in China.

Degree:

The student will be awarded a PhD degree from the University of Liverpool (UK) upon successful completion of the program.

Funding:

This PhD project is a collaborative research project between XJTLU (http://www.xjtlu.edu.cn) in Suzhou and JITRI (Jiangsu Industrial Technology

Research Institute) Advanced Materials Research Institute, Yangtze Delta (Suzhou). The student will be registered as an XJLTU PhD student but is expected to carry out the major part of his or her research at the Institute in Advanced Materials Research Institute, Yangtze Delta.

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). In addition, during the period of undertaking main research at institute in Suzhou, the PhD candidate will be provided with monthly living allowance at a standard 5000RMB per month by Advanced Materials Research Institute, Yangtze Delta.

Project Description:

1) Multi-source database creation and feature processing

Evaluate R&D, testing, production and literature data, establish a multi-source database covering alloy composition, processing conditions, and microstructural characteristics, and with the yield strength as the target property. Referring to the strategy of the computational thermodynamics and kinetics, sort and feature the selected data in order to construct high-fidelity core dataset on yield strength property.

2) Development of the multi-fidelity data fusion algorithm

The residual-connection multi-fidelity data fusion is utilized to perform multi-fidelity data fusion on the processed data. In this project, the computational simulation and micro-nano test datasets are selected as low-fidelity data while the yield strength test dataset is high-fidelity data.

3) Development of deep learning model and code

Based on the open source Scikit-learn library, a supervised Python deep learning code is developed based on the artificial neural network to predict the yield strength of the target alloy system. Through the training of the fused dataset, the optimal neural network model is found, the appropriate hyperparameters are determined, and the cross-validation is carried out to complete the machine learning prediction of yield strength.

4) Continuum constitutive model based on material data

Under the framework of continuum mechanics, we'll establish a constitutive model based on material data, analyze the differences from classical models and perform finite element analysis.

5) AI design prototype

By putting all tasks together and iterating, it is to framework an AI design prototype for the yield strength performance of target alloys.

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/doctoral/entry-requirement-phd

https://www.xjtlu.edu.cn/en/admissions/doctoral/postgraduate-research-scholarships

Supervisor Profile:

Principal Supervisor:

https://www.xjtlu.edu.cn/zh/study/departments/academic-departments/foundational-mathematics/department-staff/academic-staff/staff/chen-xuan

How to Apply:

Interested applicants are advised to email chenxuan@liverpool.ac.uk (XJTLU principal supervisor's email address) or ycui@njtech.edu.cn the following documents for initial review and assessment (please put the project title in the subject line).

- CV
- Previous projects related to this advert
- 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