

PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	Design School
Supervisors	Principal supervisor: Dr Tianhong Gu (XJTLU) Co-supervisor: Dr Shiyao Huang (JITRI) Co-supervisor: Dr Jun Xia (XJTLU) Co-supervisor: Dr Luigi Di Sarno (UoL) Co-supervisor: Mr Adam Mannis (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project
Project Title	Data-driven intelligent design methodology of flexible roll forming process 数据驱动的柔性辊压工艺智能化设计方法
Contact	Please email tianhong.Gu@xjtlu.edu.cn (XJTLU principal supervisor's email address) or huangsy@jitri-amrd.com (JITRI supervisor's email) with a subject line of the PhD project title

Requirements:

The candidate should have an undergraduate degree with a first class or upper second class honours degree, and/or a master's degree with distinction or merit (or equivalent qualification) in Mechanical Engineering, Materials Science and Mechanics or relative fields in Engineering and Science. The candidate is desirable to be familiar with CAE software, e.g. ABAQUS, LS-DYNA and has hands-on experience with big data analysis tools and technologies.

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

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). 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 RMB 5000/month per month by Yangtze Delta Region Institute of Advanced Materials.

Project Description:

Roll forming enables the forming of high-strength sheet metal materials into complex shapes. With increasing materials strength, and increasingly complex cross-sectional shapes, the process design of flexible roll forming becomes complicated. Therefore, traditional “trial and error” method fails to meet the efficiency requirements during process design phase. This study aims to develop an intelligent design method for flexible roll forming with the aid of materials characterization, finite element method and artificial intelligence technologies. Not only can the proposed process design method improve design efficiency of flexible roll forming, but also it can enrich and develop data-driven design method for other industrial applications.

The ultimate objective of this project is to develop a data-driven intelligent design methodology to improve design efficiency of flexible roll forming. To achieve this grand goal, the following approaches should be addressed:

1. **Develop high-precision materials properties models of advanced high strength steel and ultra-high strength steel.** Design mechanical tests according to the deformation and fracture mechanism during roll forming of AHSS. Carry out various mechanical tests to obtain materials properties. Develop and calibrate materials properties model, which should be able to predict deformation and fracture behavior precisely.
2. **Develop high-efficiency roll forming simulation model.** Develop parametric CAD/CAE model for roll forming process. Modeling roll forming process with elastic-plastic finite element method. Analyze deformation behavior, geometry evolution, strain distribution, etc. Compare simulation results with experimental results, and verify the developed model.

- 3. Develop data-driven intelligent design methodology for flexible roll forming.** Generate a database with the developed model. Establish the relationship between process parameters, strain, geometry, and materials properties. Develop algorithm to optimize process parameters and provide guideline for roll forming process design.

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/feescholarships.html>

Supervisor Profile:

Principal Supervisor:

Dr. Tianhong Gu is presently an Assistant Professor in Materials Science and Engineering, the Department of Civil Engineering at XJTLU. Previously she pursued the material research in the UK as a Research Associate (2018-2021) at Imperial College London and a Research Fellow (2021-2022) at University of Birmingham. She graduated with M.Phil. in Materials Science and Metallurgy from University of Cambridge in 2014 and obtained a Ph.D. in Materials Science and Engineering from Imperial College London in 2019. Her research interests focus on material microstructure control & design, in-situ micromechanical testing & microstructural characterisation and materials modelling & simulation to develop cross-disciplinary solutions for the next generation high-performance and substantial-reliability engineering materials in aerospace, automotive, electronics and nuclear applications. She is a specialist in understanding of micromechanical deformation, microstructure and for developing in-situ microscope methods and analysis.

JITRI co-supervisor:

Dr. Shiyao Huang is a Senior Research Manager at Yangtze Delta Region Institute of Advanced Materials and Professor at Nanjing Tech University. He received PhD Degree from Shanghai Jiao Tong University in 2011. He has been a supervisor in Ford Nanjing Research and Development Center, senior research engineer in Media manufacturing technology research center. His research interests include integrated computational materials engineering, materials big data, manufacturing digitalization, life cycle analysis of materials process.

How to Apply:

Interested applicants are advised to email tianhong.Gu@xjtlu.edu.cn (XJTLU principal supervisor's email address) or huangsy@jitri-amrd.com 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