

XJTLU-XJTU-UoL Joint Doctoral Supervision Project (Full-time)

Reference No.	SFXJTU2507
XJTLU School	Academy of JITRI
PhD Programme	Electrical and Electronic Engineering
Supervisors	XJTLU supervisor: Professor Huiqing Wen XJTU supervisor: Dr Yan Zhang UoL supervisor: Dr Lin Jiang
Project Title	High-Power-Density Integration and Electro-Thermal Co-Optimization Design of Wide-Voltage-Range Bidirectional DC-DC Converters 宽电压范围双向直流 - 直流转换器的高功率密度集成与电热协同优化设计
Application Deadline	Open until the position is filled

Requirements:

A UK first-class or upper second-class honours Bachelor's degree and a UK Master's degree with Merit (or their equivalent) are required for PhD admissions. Exceptional candidates holding only a Bachelor's degree may be considered on an individual basis.

Evidence of good spoken and written English is essential. The candidate should have an IELTS (or equivalent) score of 6.5 or above, if the first language is not English.

For more information about entry requirements and admission procedures of PhD programme at XJTLU, please visit:

[Entry Requirement - Xi'an Jiaotong-Liverpool University](#)

[How to Apply - Xi'an Jiaotong-Liverpool University](#)

Programme Structure:

Doctoral students in the joint programme are registered with both XJTLU and the UoL. Upon successful completion of the programme, the students will be awarded a PhD degree from University of Liverpool.

During their doctoral studies at XJTLU, students are expected to conduct research at XJTU as visiting students. Additionally, students have the opportunity to apply for a three to six-month research visit to UoL.

Project Description:

This research addresses key challenges in high-efficiency, high-power-density power conversion for mobile energy storage systems by studying wide-voltage-range bidirectional DC-DC converters using silicon carbide (SiC) devices. It focuses on four main areas: soft-switching techniques, electro-magnetic-thermal coupling, high-density integration, and multi-objective optimization. Innovations include an extended soft-switching method for light loads, a detailed

loss model with parasitic and multi-physics considerations, and advanced integration with 3D planar transformers, composite busbars, and liquid cooling. A global optimization framework balances efficiency, density, cost, and control complexity. Experimental results show improved efficiency, power density, and thermal performance, offering practical solutions for next-gen converters.

Joint Supervisory Team:

XJTLU supervisor: [Professor Huiqing Wen](#)

XJTU supervisor: [Dr Yan Zhang](#)

UoL supervisor: [Dr Lin Jiang](#)

How to Apply:

Interested applicants are advised to email Professor Huiqing Wen (Huiqing.wen@xjtlu.edu.cn) or Dr Yan Zhang (zhangyanjtu@xjtu.edu.cn) the following documents for initial review and assessment (Please include 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