

PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	School of Advanced Technology
Supervisors	Principal supervisor: Assoc. Prof. Kain Lu Low (XJTLU) Co-supervisor: Senior Assoc. Prof. Wen Liu (XJTLU) Co-supervisor: Professor Ivona Mitrovic (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Physics-Driven and AI-Enhanced Methods for Advancing GaN-based CMOS Technology
Contact	Please email KainLu.Low@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title. The principal supervisor's profile is linked here: https://scholar.xjtlu.edu.cn/en/persons/KainLuLow

Requirements:

A Master's degree with Merit and a Bachelor's degree with first-class or upper second-class honors are required for PhD admissions. Exceptional candidates holding only a Bachelor's degree may be considered on an individual basis in certain disciplines.

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. 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 99,000 per annum). It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. The scholarship holders are expected to conduct the majority of their research at XJTLU in Suzhou, China. However, they may apply for a short-term research visit to the University of Liverpool if the project requires it.

Project Description:

We invite outstanding candidates to apply for a funded PhD position focused on designing and optimizing next-generation **Gallium Nitride (GaN) CMOS integrated circuits**. GaN devices are transforming power electronics and RF systems with their exceptional speed and efficiency, but realizing fully GaN-based CMOS circuits remains challenging due to the performance gap between n-type and p-type transistors.

This project aims to overcome this barrier by developing a **novel artificial intelligence (AI)-assisted optimization framework that enables the co-optimization of material properties, device architectures, and circuit-level performance**. By seamlessly **integrating physics-based TCAD simulations with machine learning (ML) and multi-objective optimization**, the research will explore the full design space: from heterostructure engineering and p-FET/n-FET co-design to CMOS circuit functionality. You will gain deep insights into GaN device physics while advancing **computational techniques that bridge innovations across multiple levels**, ultimately enabling the development of high-performance, fully integrated GaN CMOS circuits.

Key areas include:

- Modeling and optimizing GaN FET structures (e.g., gate stack, heterostructure, etc.)
- Developing and validating TCAD models for GaN devices
- Applying machine learning for performance prediction and design optimization
- Exploring transfer learning to extend methods to future wide-bandgap semiconductors

Why Join Us?

- Interdisciplinary training in semiconductor physics, TCAD, and AI/ML
- Access to high-performance computing and collaboration with experimental labs
- Opportunities to publish in top-tier journals and present at international conferences
- A chance to shape the future of energy-efficient electronics

Ideal Candidate:

- A strong background in electrical and electronic engineering, semiconductor devices
- Programming experience in Python, MATLAB, and familiarity with TCAD or ML
- Interest or experience in AI for device modeling is a plus
- A passion for applied research and innovation in electronic devices

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/global/entry-requirements/>

<https://www.xjtlu.edu.cn/en/admissions/global/fees-and-scholarship>

How to Apply:

Interested applicants are advised to email KainLu.Low@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 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