

PhD studentship (Full-time)



Institution	Xi'an Jiaotong-Liverpool University, China
School	School of Science
Supervisors	Principal supervisor: Professor Uwe Schauz (XJTLU) Co-supervisor: Dr Luca Demangos (XJTLU) Co-supervisor: Professor Radhakrishnan Nair (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	The Functional Degree and the Dispersion of Multivariate Functions
Contact	Please email uwe.schauz@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. 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 six months, if this is required by the project.

Project Description:

Generalizing the concept of multivariate polynomials and their total degree, we consider the *functional degree* of maps between (finite) vector spaces and between commutative groups. The functional degree is defined based on a simple idea: it should decrease if a *discrete derivative* is taken. It may also be seen as the total degree of some kind of *integer-valued polynomials*. We want to see which special properties functions have if their functional degree is low. In particular, we want to study the distribution of the roots of such functions, which seem to be somehow *dispersed* over the domain. It may be possible to generalize or strengthen *Chevalley and Warning's Theorem* about the set of simultaneous zeros of polynomials in several variables over finite fields. We will also try to generalize the (*Quantitative*) *Combinatorial Nullstellensatz* and its corollaries. The language of module theory, finite fields and some simple arithmetic results will be important in this research.

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>

How to Apply:

Interested applicants are advised to email uwe.schauz@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 Uwe Schauz (uwe.schauz@xjtlu.edu.cn), whose personal profile is linked below, <https://www.xjtlu.edu.cn/en/departments/academic-departments/pure-mathematics/staff/uwe-schauz>