

## PhD studentship (Full-time)



Institution	Xi'an Jiaotong-Liverpool University, China
Department	Department of Mathematical Sciences
Supervisors	Principal supervisor: Prof/Dr Chen Xuan (XJTLU, maths) Co-supervisor: Prof/Dr M.B.N. Kouwenhoven (XJTLU, physics) Co-supervisor: Prof/Dr Hao Yu (XJTLU, physics) Co-supervisor: Prof/Dr Paolo Paoletti (UoL, engineering)
Application Deadline	Open until the position is filled
Funding Availability	Fully funded (world-wide students)
Project Title	mathematical theory and design of photothermally driven soft robots
Contact	Please email <a href="mailto:chen.xuan@liverpool.ac.uk">chen.xuan@liverpool.ac.uk</a> (XJTLU principal supervisor's email address)

### **Requirements:**

1. The candidate should have a 1<sup>st</sup> class or upper 2<sup>nd</sup> class honours bachelor's degree, or a master's degree (or equivalent qualification), in mechanics, physics, optics, maths, engineering, materials etc.
2. Experience in computational mechanics/physics/maths (with MATLAB/C++, MATHEMATICA, ANSYS/ABAQUS/COMSOL etc) will be an advantage.
3. Experience in mathematical modeling of physical systems, continuum mechanics, PDEs will be an advantage.
4. Candidates will be reviewed holistically so those with other skillsets not listed are encouraged to apply.

### **Degree:**

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

### **Funding:**

The PhD scholarship is available, covering tuition fees for 3 years (RMB 80,000 per year) and living expenses with a monthly salary of RMB 5,000. It also provides up to RMB 16,500 for international conferences. 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, if this is required by the project.

### **Project Description:**

Successful completion of this PhD programme could lead to worldwide career opportunities in academia and high-tech industrial sectors like software, R&D, biomed, robotics and smart manufacturing alike. The PhD project is on mathematical modeling and computer simulation of stimuli responsive smart materials. Macroscopic mechanical response could originate from changes in microscopic configurations in such smart materials as liquid crystals and gels driven by thermal, optical, electrical and photochemical excitations. Soft biomimetic robots made of

such smart materials capable of walking or swimming like animals in nature could be designed via simulation, together with experiments done by external collaborators. Smart remote control of such stimuli driven soft robots has promising engineering applications, the mechanical side of artificial intelligence. The primary role of the PhD candidate is to develop theoretical and numerical models to study the mechanics of smart materials and structures. The supervisors will endeavor to help the candidate work on simplified models to initiate the project. The candidate is welcome to propose additional ideas to the project.

For an overview of the field see:

Science Robotics: <https://robotics.sciencemag.org/content/4/33/eaax7112>

JMPS: <https://www.sciencedirect.com/science/article/abs/pii/S0022509618306045>

JMPS: <https://www.sciencedirect.com/science/article/abs/pii/S0022509618308226>

Proc. Roy. Soc. A: <https://royalsocietypublishing.org/doi/10.1098/rspa.2013.0535>

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:**

Applicants are advised to email [chen.xuan@liverpool.ac.uk](mailto:chen.xuan@liverpool.ac.uk) (XJTLU principal supervisor's email address) their CV in the first instance. Shortlisted applicants will be interviewed.

**Informal enquiries** addressed to Prof/Dr. Chen Xuan ([chen.xuan@liverpool.ac.uk](mailto:chen.xuan@liverpool.ac.uk)), whose personal profile is linked below,  
<http://www.xjtlu.edu.cn/en/faculty/chen.xuan>

#### **Xi'an Jiaotong Liverpool University (XJTLU):**

We are the result of a historic partnership between Xi'an Jiaotong University and the University of Liverpool. Our location in Suzhou Industrial Park, China's equivalent of Silicon Valley and a hub of global innovation, means our students have numerous internship opportunities and access to job positions. By May 2020, our global community of more than 17,000 undergraduate and postgraduate students (around 3,500 of whom are studying at the University of Liverpool through the 2+2 programme), and nearly 1000 academic staff (50% international) is continually growing, offering you the chance to make connections with people from across the world. All our degree programmes are taught 100% in English. In 2019, 86.50% of our graduates planned to continue their studies in world-renowned universities, while others get jobs with major companies in China, UK and around the world.