



Tan Lab



Mechanics of Composite Materials

PhD studentship in Mechanics of Composite Materials for Energy Storage

Queen Mary University London, UK

Job description: Applications are invited for a PhD studentship at Queen Mary University London (QMUL). The project will involve the development of novel experimental characterisation methods and computational tools to reveal and model the failure process of composites for energy storage (battery/supercapacitor). UK is set to replace petro/diesel cars by electric/hybrid cars in 2040. However, the electrode materials in battery and supercapacitor are often degraded after hundreds charge cycles due to the coupled mechanical-electrochemical effect. Therefore, there is an emerging need to understand the failure mechanism of energy-storage materials for a better material design. This work will require modelling the multi-physics nature of material behaviour. It will couple the fracture mechanics and electro-chemistry to predict the degradation and fracture during charge-discharge cycles.

The student will join the Mechanics of Composite Materials Lab, led by Dr Wei Tan. This group is part of School of Engineering and Materials Science. It provides the world-leading research activities represented by five academic divisions. Research strengths include materials science, computational modelling, robotics and mechanobiology which are applied to key strategic applications aligned with the Governments Grand Challenges. The student will benefit from the world-class facilities in an ambitious and collaborative environment. The PhD will be based in the Mechanical Engineering Division. Besides, the project will build upon existing collaborations with leading academics in the UK and overseas.

Requirements:

- A good First Class or Upper Second Degree (or International equivalent), in engineering, mathematics, physics, materials science, chemistry or other closely-related disciplines.
- Solid and verifiable background in Mechanics of Materials and Finite Element Analysis.
- Excellent English communication and writing skills.

In addition, a competitive candidate for this role should demonstrate the following desirable (non-essential) qualifications:

- A relevant Masters level degree qualification.
- Experience in fracture mechanics and electrochemistry.
- Familiarity with ABAQUS, COMSOL, ANSYS or other similar finite element packages.
- Experience in coding with Fortran, Matlab, Python or other programming languages.
- Knowledge of computational fracture mechanics methods, such as cohesive zone models, continuum damage mechanics, phase field fracture or the like.
- Related research experience that has led to high-quality outputs (e.g., publications).

A lack of experience in the above non-essential skills could be compensated by evidence of research potential. Appropriate training will be provided.

Funding and eligibility:

- Full funding is only available to Home/EU Applicants.
- Full-time programme only.
- Applicant required to start in the **spring term 2020**.
- The studentship arrangement will cover tuition fees and provide an annual stipend for up to three and a half years (Currently set as £17,009 in 2019/20).
- If English is not your first language then you will require a valid English certificate equivalent to IELTS 6.5+ overall with a minimum score of 6 in Writing and 5.5 in all sections (Reading, Listening, Speaking), or other equivalent English certificate.

How to apply:

Applicants wishing to apply for this opportunity should send the following application documents to Dr Wei Tan via email (wtan.cam@gmail.com).

- CV, including average grades, research or industrial experience (if any).
- Cover letter, explaining your motivation and fit to this position.
- Contact details of two academic referees.
- Representative publications list (if any).

Please use the title 'PhD_2020_Surname' in your email to associate your application with this studentship opportunity.

Application via the Queen Mary application system is not necessary at this stage.

The closing date for applications is **January 6, 2020**, after which reviewing of applications will commence. However, applications will continue to be accepted until the position is filled.

About Queen Mary University London

Queen Mary University of London (QMUL) is one of the UK's leading research-focused higher education institutions, a member of the elite **Russell Group** of UK universities. QMUL was recently ranked among the **top 100** universities in the world in the latest edition of the QS World University Rankings, and the Times Higher Education ranked us **9th** among multi-faculty institutions in the UK, following the Research Excellence Framework (REF) 2014. Based on a beautiful, self-contained campus in east London, Queen Mary has further campuses in the City and central London. We also offer postgraduate law courses in Paris, France and Piraeus, Greece and distance learning programmes in law, medicine and dentistry, and politics and international relations. We have 18,000 UK, European and international students from 151 countries, studying over 240 degree programmes in Humanities, Social Sciences and Laws, Medicine and Dentistry and Science and Engineering. Of these, over 4,200 are following postgraduate programmes or are registered for research.

About School of Engineering and Material Science

In the 2014 Research Excellence Framework (REF), QMUL's General Engineering was ranked 7th in the UK out of 62 universities based on World Leading (4*) overall percentages. QMUL's General Engineering research publications were ranked 4th in the UK in the 2014 REF. Our research continues to be published in the highest quality journals.

Additional information:

More information to apply for this studentship and for entry on to the PhD in Mechanical Engineering programme (Full Time) please follow the instructions detailed on the following webpage:

Research degrees in Engineering:

<https://www.qmul.ac.uk/postgraduate/research/subjects/engineering.html>

Further Guidance: <http://www.qmul.ac.uk/postgraduate/research/>

