

## Developing Next-Generation Lightweight Resilient Composite Materials

### QMUL-CSC PhD studentship at Queen Mary University London, UK

**Context of the research:** Lightweight composite materials are finding increasing applications in aerospace, automotive and energy sectors due to their high specific strength, modulus and energy absorption. Particularly, lightweight composite materials that make future vehicles and wind turbine blades **lighter** and more **damage-tolerant** are particularly relevant to the world in achieving the net-zero emission target. The synergy of multi-phase materials often results in the unique behaviour of composite materials, outperforming the conventional materials. We aim to reveal the deformation and failure mechanisms of composite materials through a combination of experimental, analytical and numerical approaches. This will not only address some fundamental scientific questions but also accelerate the discovery and development of new composite materials.

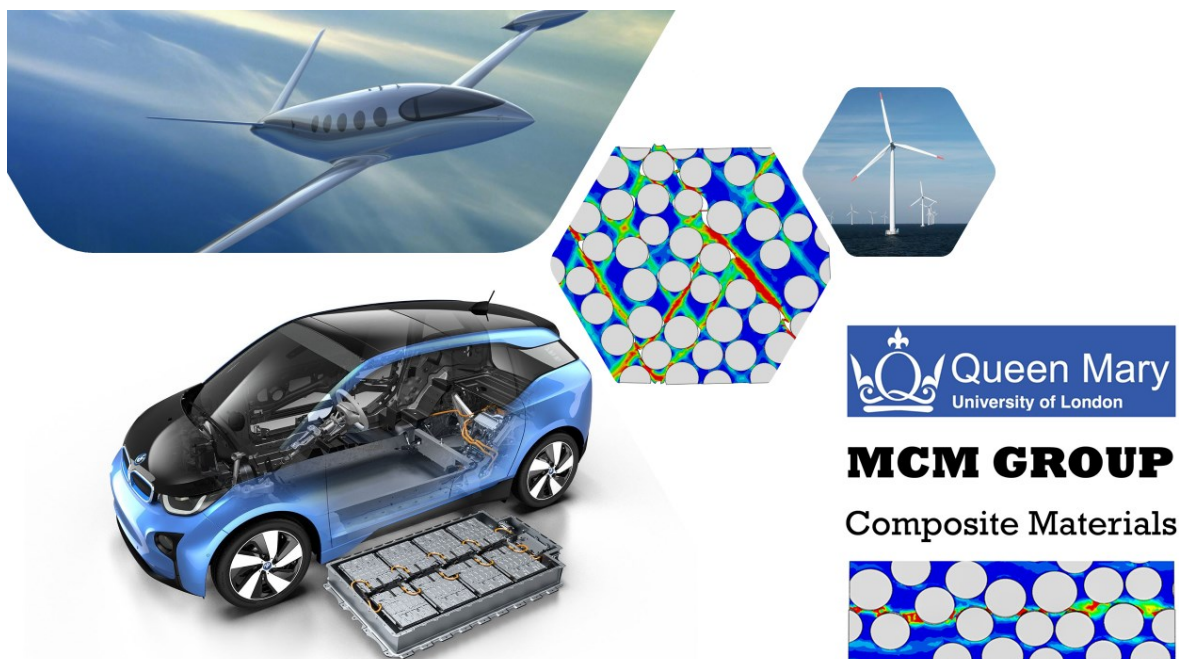


Figure 1. Research relevant to wind energy, battery and aircrafts at Mechanics of Composite Materials Group (MCM group)

**Requirements:** A relevant Master level degree qualification (or First-class bachelor degree) in engineering, mathematics, physics, materials science, chemistry or other closely-related disciplines.

- Solid and verifiable background in Mechanics of Materials and Finite Element Analysis.
- Good experimental skills in material synthesis and mechanical testing.
- Excellent English communication and writing skills.

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

- Familiarity with ABAQUS, COMSOL, ANSYS or other similar finite element packages.
- 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 **Chinese** applicants through **QMUL-CSC** scheme. QMUL will waive the tuition fee and CSC will provide the stipend.
- Full-time programme only.
- Applicant required to start in the **September 2023**.
- 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 ([wei.tan@qmul.ac.uk](mailto:wei.tan@qmul.ac.uk)).

- 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 'QMUL-CSC\_2023\_Surname' in your email to associate your application with this studentship opportunity. After the interview, the applicants will need submit formal application via Queen Mary application system <https://www.qmul.ac.uk/postgraduate/research/subjects/engineering.html>. The closing date for applications is **January 30th, 2023**, after which reviewing of applications will commence.

### 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. Queen Mary University London is ranked **#100** in Best Global Universities by US News. QMUL's General Engineering research publications were ranked **2nd** in the UK in the **2021 Research Excellence Framework (REF)**.

### About MCM Group

Mechanics of Composite Materials Group (MCM Group) at Queen Mary University London is a vibrant team led by Dr. Wei Tan. Our group focuses on the understanding, predicting and optimising the mechanical properties of composite materials. We currently have **1 Postdoc, 5 PhD students, 4 MSc students**. We are also part of the Graphene Mini CDT funded by EU Graphene Flagship. More information can be found in his [Group website](#).

### About The PI

Dr. Wei Tan is currently a Senior Lecturer (Associate Professor) at Queen Mary University London. He received his Bachelor in Mechanical Engineering and Physics in Central South University in 2011, followed by his PhD in Aerospace Engineering at Queen's University Belfast in 2016. He then worked a Research Associate at University of Cambridge from 2016 to 2020. His research interests lie in the **mechanics of composite materials, computational modelling and multifunctional materials**. His research features the impact damage prediction and crashworthiness design of carbon fibre composites, the mechanical and electrochemical behaviour of carbon nanotube (CNT) polymer composites. He has published over 40 papers in the leading journals (Compos. Sci. Technol., Carbon, Compos. Part A/B, etc), of which about 20 as first author/corresponding author. He has been the principal investigator for the **EPSRC New Investigator Award** (£392k) and Cambridge CAPE Research Project (£20K), the co-investigator of the **EU graphene flagship core 3 project** (£376k), and the main researcher for £2.8 million projects funded by EPSRC, Royal Academy of Engineering and Bombardier. His work has been reported by many medias (DailyMail, etc). More information can be found from his [official website](#).