UNIVERSITY of GREENWICH

Information on Postgraduate Research Scholarship - Ref: Eng-PhD-08-25			
Faculty:	Engineering and Science	**Department:**	School of Engineering
Lead Supervisor:	Dr. Osama Maklad		
Project Title:	**Corneal Material Characterisation Using Digital Volume Correlation**		
Project Description: (maximum 500 words)	**Background:** The cornea is a crucial component of the human eye, providing structural support and contributing significantly to its optical properties. Understanding the mechanical behaviour and material properties of the cornea is essential for advancing treatments for various ocular diseases and disorders. Digital Volume Correlation (DVC) is a powerful non-invasive imaging-based technique that allows for three-dimensional measurement of displacement and strain fields of materials. This research project aims to employ DVC to characterize the material properties of the cornea, enhancing our understanding of its mechanical behaviour and paving the way for improved diagnostic and therapeutic approaches. **Objectives:** • To develop a comprehensive understanding of the mechanical behaviour of the cornea through Digital Volume Correlation. • To investigate the anisotropic properties of the cornea under different loading conditions. • To establish a correlation between microstructural changes in the cornea and its mechanical response. • To explore the potential clinical applications of corneal material characterization in the diagnosis and treatment of ocular diseases. The research will involve designing a novel in situ experimental setup for the recently acquired inCiTe 3D X-ray microscope and implementation of DVC algorithms to analyse the deformation of the cornea under various loading conditions. This will enable inverse finite element (FE) analysis to extract the material properties of the cornea based on the deformation data obtained from DVC, developing a constitutive model that accurately represents the corneal biomechanics. The project is mainly designed to offer a comprehensive and enriching research experience for the potential student, combining hands-on experimentation, exposure to advanced imaging technologies, interdisciplinary training, and opportunities for professional development. It aims to equip the student with a diverse skill set and a strong foundation for a future career in research and academia. **Skills & work plan:** The PhD candidate will gain significant experience on soft tissue materials and advanced imaging techniques such as phase-contrast X-ray tomography, in situ mechanics and DVC. In addition, the student will		

	develop skills on advanced numerical modelling, through the simulation of the physical models and the calibration of numerical models in Abaqus. This scholarship is awarded competitively, and all applications are carefully reviewed. While we cannot guarantee an offer, we encourage strong candidates to apply.
Duration:	3 years, Full-Time Study or 6 years, Part-Time Study

Support available (subject to satisfactory performance):

A successful Home candidate will receive:

- A Full tuition fee waiver at the university Home-student rate for the specified duration of the scholarship

A successful International candidate will receive:

- A tuition fee waiver for 50% of the International-student rate for the specified duration of the scholarship.

Tuition fees are subject to annual increases.

This scholarship does not include funding for living expenses.

Person Specification of Essential (E) or Desirable (D) requirements:

Criteria:	**E or D**
Education and Training:	
• 1st Class or 2nd class, First Division (Upper Second Class) honours degree or a taught master's degree with a minimum average of 60% in all areas of assessment (UK or UK equivalent) in a relevant area to the proposed research project	**E**
• For those whose first language is not English and/or if from a country where English is not the majority spoken language (as recognised by the UKBA), a language proficiency score of at least IELTS 6.5 (in all elements of the test) or an equivalent UK VISA and Immigration secure English Language Test is required, if your programme falls within the faculty of Engineering and Science a language proficiency score of at least IELTS 6.5 overall with a minimum of 6.0 in all elements of the test or an equivalent UK VISA and Immigration secure English Language Test is required. Unless the degree above was taught in English **and** obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA.	**E**
Experience & Skills:	
• Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation)	**E**
• Ability to work independently and operate within a diverse team, exhibiting excellent organisational, IT and interpersonal skills	
• Previous experience in physical modelling, image processing & experimental work – or willing to engage and develop such experimental skills	
• Previous experience in numerical modelling and FEA (using ABAQUS, ANSYS or equivalent packages) – or willing to engage and develop such analytical skills	

Personal Attributes:	
• Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation	**E**
• Able to, under guidance, complete independent work successfully	**E**
Other Requirements:	
• This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA	**E**
• The scholarship must commence before 15th July 2026 (offers will be withdrawn if this condition is not met)	**E**
Closing date for applications:	***midnight UTC on 20th February 2026***
For further information contact:	***Dr. Osama Maklad, o.maklad@gre.ac.uk*** ***Prof Gianluca Tozzi (g.tozzi@greenwich.ac.uk)***

Making an application:

Please read this information before making an application. Information on the application process is available at: https://www.gre.ac.uk/research/study/apply/application-process. Applications need to be made online via this link. **No other form of application will be considered**.

All applications **must include** the following information. **Applications not containing these documents will not be considered.**

- **Scholarship Reference Number (*insert reference*)**– included in the personal statement section together with your personal statement as to why you are applying
- **a CV including 2 referees** *
- **academic qualification certificates/transcripts and IELTs/English Language certificate if you are an international applicant or if English is not your first language or you are from a country where English is not the majority spoken language as defined by the UK Border Agency** *

**upload to the qualification section of the application form. Attachments must be a PDF format.*

Before submitting your application, you are encouraged to liaise with the Lead Supervisor on the details above.