**Fully-Funded PhD Position:**

**Sex Specific Biomechanics of Traumatic Brain Injury**



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A fully-funded 4 year PhD position is available in the School of Mechanical & Materials Engineering at University College Dublin, Dublin, Ireland.

**Stipend:**

€18,500 tax-free stipend per annum, plus PhD registration fees.

**Project Description:**

The worldwide incidence of traumatic brain injuries (TBI) is on the rise and is most prevalent in people younger than 25 and older than 75 years. TBI lie on a continuum from transient symptoms to fatal haemorrhages with mild TBI (mTBI) being the most common type of TBI. It is estimated that 42 million people sustain a mTBI or “concussion” worldwide each year.Current finite element (FE) brain models used to simulate TBI and design preventative, diagnostic, prognostic, and therapeutic technologies have mostly been developed using adult male data. Therefore, due to the significant morphological differences between male and female brains, the lack of female specific FE brain models may be having a detrimental effect on the advancement of these technologies. Moreover, this may adversely affect progress on reducing the economic, societal, and clinical burdens of TBI.

This project aims to determine the role sex specific biomechanics plays in the initiation and development of TBI by developing advanced FE brain models. These FE models will be used to simulate real world TBI events to determine the differences in biomechanics between men and women.This is a unique challenge in TBI biomechanics with the potential to have life-saving impacts by providing overdue and novel tools to understand the differences of TBI biomechanics in men and women. The outputs of this PhD project have the potential to significantly impact our understanding of TBI and enable the development of advanced sex specific preventative technologies (e.g., helmets). The potential gain from this research cannot be overstated, particularly in its ambition to address the inequality in research and treatment of women’s health.

**Principal Duties and Responsibilities:**

The candidate will be required to:

* Work full time on your PhD project at University College Dublin.
* Engage in teaching assistance, e.g., delivering tutorials to undergraduate students.
* Take part in training and development.
* Contribute to public engagement and outreach activities.

**Selection Criteria:**

Mandatory:

* Masters degree or Primary degree (First or Upper Second Class Honours) in Mechanical Engineering, Biomedical Engineering, or related cognate discipline.
* Excellent finite element modelling skills.
* Excellent coding skills in Python or Matlab.
* Excellent English communication skills.
* Excellent report writing skills.
* Experience with data analysis and visualization.
* Attention to detail and organisational skills.
* Ability to manage a complex workload and tight deadlines.
* Ability to work independently and as part of a team of researchers.
* Be self-motivated.
* Willingness to work closely with other collaborators.
* Willingness to learn new skills e.g., machine learning, coding languages, conduct experiments.
* Awareness of equality, diversity and inclusion.

Desirable:

* Experience with medical image analysis (e.g., 3DSlicer, MIMICS).
* Experience in machine learning and optimization.
* Experience with Linux.
* Experience with FreeSurfer.
* Good research skills.

**How to apply:**

Please send the following in PDF format to [david.macmanus1@ucd.ie](mailto:david.macmanus1@ucd.ie)

* Cover letter detailing why you are interested in pursuing a PhD on this topic and how your experience to date makes you the ideal candidate (max. 2 pages).
* Your CV.
* Academic transcripts or a copy of your degree certificate.
* Two academic reference letters.

**Closing date for applications:**

31st March 2023. Applications received after this date will not be considered for this position.

**Start Date:**

The candidate should be in a position to start their PhD by September 2023.

**Informal Enquiries:**

Please email any informal enquiries to Dr David MacManus: [david.macmanus1@ucd.ie](mailto:david.macmanus1@ucd.ie)

**Supplementary Information:**

* The University: [www.ucd.ie](http://www.ucd.ie)
* UCD School of Mechanical & Materials Engineering: <https://www.ucd.ie/mecheng/>
* Equality, diversity, and inclusion: <https://www.ucd.ie/equality/>