PhD Studentship

Department of Mechanical Engineering
University College London

PhD: Virtual, Simulation-Based Tools for Aortic Dissection Treatment

Description:

A fantastic and exciting 3.5-year funded position is available in the WEISS Centre at UCL as part of a longstanding collaboration between the Multiscale Cardiovascular Engineering (www.ucl.ac.uk/muse) and FluME groups (https://wp.cs.ucl.ac.uk/flume/) of UCL Mechanical Engineering.

This PhD studentship is funded by the Department of Mechanical Engineering at UCL as part of the newly BHF funded project 'VIRTUOSO' (A Virtual Platform for Precision Vascular Surgery), an exciting collaboration between UCL, Barts Hospital and the Royal Free Hospital.

This is a truly groundbreaking opportunity for a PhD student that will combine bioengineering/biomedical engineering and imaging. This opportunity is open to, UK EU and International students*.

If you want to make a different in patients' lives and build a career in this field, this is for you!

Project aims:

An Aortic dissection is a complex and highly patient-specific, condition, involving a tear in the descending aorta. Aortic Dissections affect approximately 4,000 people/year in the UK, only 1,200 of whom survive to be admitted to hospital, killing more people in the UK than road traffic accidents.

Treatment options for these patients often involve stents/grafts tailored to each patients' unique characteristics, and it is vital to understand the blood flow dynamics and the role of haemodynamic markers in disease progression/prognosis when these are performed. AD is an ideal candidate to represent a whole subset of complex vascular problems, which can benefit from novel tools that provide more quantifiable metrics to guide surgical interventions.

This is a truly exciting project that aims at developing tools for the pre & post-operative in-silico planning and treatment for Aortic Dissections (AD) and to extend its finding to a number of CV diseases and conditions.

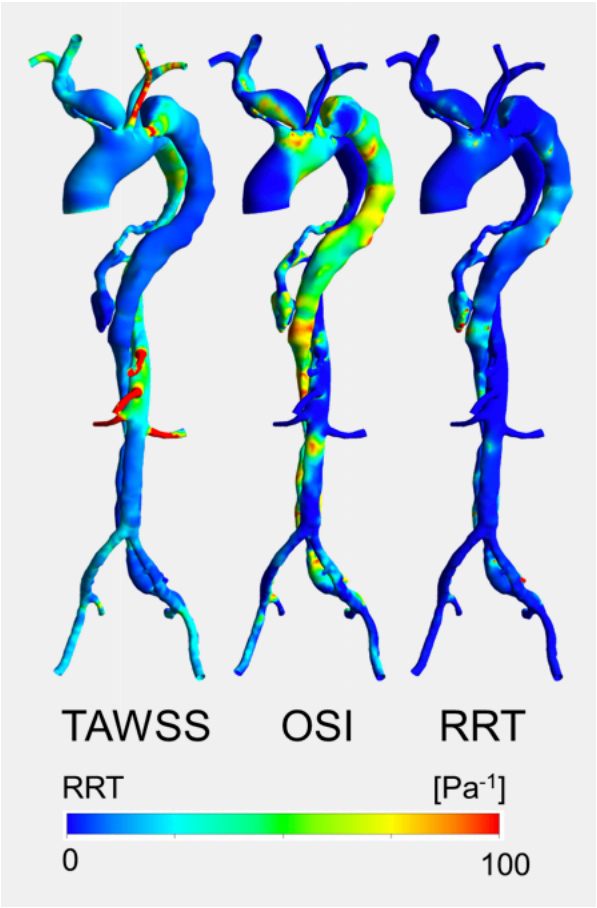

Figure: Heamodynamic indices in a complex Aortic Dissection. This dissection had more than 10 fenestrations and links between the false and true lumen.

This project will be an exemplar application that will provide a blueprint and proof of concept for the use of in-silico tools in the personalised management of aortic diseases in general (applicable also to other pathologies). The clinical impact and viability of these technologies will be tested via our partner Hospitals in the UK and Europe. These models will be validated using a sophisticated experimental setup available (including PIV) within the group.

Expected Results:

- A patient-specific simulation framework delivering simulation of Aortic Dissections
- Proof-of-concept of the use of these technologies in the clinic
- Proof of feasibility of the use of these models in surgical planning
- Validated set of results using a patient-specific physical platform.

PERSON SPECIFICATION

Knowledge, Education, Qualifications and Training

Essential: MSc or equivalent in Biomedical Engineering, Mechanical Engineering, Aeronautical Engineering, Physics, Applied Mathematics or a related subject.

Experience

- Essential: Strong background in biomedical engineering, mechanical engineering, aeronautical engineering, physics, applied mathematics; in particular, strong knowledge of how to derive and manipulate differential equations
- Essential: Excellent programming skills in any of the following languages: C, C++, FORTRAN, Matlab, Octave or Python
- Essential: Experience in CFD.
- Essential: Good oral written and presentation skills.
- Essential: Well-organised, attention to detail and ability to meet deadlines.
- Essential: Ability to think logically, create solutions and make informed decisions.
- Desirable: Excellent IT skills.
- Desirable: Experience with image processing software, such as MIMICS or ScanIP

Skills and/or Abilities

- Essential: Fluency and clarity in spoken English.
- Essential: Good written English.
- Essential: Independence and ability to work collaboratively as part of a team

Supervisory Team and Training:

Prof. Vanessa Diaz and Prof. Stavroula Balabani will lead for Engineering, and Prof. Janice Tsui and Prof Aung Oo (Barts) will lead for Vascular Surgery. The successful applicant will be provided superb training by an experienced team that works well together and has led students to win more than 22 national and international prizes, including 'Best Thesis Awards' from the Institution of Mechanical Engineers, the Reynolds Prize and the European Society of Biomechanics. We offer state-of-the-art training with 1 to 1 supervision and co-location with clinicians at the Royal Free Hospital/Barts Hospital part of the week.

A Diverse and Inclusive Environment – We Work Flexibly too!:

We pride ourselves in being nurturing, open, diverse and inclusive and we believe in responsible research metrics. We fully support DORA and we believe in a working environment where we help individuals reach their full potential. We provide outstanding mentorship. We welcome applications from minoritized (underrepresented) groups in STEM disciplines and we are very flexible in the ways we work. If you have the passion and you are a good fit to the project, we want to hear from you!

World Class Science, Excellent Location and Experience:

wellcome EPSRC centre interventional+ surgical sciences

The successful candidate will become part of the Wellcome/EPSRC Centre for Interventional and Surgical Sciences (WEISS) at UCL and will benefit from a dynamic and world-class learning and working environment in the Centre's unique facilities, as part of the main UCL campus. WEISS offers a number of opportunities including close interactions with internationally leading researchers of different specialties, a dynamic programme of scientific outreach and close links with industry.

Eligibility:

This funding is available for UK and EU passport holders. International students may apply, however, fees will be capped at UK/EU level (students will be required to pay the difference in fees). There is no minimum qualifying residence requirement for applicants from the EU. We actively encourage the application of applicants from minoritized groups for this position. Please DO NOT enquire about this studentship if you are ineligible. Please refer to the following website for eligibility criteria: http://www.ucl.ac.uk/prospectivestudents/graduate/research/degrees/mechanical-engineering-mphil-phd

Closing Date and Start Date:

Deadline: Please apply by the 15^{sth} of August 2020. However, we will be continuously having informal discussion with interested candidates until this position is filled. We expect the successful candidate to start in October 2020 but there is flexibility regarding the dates.

Value of award:

Successful applicants will be awarded a stipend of at least £17,280 (tax free stipend) and full tuition fees.

Application Procedure:

Eligible applicants should contact Dr Vanessa Diaz (v.diaz@ucl.ac.uk) quoting the job reference number. Please forward a CV (including at least two referees), a covering letter and a transcript of results (listing all subjects taken and their corresponding grades/marks) to Prof. Diaz (v.diaz@ucl.ac.uk) and Prof. Balabani (s.balabani@ucl.ac.uk)

The supervisory team will arrange interviews for short-listed candidates. After interview, the successful candidate will be required to formally apply online via the UCL website. Regrettably, we are only able to contact candidates who are successful at the shortlisting stage. Thank you for your interest in this position.