



MONASH University
Engineering

PhD Research Project

Development of a novel implantation mechanism for mechanical circulatory and respiratory support

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The Opportunity

This is an exciting opportunity for a PhD candidate to work in an interdisciplinary team to solve a major health issue. Cardiovascular and respiratory diseases are a major cause of death, while limited transplant availability means patients rely on mechanical circulatory and respiratory support (MCRS). Common complications associated with MCRS are bleeding, thrombosis and infection, all of which can be related to the cannula (the tube which connects the MCRS system to the patient). This project will use engineering techniques to develop a novel MCRS cannula to reduce bleeding, thrombosis and/or infection. The PhD project direction is flexible and could aim to improve cannula fixation (bleeding), flow dynamics (thrombosis), or tissue integration / surface features (infection), depending on the applicants expertise and research interests. This project aims to improve survival and quality of life for patients with heart and/or lung failure. The PhD candidate will work with a team of engineers and clinicians (intensive care, cardiac surgery, cardiology and more) to develop cannula prototypes and evaluate them using state-of-the-art in-vitro and in-vivo facilities.

The candidate must have outstanding undergraduate results with a first class Honours degree or postgraduate degree in engineering (preferably medical or mechanical). The candidate must demonstrate a strong work ethic, excellent written and oral communication skills, and exceptional interpersonal skills to work in a team environment.

The candidate will be based within the Department of Mechanical and Aerospace Engineering at the Clayton Campus of Monash University while maintaining a close working relationship with partnering hospitals. The candidate will be supervised by Dr Shaun Gregory with co-supervision from Prof Ulrich Steinseifer and A/Prof Vincent Pellegrino (all Monash University). Monash University is in the top 100 universities worldwide, and the highest ranked engineering university in Australia.

Candidates who meet the academic requirements and entry requirements for a PhD at Monash and who would like further information can contact Dr Shaun Gregory using the email above.