



UNIVERSITY OF
TORONTO



Thesis project available: Early Detection of Coronary Artery Bypass Graft Failure using Medical Imaging and Computational Fluid Dynamics

The Modelics Lab of Prof. Piero Triverio at the University of Toronto is seeking 4th year students for a thesis project on computational fluid dynamics applied to coronary artery disease.

Project rationale: In Canada, about 1 person out of 7 dies because of coronary artery disease (CAD). Coronary arteries play a vital role, bringing oxygen-rich blood to the heart, but can become occluded. With graft surgery, new vessels are created to increase blood flow to the heart and prolong life. However, graft failure is quite common, and we still do not know exactly *why* grafts fail and, consequently, how to prevent their failure.

Goal: The objective of this research is to obtain new insights into the mechanisms responsible for graft failure, using computational fluid dynamics simulations guided by the latest advancements in medical imaging (CT and 4D-flow MRI). Simulations will be performed on a cohort of patients who had CAD surgery. Results will be correlated with patient outcomes one year after surgery. The project is in collaboration with Dr. Laura Jimenez-Juan (cardiovascular radiologist, Sunnybrook Health Sciences Centre), Dr. Stephen Fremes (cardiovascular surgeon, Sunnybrook Health Sciences Centre), and with the International School for Advanced Studies (Trieste, Italy).

Mandatory requirements: average $\geq 80\%$, interest in mathematics applied to real-life problems.

Useful skills (not mandatory): previous experience with computational fluid dynamics, medical imaging, Python, or parallel computing.

More information: see this article

To apply: email your CV and transcripts to piero.triverio@utoronto.ca

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