

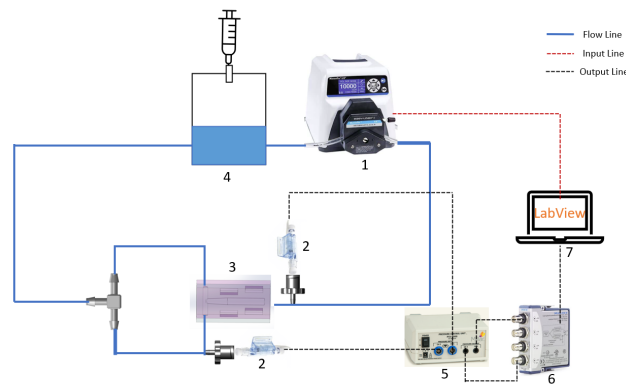
# The Hemodynamics of Bifurcated Cerebral Aneurysms: An Experimental Study

Laboratory Name: Industrial and Biological Multiphysics Laboratory  
Faculty Supervisor: Prof. Dana Grecov  
Mentor: Dr. Mehdi Jahandardoost

## The Project

Cerebral aneurysms (CAs) have a great chance of causing mortality and permanent disability, and it is one of the leading causes of death across the world. Bifurcated CAs are one type of lesions located at the major bifurcations in the cerebral vessels, and they have rupture risk and are harder to manage and treat. This project aims to use an *in vitro* experiment to assess the hemodynamic factors of bifurcated CAs to assist their treatment and management.

The proposed method uses pressure transducers and particle image velocimetry (PIV) to measure the pressure gradients and velocity profile of bifurcated CAs in an *in vitro* environment. The experiment setup mimics the cerebral circulation for a PDMS cast phantom of a bifurcated CA to develop image and pressure measurement. Both Newtonian and non-Newtonian working fluids will be used to match the rheology of the blood and the reflective index of the PDMS. A peristaltic pump will be used to produce a pulsatile flow that mimics the inlet boundary condition for the CAs.



## Tasks to be performed by the student

- Finalize the set-up for the *in vitro* experiment.
- Design and 3D print the aneurysm phantoms.
- Test Newtonian and non-Newtonian working fluids using different hemodynamic factors.
- Analyze and process the data and interpret results.

## Facilities and team

The experiments will be conducted in PPC (Pulp and Paper Center) 108. The student will work closely with Dr. Mehdi Jahandardoost, postdoctoral fellow in the Industrial and Biological Multiphysics Laboratory (email: mehdi.jahandardoost@ubc.ca).

The student will be assisted on a regular basis by the mentor, and will receive guidance from Prof. Grecov.