Contribution ID: **378** Type: **Poster Presentation**

A computational simulation of vascular deformation when subject to internally and externally applied forces

Monday, 9 July 2018 19:45 (15 minutes)

The walls of our blood vessels are under a constant mechanical load, introduced by the blood pulsating through our vessels. Recent years have seen a substantial increase in the understanding of the interplay between the dynamics of blood flow (haemodynamics) and vessel (vascular) morphology. Alterations in the homeostatic distribution of mechanical forces exerted by blood on the vessel wall is correlated with various cardiovascular diseases, including atherosclerosis and aneurysm development and rupture. Furthermore, alterations in the haemodynamic distribution have a notable effect on vascular development and remodelling. Experimental analysis of the effects of blood flow on the local vasculature is invasive and extremely difficult to measure in real time. As such, the development of computational models to analyse the relationship between the local haemodynamics and the surrounding vasculature is invaluable.

In this project we will develop a computational model to study how vessels deform when subject to internally and externally applied forces. Using the open source multicellular modelling software package, Chaste, we will employ a discretised approach to simulate long time scale vascular wall deformation. A Voronoi tessellation-based model will be used to model vessel walls. This discretised model will enable us to examine how blood vessels deform when subject to internal and external forces, thus laying the foundations for future research examining vascular deformation due to haemodynamic pressure.

Primary author: Ms CRAWSHAW, Jessica (The University of Melbourne)

Co-author: Dr OSBORNE , James (the University of Melbourne)

Presenter: Ms CRAWSHAW, Jessica (The University of Melbourne)

Session Classification: Poster Session

Track Classification: Physiology