## CRIMSON: An integrated computer modelling framework for subject-specific cardiovascular simulation

SEMINAR

In this talk, we will provide an overview of the CRIMSON (**C**ardiovascula**R** **I**ntegrated **M**odelling and **S**imulati**ON**) software which is currently being developed under an ERC Starting Grant. The main features of the CRIMSON simulation environment are:

i. A parallel blood flow solver based on the academic code SimVascular.

ii. A modern GUI for medical image data segmentation based on the Medical Imaging Interaction Toolkit (MITK).

iii. Libraries for automatic estimation of parameters required for boundary and material parameter specification. These parameter estimation routines are based on Kalman-filtering theory.

iv. Routines to enable the automatic simulation of transitional cardiovascular stages. These routines mimic the action of key cardiovascular functions such as the baroreflex, and local auto-regulations such as those in the coronary and cerebral circulations.

We will specifically describe the functions for parameter estimation and simulation of transitional stages, and highlight a series of future developments for the project.
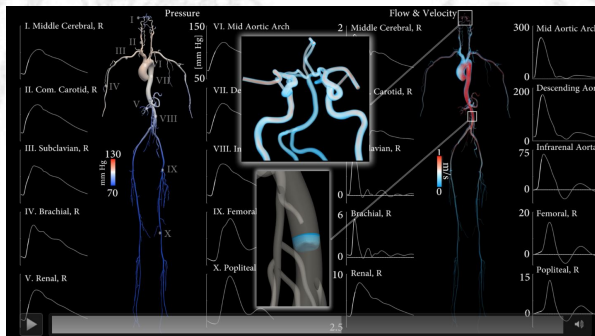
Full-body scale 3D hemodynamics in an image-based fluid-structure interaction model of the main vessels of the human vasculature. Xiao, Humphrey and Figueroa, 2013.
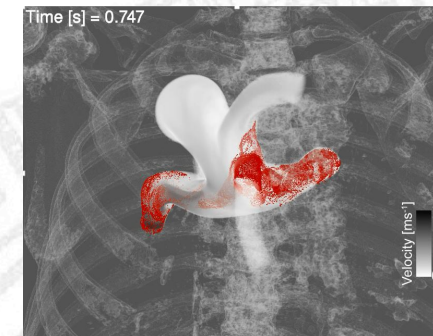
Optimization of endovascular procedure for optimal distribution of hepatic factors between both lungs.

C. Alberto Figueroa, PhD
Edward B. Diethrich Associate Professor of Surgery & Biomedical Engineering
University of Michigan
Honorary Senior Lecturer of Biomedical Engineering
King's College London

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