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Dr Shelly Singh (Gryzbon) joined the Wallace Coulter School of Biomedical Engineering in Georgia Tech in July 2016. She currently works as a Postdoctoral Fellow in the Cardiovascular Fluid Mechanics laboratory, conducting research focused on understanding complex cardiovascular problems using fundamental engineering and science. Techniques in experimental and computational fluid mechanics are used to quantify blood flow patterns and parameters in the cardiovascular system, both on the bench and *in vivo*. Prior to her current appointment, she pursued a BSc in Chemical and Process Engineering at the University of the West Indies, followed by an MSc and PhD in Chemical Engineering at Imperial College London. Her doctorate research focused on developing computational models to improve understanding of the fluid and structural mechanics in the aorta of patients with Marfan syndrome.

"Bridging the Gap between Chemical Engineering and Biofluid Mechanics"

Cardiovascular diseases (CVDs) are the number one cause of death globally, with heart attacks and strokes being the most prevalent[1]. Dr Singh's research is centered around understanding some of the fundamental processes involved in CVDs, as well as development of technologies to address these problems. The interaction of blood with the vessels through which it flows influences the development of flow patterns and flow characteristics. In engineering, these are often quantified as shear stresses, pressures and turbulent kinetic energies. Clinically, these metrics have been related to development and progression of many CVDs such as atherosclerosis, coronary heart disease and valvular diseases[2].

Engineering tools such as computational fluid dynamics and finite element analysis can be combined with medical imaging modalities (such as MRI, CT or Echo) to develop patient-specific models. These models enable one to (i) understand and predict the development and progression of CVDs, (ii) predict the hemodynamic and biomechanical implications of (structural) heart intervention for CVDs and (iii) perform surgical planning for patients with congenital abnormalities.

[1]World Health Organization. Cardiovascular disease. Retrieved 17/09/2018, from http://www.who.int
[2]Ku David N. Blood flow in arteries. Annual Review of Fluid Mechanics 1997 29:1, 399-434