

Secret Student Seminar

Experimental Algebra & Geometry Lab

Atherosclerosis Effect on Blood Flow in a Catheterized Artery

Jorge Cisneros

Department of Mathematics
University of Texas-Pan American

Abstract

We investigate the characteristic of blood flow in a catheterized artery in the presence of atherosclerosis, a condition where the artery wall thickens as a result of fatty-material build up, such as cholesterol. The use of a catheter is of immense importance as a standard tool for diagnosis and treatment in a patient whose artery is affected adversely by the presence of atherosclerosis, resulting with heart attacks and strokes that largely occur when the flow of oxygen-rich blood to the heart ceases due to blockage or breakage in the arteries and the heart cannot receive oxygen. The blood flow in the arterial tube is represented by a two-phase model composing a suspension of erythrocytes, like red blood cells, in plasma. In this study, the differential equations for both fluid and particles are solved theoretically and are subjected to reasonable modeling and approximations based on the available experimental data. The important quantities such as plasma speed, velocity of red blood cells, blood pressure force, impedance or blood flow resistance, and wall shear stress are computed for different catheter cross-sectional radii, axial locations of atherosclerosis, and hematocrit values of red blood cells to plasma mixture in the blood flow system. These variables and conclusions are of major significance to the medical sciences, specifically cardiology.

Date: Friday, April 11, 2014

Time: 3:00pm–4:00pm

Place: MAGC 1.302

Pizza and soda will be served at the presentation.

For further information or for special accommodations, please contact Dr. Sean Lawton via email at lawtonsd@utpa.edu.