1020-00-4 **Suncica Canic***, University of Houston. *Mathematics for Cardiovascular Interventions.*

Abstract: The study of flow of a viscous incompressible fluid through a compliant (elastic or viscoelastic) tube is of interest to many applications. Major application is blood flow through human arteries. Understanding wave propagation in arterial walls, local hemodynamics and temporal wall shear stress gradient is important in understanding the mechanisms leading to various complications in the cardiovascular function. Many clinical treatments can only be studied in detail if a reliable model describing the response of arterial walls to the pulsatile blood flow is considered. This field is rich with new mathematical problems requiring novel analytical methods for the study of their solutions.

The speaker will focus on the several mathematical problems motivated by the cardiovascular applications such as non-surgical treatment of aortic abdominal aneurysm, and coronary angioplasty with stenting. The mathematical problems include designing effective fluid-structure interaction models for blood flow by using homogenization theory in porous media flows, modeling the behavior of arterial walls by designing appropriate viscoelastic (and elastic) models, and the development of an existence theory for the analysis of moving-boundary problems describing fluid-structure interaction in blood flow. The problems presented in this talk derive from an interdisciplinary collaborative endeavor between the researchers in the Mathematics Department at the University of Houston, the Texas Heart Institute, Baylor College of Medicine, the Mathematics Department at the University of Zagreb, and the Mathematics Department of the University of Lyon 1.

Research support from the NSF, NIH, and the Texas Higher Education Board is acknowledged. (Received May 09, 2005)