**Fluid-Composite Structure Interaction and Blood Flow**

**Abstract**

Fluid-structure interaction problems with composite structures arise in many applications. One example is the interaction between blood flow and arterial walls. Arterial walls are composed of several layers, each with different mechanical characteristics and thickness. No mathematical results exist so far that analyze existence of solutions to nonlinear, fluid-structure interaction problems in which the structure is composed of several layers. In this talk we summarize the main difficulties in studying this class of problems, and present a computational scheme based on which a proof of the existence of a weak solution was obtained. Our results reveal a new physical regularizing mechanism in FSI problems: inertia of thin fluid-structure interface with mass regularizes evolution of FSI solutions. Implications of our theoretical results on modeling the human cardiovascular system will be discussed.

This is a joint work with Boris Muha (University of Zagreb, Croatia), and with Martina Bukac (U of Notre Dame, US). Numerical results with vascular stents were obtained with S. Deparis and D. Forti (EPFL, Switzerland).