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Suncica Canic*, Department of Mathematics, University of Houston, 4800 Calhoun Road, Houston, TX 77025, and **Boris Muha** and **Martina Bukac**. *Existence of weak solutions to a class of fluid-structure interaction problems involving composite structures.*

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 will 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 the 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. (Received September 10, 2017)