ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

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➢ **THURSDAY 21 JUNE 2011 - ROOM MA A3 31 - 16h15**

Prof. Annalisa Quaini, (Univeristy of Huston, USA) will present a seminar entitled:

"A Fluid-Structure Interaction Model to Simulate Mitral Valve Regurgitant Flow"

Abstract:

We discuss the numerical approximation of a fluid-structure interaction (FSI) problem involving an incompressible fluid (blood). This fluid surrounds an elastic wall containing a geometric orifice which mimics a leaky mitral valve. Our goal is to simulate hemodynamics conditions encountered in patients with mitral regurgitation in order to show strengths and limitations of echocardiographic methods to assess the severity of the pathology. To solve the coupled problem, we propose a semi-implicit monolithic approach which consists in preconditioning the linear system obtained after the space-time discretization and linearization of the FSI problem with a suitable diagonal scaling combined with an ILU preconditioner. Mitral regurgitant jets can be of two kinds: central (i.e. flowing in center of the atrium) and eccentric (i.e. flowing close to the atrial wall). The wall-hugging behavior of the latter kind has been associated with the Coanda effect. We will present numerical results for central jets and some preliminary work on jets undergoing the Coanda effect.

Lausanne, 25 May 2012/MP/cr
