Università degli Studi di Pavia
Computational Mechanics & Advanced Materials Group - DICAr

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Virtual Modeling and Additive Manufacturing for Advanced Materials

CHT
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EUROPEAN SOCIETY OF CARDIOLOGY®

SEMINAR

Experimental and numerical blood flow studies in stented arterial geometries

At the University of Twente, research is conducted in the area of fluid dynamics of stented arterial geometries. We develop experimental and numerical methods for investigating blood flow. In the presentation attention will be given to:

- **In vitro ultrasound particle image velocimetry in a carotid artery stent**

High-frame-rate contrast-enhanced ultrasound acquisitions of a carotid artery phantom are performed before and after stent placement to test feasibility of this technique in stented arteries. Flow field analysis is performed on post-processed filtered ultrasound data. We compared flow patterns and mean and peak velocities between stented and non-stented regions. Also, experimental results were validated with theoretical and numerical models.

- **Automated analysis of flow in stented cerebral aneurysms**

A computational model for the simulation of blood flow through cerebral aneurysms is developed, using an immersed boundary method to compute the pulsatile flow in complex domains. The medical image data representing the patient-specific geometry is processed to extract the 'masking function', which is used to simulate flow patterns and obtain wall shear stresses under realistic physiological conditions. We will illustrate the numerical method for realistic aneurysms and put the flow simulation in the context of a complete workflow connecting a patient's vascular configuration to a corresponding fluid-mechanical simulation of flow and forces.

Ing. Astrid Hoving, PhD Candidate
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October 22nd, 16:00pm (sharp)
DICAr MS1 Meeting Room
Via Ferrata, 3 – Pavia