

## **Fluid-structure interaction and large eddy simulations for complex blood flow scenarios**

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Blood flow in complex scenarios may lead to disturbed patterns, transition to turbulence effects, recirculation regions, large vessel wall displacements, and other complicated features that make the numerical approximation of such problems very demanding. This is the case, for example, of geometrical complex scenarios such as stenotic carotids, abdominal aortic aneurysms, ascending aorta in presence of a bicuspid valve. In this context, a further difficulty arises in the case of multiple coronary by-passes where the fluid-structure interaction (FSI) problem with jumping material properties needs to be accounted for. Another challenging scenario is given by the interaction between the heart leaflets and the blood, where the large displacements of the former make the numerical approximation of this problem very troublesome. In this talk we will present some numerical strategies (FSI coupling, Large Eddy Simulations, prescription of boundary conditions) and their application to three-dimensional real geometries and data.