SORS: Understanding Cerebral Aneurysms through HPC-based Computational Modeling

Speaker: Mariano Vazquez, CASE Department at BSC

Abstract:

This talk addresses the use of HPC-based simulation tools in understanding cerebral aneurysms. In particular, coupled CFD and Solid Mechanics simulations could help to assess the risk of rupture. The tools are FeFlo for CFD and Alya for the solid mechanics problem. The work flow starts with acquiring images for several patients, which are used nexto to create a CFD simulation scenario. Then, the mean values of pressure and strains are transferred to Alya solver as boundary conditions for a 3D solid mesh created by

extrusion of the surface fluid mesh. Mechanical and material properties are modulated according to some criteria and the inner stress analyzed.

The Presentation can be viewed here.

Speaker´s Bio:

Since 2005, MV is research group leader at the Computer Applications in Science and Engineering (CASE) Department of the Barcelona Supercomputing Center – Centro Nacional de Supercomputación de España (BSC-CNS). He leads the High Performance Computational Mechanics Group. His group's main task is to develop Computational Mechanics tools adapted to run efficiently in large-scale parallel computers. This involves Physical modelling, Mathematical algorithms and code development and optimization, all with the strong constraint of efficient use of parallel resources. This multidisciplinary group is composed by 10-15 researchers including post-docs, PhD students and programming engineers. MV is one of the three main architects of the Alya System, the in-house HPCM tool. His main lines of research are on Computational Mechanics and HPC, with a strong focus in Biomechanics. In particular, all the computational aspects of Cardiac Computational Modelling (partially financed by the Severo Ochoa Program), Respiratory System or Hemodinamics (aneurisms).

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