

High Performance Scientific Computing - A New Physician Assistant

Modern computing systems have potential to significantly advance biomedical research in many areas, e.g., processing of data, simulating functionality of different organs or even systems, and assisting in surgical planning. However, the success of high performance computing (HPC) in biomedicine depends critically on a) simultaneous developments of mathematical models and computational algorithms; and b) collaboration between clinicians, applied mathematicians and computer science specialists.

This talk will focus on simulations of 3D unsteady blood flow in large arterial networks. I will present several numerical methods and computational approaches developed by our research group at Brown University. I will also present results of numerical simulations and hypothesize on the potential impact of the developed methods.

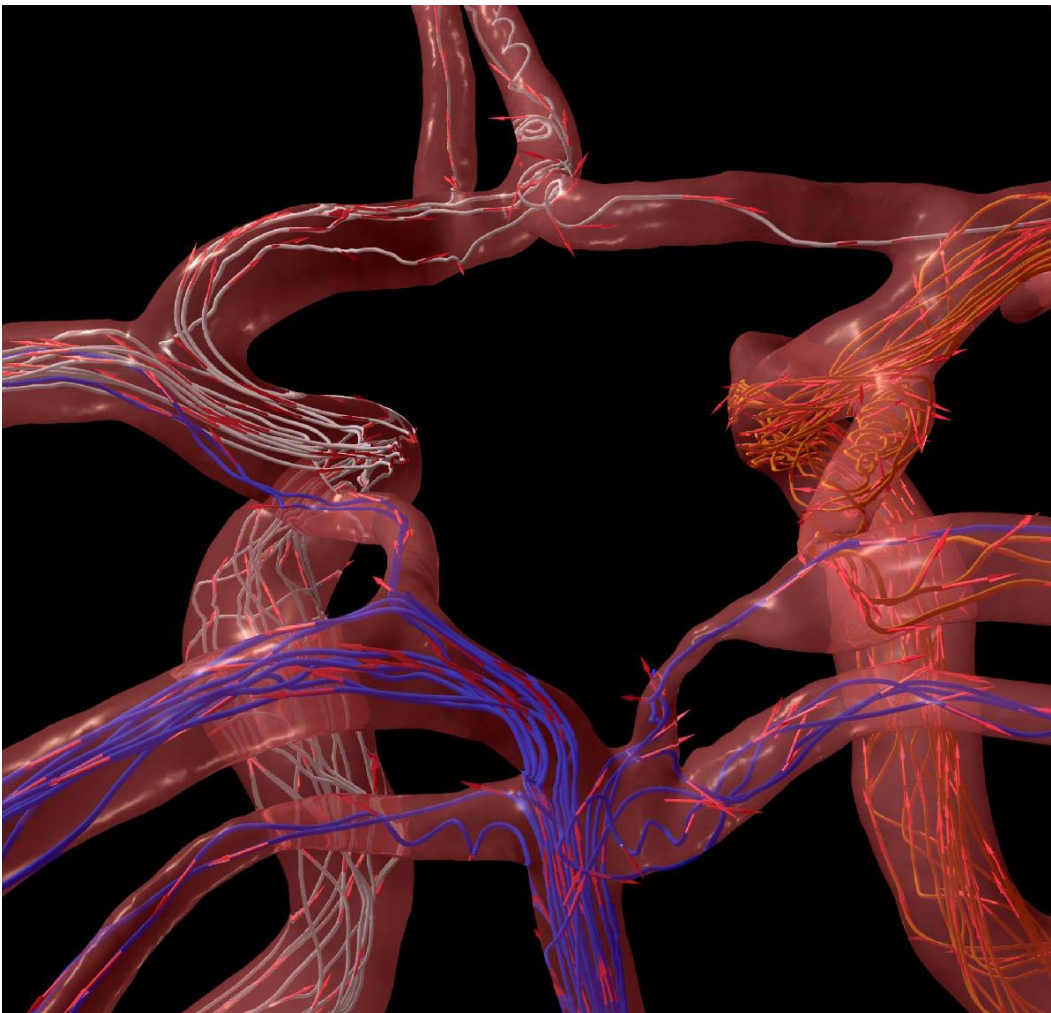


Figure 1. Arterial flow simulation: Circle of Willis. Red, blue and with lines are instantaneous streamlines. Patient-specific data have been provided by Children's Hospital, Boston. Simulation has been performed at Texas Advanced Computing Center. Visualization: Greg Foss, Pittsburgh Supercomputing Center.