Temple University Mathematics Colloquium

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will speak on

A domain decomposition method for simulation of blood flows in arteries

ABSTRACT: Numerical simulation of blood flows in compliant arteries based on patient-specific geometric conditions can be clinically helpful for physicians or researchers to study vascular diseases, to enhance diagnoses, as well as to plan surgery procedures. The computation is usually complex and expensive. In this talk, we discuss a scalable domain decomposition method for the simulation of blood flow in compliant arteries on large scale supercomputers. The incompressible Navier–Stokes equations are used to model the blood flow and the incompressible elasticity equation is used to model the vessel wall. The method features an unstructured dynamic mesh capable of modeling complicated geometries, an arbitrary Lagrangian–Eulerian framework that allows for large displacements for the moving fluid domain, a monolithic coupling between the fluid and structure equations, a stabilized finite element discretization, and a fully implicit time discretization. This is joint work with Andrew Barker and Yuqi Wu.

Monday, 1 February 2010
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3-5 pm
Room 617, Wachman Building
Department of Mathematics