UNIVERSITY of HOUSTON

Department of Mathematics

Scientific Computing Seminar

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Medical applications of computational modeling

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1 PM- 2 PM
Room 646 PGH

Abstract:

Cardiovascular modeling is becoming increasingly popular in clinical settings, with many different methods allowing for customizations in efficiency and detail. A recent focus of many cardiovascular models is creating patient-specific pipelines; where a model can be easily tuned to produce high-accuracy predictions for individual patients. With this patient-specificity there are trade-offs. One-dimensional (1D) models offer computational efficiency while still maintaining a relatively high level of accuracy of model predictions. Three-dimensional (3D) models are able to capture more complex flow patterns and represent patient geometry. In this talk we will discuss two cardiovascular modes; 1) a 1D arterial network model used to predict pressure and flow in patients with hypoplastic left heart syndrome (HLHS) and 2) a multiscale 3D-1D transport model to investigate drug dosing efficacy in patients with liver cancer. We compare the tradeoffs of both models, their potential to be used in real-time clinical settings, and discuss their potential to be integrated together.