

Department of Applied and Computational Mathematics and Statistics Colloquium


Suncica Canic
Department of Mathematics
University of Houston

will give a lecture entitled:

Hyperbolic Nets: Modeling, Analysis, Numerical Simulation and Applications

Abstract

From local to global, and from simple to complex, hyperbolic nets can be used to capture the structural properties of various multi-component, net-like objects whose global properties emerge from complex combinations of local components modeled by 1D conservation laws. Examples include emerging new constructs such as tissue scaffolds, carbon nano-tubes, and endovascular stents, or classical structures such as bridges and buildings made of metallic frames, which have been modeled using simplified net-based truss theory. This talk will present our first steps in the development of general theory, modeling, numerical simulation, and applications of nonlinear hyperbolic nets. As a prototypical example, we will focus on studying the structural properties of endovascular stents modeled as hyperbolic nets in 3D. The speaker will talk about the novel modeling approach to studying mechanical properties of these cardiovascular devices, and on the applications of the numerical results on understanding the behavior of 4 commonly used coronary stents in the US (collaboration with Texas Heart Institute). The new modeling approach discussed in this talk provides substantial computational savings, it provides new information about the emergent mechanic behavior of stents, and it provides a novel framework for the development of general mathematical hyperbolic net theory.



Tuesday, October 25th, 2011
4:00 p.m. to 5:00 p.m.
127 Hayes-Healy Center