Department of Mathematics

University of Houston

## Scientific Computing Seminar

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# Isogeometric Boundary Element Methods

Friday, November 22, 2013
2:00 PM- 3:00 PM
Room 646 PGH

**Abstract:** Isogeometric analysis is an umbrella for numerical methods in which the basis functions are either Non-Uniform Rational B-Splines or T-splines. Those functions are central to Computer Aided Design tools. Thus isogeometric analysis in effect eliminates finite element mesh generation, and therefore significantly shortens the design stage for high-end engineering components. In terms of numerical methods, isogeometric analysis is advantageous because it involves exact geometry and smooth basis functions. This feature has resulted in the development of many efficient and highly accurate finite element methods. The premise of this work is that exact geometry and smooth basis functions will have even greater impact on boundary element methods because they involve singular integral operators, and in the presence of smooth exact geometry, those operators can be transformed so that one can develop a new generation of boundary element methods which include higher-order approximation schemes, linear algebraic problems with mesh-size-independent condition numbers, and efficient integration schemes. These features are usually not accessible with conventional boundary element methods, based on finite element basis functions.