

# **Michigan Tech**

**Mathematical Sciences Colloquium  
Michigan Technological University  
Friday, March 27, 2015  
1:00 P.M.**

**Fisher Hall 101**

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***Radial Basis Functions – Freedom from meshes in scientific computing: Developments and Applications***

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Applied to Geosciences***

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Finite difference methods were first used for solving PDEs over a century ago. Ever since then, FD stencils have typically been based on Cartesian grids, and the coefficients in the stencils have been obtained by requiring results to be exact for polynomials of as high degree as permitted by the stencil size. When the polynomials are either supplemented with or altogether replaced by RBFs, grids become unnecessary. Such RBF-FD approximations combine high levels of accuracy with much improved geometric flexibility, essential both for local refinement and also to accurately handle curved boundaries and material interfaces. Additional benefits include high computational efficiency, short and simple codes, and excellent opportunities for distributed computing. We will in this presentation highlight some recent RBF-FD calculations, mostly from the geosciences.