*Oklahoma State University*

# Computational and Applied Math Seminar

Title

*Immersed Finite Element Methods for Three-Dimensional Interface Problems*


Speaker: Xu Zhang, Oklahoma State University

Date: Feb 29, 2024
Time: 3:00 PM
Room: MSCS 514


**Abstract:** Interface problems arise in many applications in science and engineering. Partial differential equations (PDEs) are often used to model interface problems. Solutions to these PDE interface problems often involve kinks, singularities, discontinuities, and other non-smooth behaviors. The immersed finite element method (IFEM) is a class of numerical methods for solving PDE interface problems with unfitted meshes. In this talk, I will introduce recent advances in developing and analyzing several IFEMs for solving 3D interface problems. The proposed method can be utilized on interface-unfitted meshes even if the interface possesses an arbitrary shape. The new IFE space is isomorphic to the standard finite element space, and the isomorphism is stable with respect to the interface location. The IFE method is proven to maintain optimal convergence in both the energy norm and the L2 norm. Numerical examples will be provided to verify our theoretical results and demonstrate the applicability of this method in tackling some real-world 3D interface models.