

Department Colloquium

Speaker: Evan Gawlik, University of California San Diego

Time: 4:30 p.m.

Place: Jeffery 234

Title: Numerical Methods for Partial Differential Equations on Evolving Domains

Abstract: Many important and challenging problems in computational science and engineering involve partial differential equations with a high level of geometric complexity. Examples include moving-boundary problems, where the domain on which a PDE is posed evolves with time in a prescribed fashion; free-boundary problems, where the domain is one of the unknowns in and of itself; and geometric evolution equations, where the domain is an evolving Riemannian manifold. Such problems are inherently challenging to solve numerically, owing not only to the difficulty of discretizing functions defined on evolving geometries, but also to the coupling, if any, between the geometry's evolution and the underlying PDE. Similar difficulties, which are in some sense dual to those just mentioned, are faced when the goal is to numerically approximate functions taking values in a manifold. This talk will focus on tackling these unique challenges that lie at the intersection of numerical analysis, PDEs, and geometry.