Instructorship position in Applied and/or Computational Mathematics

Talks via zoom – Schedule

Monday, 8 February 2021
17:15 – 17:45
Dr Martin LICHT - ICERM – Brown University, Providence, USA

Title:
Perspectives in structure-preserving numerical methods

Abstract:
Structure-preserving numerical methods have had a transformative impact in the numerical analysis of partial differential equations over the last decade. These numerical methods replicate fundamental qualitative features of partial differential equations already at the discrete level. The research in structure-preserving methods goes beyond classical topics in numerical analysis and relates differential geometry and algebraic topology to scientific computing.

In this talk, I will discuss new developments in structure-preserving numerical methods within the framework of finite element exterior calculus. This framework uses the language of differential forms to unify results in finite element methods for vector field equations, such as in numerical electromagnetism. This talk will showcase two recent research developments: we address mixed boundary conditions in numerical electromagnetism, and we discuss finite element methods over manifolds.

The discussion will illustrate how finite element exterior calculus connects numerical analysis with diverse branches of pure and applied mathematics. Future research perspectives include differential complexes in elasticity and relativity at the frontier of mathematical research.