

# Qualitative and Numerical Analysis of Multi-physical Models and Applications

JINCHAO XU

Pennsylvania State University, USA

*Email:* xu@math.psu.edu

---

In this talk, I will report some recent results on the qualitative and numerical analysis of several mathematical models and their discretizations that couple with the Navier-Stokes equations. I will analyze the Navier-Stokes equations coupled with elasticity equations, the Maxwell's equations, and the Poisson-Nernst-Planck system. These systems model fluid-structure interaction, magnetohydrodynamics, and electrokinetic phenomena, respectively, and are widely used in engineering applications and other scientific disciplines. I will also give some numerical examples to validate our analyses and models.