

CIVIL AND ENVIRONMENTAL ENGINEERING DISTINGUISHED DEPARTMENT SEMINAR



DR. SANGHYUN LEE

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Date: Thursday, October 29th, 2026

Time: 10:00am - 11:00am EST

Location: In person, Bingham Bldg., Vose #138

Zoom Link: [Here](#)

Reliable Scientific Computing for Multiphysics PDEs: Structure- Preserving Numerics, Data Assimilation, and Scientific Machine Learning

Abstract: Many subsurface and energy applications involve coupled multiphysics, heterogeneous media, evolving fractures, and uncertain data. Reliable prediction therefore requires more than accurate forward simulation: numerical methods should preserve key physical structure, assimilate sparse and noisy observations, and support efficient inference. This talk presents a research program connecting these goals. I will discuss structure-preserving finite element methods for flow, poromechanics, thermo-poroelasticity, and fracture; data-assimilation methods for uncertain subsurface systems; and scientific machine learning for inverse problems and accelerated prediction. A central theme is that data-driven methods are most reliable when built on high-fidelity numerical models rather than used as a substitute for them.

Bio: Dr. Sanghyun Lee is an Associate Professor of Mathematics at Florida State University. His research focuses on numerical analysis and scientific computing for multiphysics partial differential equations, with recent work in scientific machine learning, inverse problems, data assimilation, uncertainty quantification, and optimization. His applications include subsurface energy systems, fracture and poromechanics, and AI-enabled modeling for fusion materials. His research has been supported by the National Science Foundation and the U.S. Department of Energy.