

# ***Semi-Plenary Lecture***



**Professor John E. Dolbow**

Department of Civil and Environmental  
Engineering, Duke University

***Title: The Computational Mechanics of Stimulus-Responsive Hydrogels***

Stimulus-responsive hydrogels (SRHs) constitute an example of an emerging class of soft, active materials, whose unique characteristics present a rich set of challenges to the computational mechanics community. For example, SRHs have been designed to actuate in response to changes in temperature, solvent concentration, pH, and light. The unique properties of these materials make them appealing for a large range of applications in materials science, engineering, and medicine. This presentation will focus on recent efforts to characterize the unique behavior of SRHs and develop robust numerical methods for the same. Salient issues include the advance of modern models for coupled field phenomena and phase transitions, the development of element technology for sharp interface problems, and the use of stabilized methods to enforce constraints.

**Brief Biography:**

Dr. John Dolbow received his Ph.D. in Theoretical and Applied Mechanics from Northwestern University in 1999. He then joined the faculty of Civil and Environmental Engineering at Duke University, where he is now an Associate Professor. Considered one of the progenitors of the eXtended Finite Element Method, his expertise includes meshfree methods, numerical methods for evolving interfaces, and continuum-based models for soft-wet materials. Professor Dolbow was awarded the Gallager Young Investigator in 2005.