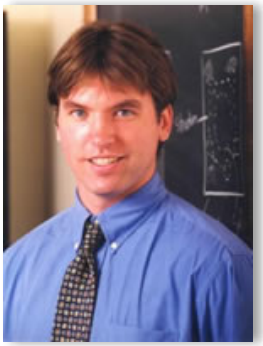
Computing@PNNL SEMINAR

Recent Advances in Gradient-Based Damage Methods for Fracture and Fragmentation



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Recently, much attention has focused on gradient-based damage and phase-field models for fracture problems. These approaches often suffer from a number of shortcomings when applied to dynamic fracture and fragmentation, including, for example, the computational cost of a global reaction-diffusion auxiliary equation and challenges associated with introducing critical thresholds that trigger the onset of damage. In his talk, Professor Dolbow will present a recent method for fracture and fragmentation that builds on the work of Lorentz and coworkers which established links between gradient-based damage models and cohesive models of failure. In particular, incorporating a viscous regularization term enables the use of a fully explicit treatment of the evolution equations. The approach naturally introduces a threshold for the onset of damage and allows for a cohesive model to be recovered in the limit as the regularization length scale vanishes. He also will present results for a series of benchmark problems in large-scale dynamic fracture and fragmentation and will discuss progress on extended finite element methodologies to transition from regularized to discontinuous representations of failure surfaces.

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