



Northeastern

Department of Civil and Environmental Engineering

Distinguished Seminar Series

What We Don't Know *Can* Hurt Us: the Case for Stochastic Multi-scale Mechanics

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Professor and Chair

Department of Civil Engineering,

Johns Hopkins University, Baltimore, MD

Monday, February 29th, 2016

12pm-1pm

West Village F 020

Abstract

Structural failure is often governed by randomly occurring stress localizations that drive the failure mechanisms. These localizations that drive large-scale structural failure are dictated by random material heterogeneities at the micro- or even nano-scale. This leads to a number of challenges. First, it is critical that any distribution or scatter that is assumed to represent the stochastic local material properties must be consistent with the actual variations of the underlying material microstructure. Second, an accurate technique is required that can develop instantiations of the stochastic properties that reflect these statistics. Finally, accurate and efficient models of structures with stochastically varying are required to assess the structural performance. This talk will explore approaches to all three of these challenges, in the context of three-dimensional characterization of polycrystalline materials and of brittle materials under high-rate loadings.

Bio

Lori Graham-Brady is Professor and Chair of the Civil Engineering Department at Johns Hopkins University, with secondary appointments in Mechanical Engineering and Materials Science & Engineering. Her research interests are in computational stochastic mechanics, multiscale modeling of materials with random microstructure and the mechanics of failure under high-rate loading. She is the Associate Director of the Hopkins Extreme Materials Institute and Director of an NSF-funded IGERT training program with the theme of Modeling Complex Systems. She has received a number of awards, including the Presidential Early Career Awards for Scientists and Engineers (PECASE), the Walter L. Huber Civil Engineering Research Prize, and the William H. Huggins Award for Excellence in Teaching.



Lori Graham-Brady, PhD

Professor and Chair, Civil Engineering Department

JOHNS HOPKINS UNIVERSITY



Education

- **PhD, Civil Engineering, *PRINCETON UNIVERSITY***
- **MA, Civil Engineering, *PRINCETON UNIVERSITY***
- **AB/BE, Engineering Sciences, *DARTMOUTH COLLEGE***

Research Interests

- **Computational stochastic mechanics**
- **Multiscale modeling of materials with random microstructure**
- **Failure mechanics under high-rate loading**

Selected Service and Awards

- **Associate Director, Hopkins Extreme Materials Institute**
- **Director, IGERT training program, “Modeling Complex Systems”**
- **Presidential Early Career Awards for Scientists and Engineers**
- **Walter L. Huber Civil Engineering Research Prize**
- **William H. Huggins Award for Excellence in Teaching**