
SIBLEY SCHOOL OF MECHANICAL AND AEROSPACE ENGINEERING COLLOQUIUM SERIES

"Modeling Dynamic Shear Ruptures at Weak Interfaces"



David Kammer, Ph.D.

Assistant Professor, Civil and Environmental Engineering
Cornell University

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Refreshments at 3:30, 116 Upson Hall

ABSTRACT

Unraveling the underlying mechanics of dynamic shear ruptures along weak interfaces is of great importance to earthquake source mechanics as well as engineering. In particular, deepening our understanding of the nucleation process, the propagation speed, and the arrest of shear ruptures is crucial to improving earthquake hazard estimation and to developing predictive models for failure of composite materials. This talk will focus on recent advances in understanding propagation speed of shear ruptures in the sub-Rayleigh and supershear regimes at various stress states. I will also discuss the synergies resulting from combining numerical modeling in a high-performance framework with observations from laboratory experiments, and show how this approach provided new insights to wave radiation from the interface and the arrest of laboratory earthquakes. Furthermore, I will present our ongoing efforts to characterize the effects of material non-linearities and heterogeneities on dynamic rupture propagation with particular focus on the transition to supershear speeds.

BIOGRAPHICAL SKETCH

Dr. David S. Kammer is an Assistant Professor in the School of Civil and Environmental Engineering at Cornell University. His research interests are in mechanics of materials, dynamic fracture and computational mechanics. Particularly, Kammer's research group develops and applies numerical models in a high-performance computing framework to study non-linear and transient phenomena in materials and at interfaces. Current efforts are focused on characterizing the effect of material heterogeneities on dynamic interface failure and predicting the propagation of supershear ruptures. Prior to joining Cornell University, Kammer was a postdoctoral fellow at the Hebrew University of Jerusalem and worked as a research scientist at Bern University of Applied Sciences. He also volunteered as project manager for a development project in Senegal and an executive vice director of a non-governmental organization supporting sustainable cities. Kammer received his Ph.D. in Mechanics, and a M.Sc. and B.Sc. in Civil Engineering from Ecole Polytechnique Federale de Lausanne (EPFL) in Switzerland.