UNIVERSITY OF CALIFORNIA
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The Department of Mechanical Engineering
Presents

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Professor of Materials Science
Executive Officer, Mechanical and Civil Engineering
California Institute of Technology

Friday, April 25
11:10 AM - 12:00 PM
Winston Chung Hall 205/206

DEPARTMENT OF MECHANICAL ENGINEERING COLLOQUIUM

Peeling adhesive tape: A case study for understanding the effective properties of heterogenous materials

Abstract:
While there is a good understanding of the overall behavior of heterogeneous materials concerning properties that are characterized by a variational principle, much remains unknown concerning those properties that are characterized by evolutionary processes. This talk will discuss the simple process of peeling an adhesive tape from a rigid substrate as a case study to demonstrate the complexities that can arise in this situation. Specifically, we show that that one can dramatically affect adhesive strength by patterning the elastic modulus of the tape, or by patterning the surface of the adhesive. The talk will conclude with broader lessons for other phenomena including fracture, dislocations, phase boundaries and wetting fronts.

This talk is based on joint work with S. Xia, L. Ponson and G. Ravichandran.

About the Speaker:
Kaushik Bhattacharya is Howell N. Tyson, Sr., Professor of Mechanics and Professor of Materials Science as well as the Executive Officer for Mechanical and Civil Engineering at the California Institute of Technology. His research concerns the mechanical behavior of solids, and specifically uses theory to guide the development of new materials. He received his B.Tech degree from the Indian Institute of Technology, Madras, India in 1986, his Ph.D from the University of Minnesota in 1991 and his post-doctoral training at the Courant Institute for Mathematical Sciences during 1991-1993. He joined Caltech in 1993. He has held visiting positions at Cornell University, Heriot-Watt University (Scotland), Max-Planck-Institute (Leipzig, Germany), University of Cambridge (England), Indian Institute of Science (Bangalore, India) and the Jet Propulsion Laboratory. He is currently an Editor of the Journal of the Mechanics and Physics of Solids.