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DYNAMIC ADHESION AND RUPTURE FORCES

in material, soft matter
and biological systems

ABSTRACT

Most theories or models of adhesion, failure, or the strength of materials are equilibrium theories, typically represented by thermodynamic phase diagrams. With the increasing appreciation of the complexity of polymer and biological systems – now also referred to ‘complex fluid’ and ‘soft material’ systems – many more types of rate, time, and history-dependent phenomena (*including ‘dynamic’ interaction forces or potentials, and processes*) have appeared whose essential feature is their non-equilibrium nature. These will be reviewed, especially recent experimental studies of interactions in viscoelastic, soft material, colloidal and biological systems, that involve complex deformations, slow structural rearrangements, and various relaxation processes occurring at different time scales. Scaling effects of length (*size*), and time will also be discussed.



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OCTOBER 24, 2016

Pre-lecture Reception: 4:30pm

Lecture: 5-6pm

Building 1-190

Faculty Host:

Professor Lydia Bourouiba

BIOGRAPHY

Professor Israelachvili is Professor at the University of California at Santa Barbara. Dr. Israelachvili received his PhD in Surface Physics from the University of Cambridge-Cavendish Laboratory. Professor Israelachvili made major contributions to the general area of intermolecular and intersurface forces in complex fluid, biological and materials systems and in particular in studying other interfacial and thin film phenomena at the molecular level. Professor Israelachvili is a member of the US National Academy of Science, a Fellow of the American Association for the Advancement of Science and the Royal Society of London. He is also a Foreign Associate member of the US National Academy of Engineering. Professor Israelachvili was awarded the Materials Research Society Medal for work on adhesion and friction and the Alpha Chi Sigma Award for Chemical Engineering Research.