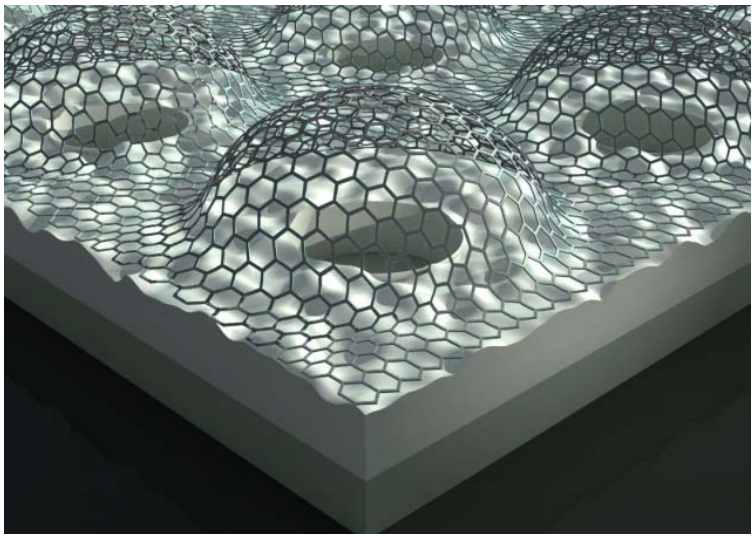
Graphene Mechanical Wonders



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Graphene, a single layer of graphite, represents the first truly two dimensional atomic crystal. It consists solely of carbon atoms covalently bonded in a hexagonal chicken wire lattice. This unique atomic structure gives it remarkable electrical, mechanical, and thermal properties. It has the highest electrical and thermal conductivity among all materials known. However, it is the mechanical properties of this wonder material that fascinate our group the most. It is the thinnest, stiffest, and strongest material in the world as well as being impermeable to all standard gases. In this talk, I will review some of our recent experimental results on graphene adhesion, atomically thin semipermeable membranes, and the mechanical properties of a new class of ultrathin (~1 nm) oxide membranes.

Scott Bunch is currently an Assistant Professor of Mechanical Engineering at the University of Colorado at Boulder. He is primarily interested in the mechanical properties of atomically thin materials such as graphene. He received his B.S. degree in Physics from Florida International University (2000) and a Ph.D. in Physics (2008) from Cornell University where he studied the electrical and mechanical properties of graphene. After finishing his Ph.D, he spent 3 months as a postdoctoral researcher in the Laboratory of Atomic and Solid State Physics at Cornell University studying nanoelectromechanical systems before joining the faculty at CU Boulder in 2008. His awards include a Ph.D. fellowship from Lucent Technologies, Bell Laboratories (2000-2004), the DARPA MTO Young Faculty Award (2008), and the NSF CAREER Award (2011).