Molecular Mechanics on Graphene Surface and its Detection$^1$
KABEER JASUJA, NIHAR MOHANTY, VIKAS BERRY, Kansas State University
— In this talk, we demonstrate that the light-induced reversible mechanical motion of an azo-molecule-tethered on graphene can be sensitively detected electronically by motion-induced molecular-gating of graphene (without external gate). The in-situ mechanical actuation of the azo-molecule is shown to redistribute the fermionic density via due to the change in the proximity of electron-rich benzene moiety of the azo molecule. The results demonstrate that the ultra-sensitive platform offered by graphene makes it possible to electrically detect molecular-scale mechanics. We envision that this research will enable development of next-generation graphene based actuating systems with applications including FETs, optoelectronic-switches and nano-pistons.

$^1$Start-Up Kansas State University