Mechanical Properties of 1D Nanoscale Features in 2D Material Systems MOHSEN NASSERI, MATHIAS J. BOLAND, ARMIN ANSARY, D. PATRICK HUNLEY, DOUGLAS R. STRACHAN, Univ of Kentucky — Two dimensional materials, such as graphene and MoS$_2$, and hybrid structure of these materials have been studied extensively in the past few years because of their unique physical, mechanical, chemical and optical properties. Through the use of lateral force scanning probe manipulation and measurements, frictional, adhesive, and elastic characteristics of one-dimensional features of graphene and MoS$_2$ are investigated. These include the local elastic strain and friction at the edges of these 2D materials. Evidence of elastic straining of graphene and MoS$_2$ edges indicates that they behave as nanoscale springs. Estimates of the strain energy are consistent with out-of-plane bending of the edges and could represent a possible route for reversibly tuning the local electronic properties of these 2D materials. Unique mechanical properties of other 1D features, such as nanotubes, integrated with these 2D materials are also investigated. Such lateral force measurements reveal surprising nanometer-scale properties not apparent through other scanning probe investigations.