In this proposed work, we aimed to simultaneously measure electronic and mechanical properties of single-molecule junctions using a custom built atomic force microscope (AFM). We used funds from the RISE grant to purchase parts required for the AFM and develop methods to synthesize a molecule that would function as a force-triggered single-molecule switch, and build the AFM, which has a signal to noise resolution that is far better than that of any commercial instrument. We used the AFM to correlate bond rupture forces in single-molecule junctions with molecular structure.