**Supplemental Material**

Figure S1 presents the rms-amplitude of electromechanical actuation resolved by in-situ AFM for a similar MEMS structure as in Figure 9. Many such images were acquired in the course of this work, with the resonant node depending on the mode, harmonic, and cantilever geometry.

 Figure S1: Mechanical resonance nodes directly mapped with AFM during *in situ* electromechanical actuation of a MEMS piezoelectric cantilever (inset) with 3 distinct driving frequencies.