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Quantifying the Intercellular Forces during *Drosophila* Morphogenesis XIAOYAN MA, M. SHANE HUTSON, Dept of Physics and Astronomy, Vanderbilt University; and VIIBRE - Vanderbilt Institute for Integrative Biosystem Research and Education — In many models of morphogenesis, cellular movements are driven by differences in interfacial tension along cell-cell boundaries. We have developed a microsurgical method to determine these tensions in living fruit fly (*Drosophila*) embryos. Cell edges in these embryos are labeled with green fluorescent protein chimeras; and line scan images that intersect several cell edges are recorded with a laser-scanning confocal microscope at a time resolution of 2 ms. While recording these scans, a Q-switched Nd:YAG laser is used to cut a single cell edge. The recoil of adjacent cell edges is evident in the line scans and the time-dependent cell edge positions are extracted using custom ImageJ plugins based on the Lucas-Kanade algorithm. The post-incision recoil velocities of cell edges are determined by fitting the cell edge positions to a double exponential function. In addition, a power spectrum analysis of cell-edge position fluctuations is used to determine the viscous damping constant. In the regime of low Reynolds number, the tension along a cell-cell boundary is well-approximated by the product of the viscous damping constant and the initial recoil velocity of adjacent cell edges. We will present initial results from two stages of *Drosophila* development – germ band retraction and early dorsal closure.

Xiaoyan Ma
Dept of Physics and Astronomy, Vanderbilt University, Nashville, TN 37235

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