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Cell mechanics through analysis of cell trajectories in microfluidic channel SAMUEL BOWIE, ALEXANDER ALEXEEV, TODD SULCHEK, Georgia Institute of Technology — The understanding of dynamic cell behavior can aid in research ranging from the mechanistic causes of diseases to the development of microfluidic devices for cancer detection. Through analysis of trajectories captured from video of the cells moving in a specially designed microfluidic device, insight into the dynamic viscoelastic nature of cells can be found. The microfluidic device distinguishes cells viscoelastic properties through the use of angled ridges causing a series of compressions, resulting in differences in trajectories based on cell stiffness. Trajectories of cell passing through the device are collected using image processing methods and data mining techniques are used to relate the trajectories to cell properties obtained from experiments. Furthermore, numerical simulation of the cell and microfluidic device are used to match the experimental results from the trajectory analysis. Combination of the modeling and experimental data help to uncover how changes in cellular structures result in changes in mechanical properties.

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