Project #04: **Andrés J. García** and **Hongwei Ma:** *Study of Cell Adhesion Strength Responses to Substrate Deformation*

Cell adhesion to extracellular matrices is central to the organization, maintenance, and repair of numerous tissues. Extensive efforts have been devoted to study the cell adhesion responses to changes of underlying biomaterials. To date, most studies used static substrates and focused on the impact of surface chemistry and surface morphology. Very few reports have tried to mimic the dynamic nature of biological substrates, mainly because the lack of proper materials that can transmit mechanical cues. Elastomer poly(dimethylsiloxane) (PDMS) is one of the promising candidates that are suitable transducers if the surface properties of PDMS can be tuned. We recently reported a facile method of surface modification of PDMS via a combination of an initiator integrated PDMS (iPDMS) and surface initiated polymerization (SIP), through which the surface chemistry of PDMS can be easily tuned. Here we proposed to apply iPDMS of controlled surface chemistry to analyze adhesion strength responses to substrate deformation. Photolithography techniques widely used in microfluidic systems will be applied here to construct iPDMS devices that can be controllably deformed. Molecular/cell biology approaches will be applied to reveal the impact of substrate deformation on the cell adhesion strength and the functional role of adhesive structural and signaling components on adhesion strengthening. The success of proposed work is expected to provide necessary preliminary results for designing detailed studies that reveal relation between substrate deformation and cell adhesion.