Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Biphasic cell responses on laterally mobile films**[1] ANDREAS KOUROUKLIS, Chemical Eng., Umass- Amherst, RONALD LERUM, HARRY BERMUDEZ, Polymer Science and Eng., Umass- Amherst — The engineering of polymer surfaces or matrices that are capable of controlling cell adhesion has been widely explored. In nearly all of these works, the polymer chains (and ligands) are chemically attached to the underlying substrate, and therefore these systems are inherently static. By contrast, cellular environments such as the extracellular matrix (ECM) are dynamic and remodeled by biochemical reactions and biophysical forces. Borrowing this concept from Nature, we created polymer films by an interfacial self-assembly process, whereby individual chains can exhibit lateral mobility (in-plane diffusive motion). NIH 3T3 fibroblasts seeded on such RGD-presenting polymer films show biphasic responses in spreading and adhesion strength to lateral mobility, with a minimal response for intermediate mobility values. Futhermore, preliminary immuno-staining experiments reveal that the total area of focal adhesions demonstrates a similar biphasic trend to the cellular-scale behaviors. In contrast, actin filaments or stress fibers appear to be unaffected by the substrate lateral mobility. These results show that lateral mobility is an important, although not fully explored aspect of mechano-sensing by cells, and can potentially give new perspectives on cell-ECM interactions.

[1]National Science Foundation

Andreas Kourouklis
Chemical Eng. and Polymer Science and Eng., Umass- Amherst

Date submitted: 02 Nov 2012 Electronic form version 1.4