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Motion of Elastic Microcapsules on Compliant Surfaces with Adhesive Ligands EGOR MARESOV, GERMAN KOLMAKOV, ANNA BALAZS, University of Pittsburgh — By integrating mesoscale models for hydrodynamics, micromechanics and adhesion, we examine the fluid driven motion of elastic microcapsules on compliant surfaces. The capsules, modeled as three-dimensional fluid-filled elastic shells, represent polymeric microcapsules or biological cells. Our combined integrated Lattice Boltzmann model/Lattice spring model (LBM/LSM) approach allows for a dynamic interaction between the elastic capsule's wall and surrounding fluid. To capture the interaction between the shell and the surface, we adopt the Bell model, used previously to describe the interaction of biological cell like leukocytes rolling on surfaces under the influence of an imposed shear. The surface of the microcapsule contains receptors with an affinity to adhesive ligands of the substrate. We examine how the parameters of adhesion and rigidity of the capsules and the substrate affect movement of the capsules. The findings provide guidelines for creating smart surfaces that could regulate the microcapsules' motion.

Egor Maresov
University of Pittsburgh

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