

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Polymer Brushes that Mimic Repulsive Properties of the Boundary Lubricant Glycoprotein Lubricin¹ JAHN TORRES, Brown University/ Naval Undersea Warfare Center, GREGORY JAY, Brown University, QIAN NI, DAVID BELLO, GEOFFREY BOTHUN, University of Rhode Island, KYUNG-SUK KIM, Brown University — This is a report on the design of tailored functional groups which mimic the repulsive forces at work in the natural-joint boundary lubricant known as *lubricin*. *Lubricin*, an amphiphilic polyelectrolyte biomolecule, decreases friction and *cellular adhesion* by exhibiting surface force fields based on *steric hindrance*, *Debye electrostatic double layer repulsion* and *hydration repulsive forces*. We have identified a physically and chemically stable candidate polymers for anti-fouling coatings that will mimic lubricin's repulsive properties. Synthetic polymer brushes mimicking lubricin have been produced using these polymers grafted onto a glass surfaces. The average adhesive forces for the polymer brushes measured through atomic force microscopy are as low (56.796 ± 0.796 mN/m), similar to those exhibited by lubricin coated surfaces and on the same order of magnitude as superhydrophobic surfaces.

¹This work was supported by the Coatings/Biofouling Program and the Maritime Sensing Program of the Office of Naval Research as well as the ILIR Program of the Naval Undersea Warfare Center DIVNPT.

Jahn Torres
Brown University/ Naval Undersea Warfare Center

Date submitted: 23 Nov 2010

Electronic form version 1.4