

## Translating New Adhesive Mechanisms at Interfaces Containing Nano-Scale Features to the Manipulation of Biological Molecules and Cells

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The revolution in nanobiotechnology, along with the new availability of hosts of biomolecules and signaling compounds with highly specific functions, has enabled great strides in diagnostics and cell manipulation for tissue engineering. A large portion of this technology rests on the immobilization of antibodies, DNA fragments, and molecules such as growth factors within or on the surface of materials. These molecules can be challenging to manipulate, are expensive, and often limit the lifetimes of the products in which they are incorporated. Our research probes the question, what level of biofunctionality can be incorporated into materials without using biomolecules themselves? This talk addresses two aspects of biomimicry developed in our lab using surfaces containing nanoscale (on the order of 10 nm) polymeric features. In the first we demonstrate that careful control of the density of these adhesive features can lead to very sharp binding selectivity (competitive with that of antibodies), discriminating different proteins, synthetic model cells, bacteria, and cells. These surfaces achieve selectivity, through the requirement for multivalent contact, by discriminating objects based on their size, curvature, and charge. Additionally we examine the utility of these nanoscale features to manipulate interfacial dynamics and bacterial behavior.