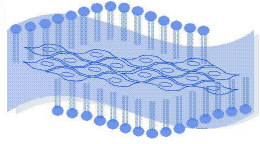




**Center for Biologically Inspired Materials and
Material Systems (CBIMMS)**



**Center for Biomolecular and Tissue
Engineering (CBTE)**

SEMINAR

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“Nanoarrays of Biomolecules on Biocompatible Surfaces and Modification of AFM Tips for Imaging and Force Measurement of Biological Samples”

Nanometric arrays of biomolecules promise to allow rapid, label-free detection of the binding a few target molecules to the array. Also, they may greatly facilitate the investigation of multivalent interactions in many biological processes. We developed a method for preparation of "atomically flat", robust monolayers presenting oligo(ethylene glycol)s (OEGs) on silicon (111) surfaces, which reduced non-specific adsorption of a variety of proteins to <1% monolayer.[1] We employed conductive AFM (c-AFM) to generate nanometric templates on these monolayer platforms. We showed that COOH groups were generated under the biased AFM tip, which were used to attach proteins. For example, avidin molecules were selectively attached to the nano-templates, and served as handles for anchoring biotin molecules. The feature size of the protein arrays was ~ 25 nm,[2] among the smallest reported to date. On the basis of our mechanistic study of the c-AFM process, it is feasible to reduce the feature size to <10 nm, thus allowing for the precise positioning single molecule at surfaces. Using the same concept, we modified silicon AFM tips with a robust monolayer presenting OEGs[3] for reducing the non-specific interactions with proteins. We showed that both the resolution and contrast of protein imaging were greatly improved using the OEG-coated tips. We also selectively oxidized the OEG molecules at the apex of the tip to generate a few COOH groups for attaching a functional moiety, such as biotin to the tip apex. The resulting "single molecule AFM tips" greatly facilitate the measurement of specific molecular interactions at a single molecule level.

Thursday, March 10 – 203 Teer Building – 3:05–5:00 PM