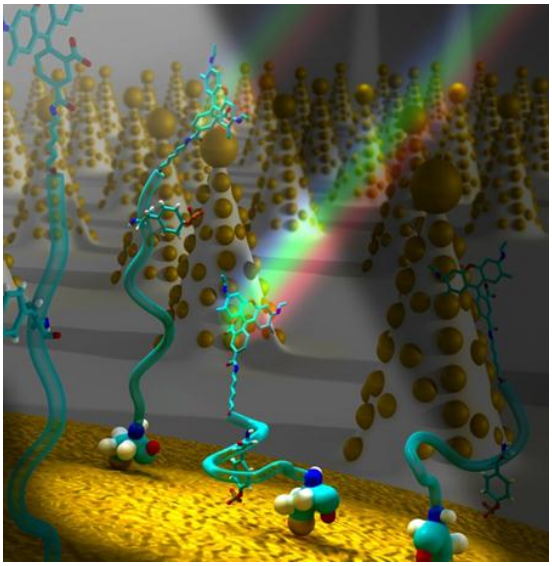
NANOHOUR

Wednesday, November 7, 2012 at ***2:00 pm (special time)***
Beckman Institute - Room 2269

Detection of Protein Phosphorylation Using Electrically Amplified Surface-Enhanced Raman Spectroscopy

Yi Chen, Electrical and Computer Engineering

Graduate Student with Professor Logan Liu



The interaction of biomolecules and solid-state nanomaterials at the bio-nano interfaces is a long-lasting research topic in nanotechnology. Historically, fundamental problems, such as the electron transfer, energy transfer, and plasmonic interaction at the bio-nano interfaces, have been intensively studied, and revolutionary technologies, such as molecular electronics, peptide chips, nanoplasmonic sensors, have been created. With the combined effort of molecular dynamics simulation and surface-enhanced Raman spectroscopy, we studied the external electric field-induced conformation changes of dodecapeptide probes tethered to a nanostructured metallic surface. Through this study, we demonstrated a reversible manipulation of the biomolecule conformations as well as an *in situ* eletro-optical detection of the sub-nanometer conformational changes at the bio-nano interfaces. Based on the proof-of-concept established in this study, we further propose a novel nanophotonic peptide phosphorylation sensor for high-sensitive peptide kinase profiling.

Fabrication of Spatial Light Modulators for High-Throughput Maskless Nanolithography for Advanced Semiconductor Integrated Circuits

Shyamala Devi Malagari, Electrical and Computer Engineering

Graduate Student with Professor Kanti Jain

In order to continue the shrinking of semiconductor devices, new lithographic approaches are needed. A promising technique is deep-ultraviolet, massively parallel maskless nanolithography that is an attractive solution for future devices. This talk first provides an overview of the current next-generation lithographic options along with their limitations. It then discusses the fundamental principle of optical maskless nanolithography and introduces the nanolithography technique based on advanced spatial light modulator arrays with resolution-enhancement features that enable fractional-pixel imaging and high throughputs. The preliminary fabrication of the prototype spatial light modulator array that is scalable to higher densities is discussed and throughput projections for the nanolithography technique are shown.

Coffee and cookies will be served

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