Yale Institute for Nanoscience and Quantum Engineering

Friday, November 4, 2011

12:00 to 1:00 p.m.

MASON LAB
9 Hillhouse Avenue, ML211
Light lunch will be served at 11:45 a.m.

Assistant Professor Anjelica Gonzalez

Department of Biomedical Engineering
School of Engineering & Applied Science, Yale University

" Outside-In Signaling: Immune regulation by biomaterial mimetics of the extravascular space"

The extracellular matrix (ECM) is the protein rich system that induces cellular behavior in response to microenvironmental cues. In disease models of sepsis, interstitial lung disease, and arthritis, we understand that a provisional extracellular matrix is created in the affected tissue, altering matrix driven signals and subsequent cell activity in response to the newly modified microenvironment. Through the development of polymer based ECM mimetics, we can dissect the role of individual bioactive domains within each ECM protein, to elucidate the changes in cellular behavior that can be attributed to cell-ECM binding interactions. Further, we can identify individual functional domains within proteins that will contribute to control of leukocyte adhesion, migration, oxidant generation, differentiation and survival in inflammatory disorders. Our findings can be translated directly to therapeutic treatments for wound healing, chronic infection, and lymphomas.

Professor Robert Schoelkopf

Department of Applied Physics
Faculty of Arts and Science, Yale University

"How coherent are Josephson junctions?"

Around the world, there are numerous different physical systems being developed in the quest to build quantum machines and perhaps one day a large-scale quantum information processor. Quantum electrical circuits based on Josephson junctions are one of the leading solid-state candidates. These systems have made remarkable progress in the past decade, and are a particular specialty here at Yale. One of the main technical challenges is whether such devices can attain a sufficient level of coherence. I will present the results of recent experiments on a very simple realization of a superconducting quantum bit, which has improved the state of the art for the coherence times by a large (~ 20x) factor, and let us probe the dissipation, stability, and the physics of decoherence in a Josephson junction with unprecedented precision. These experiments suggest that quantum circuits should be able to reach the quantum error correction threshold, allowing the construction of large scale quantum machines.