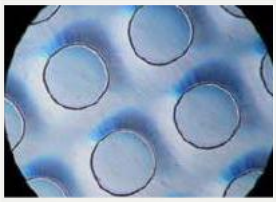
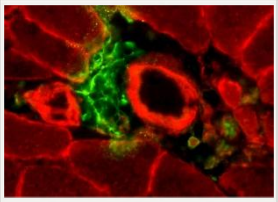
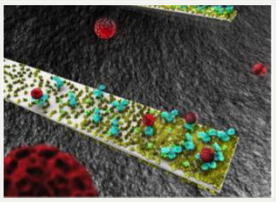
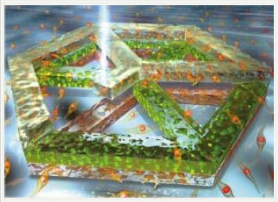
BioNanotechnology Seminar Series

Fall 2011

Magnetomotive Molecular Nanoprobes

Dr. Stephen Allan Boppart

Beckman Institute, Bioengineering, and ECE
University of Illinois at Urbana-Champaign

Date: **Tuesday, September 20, 2011**

Time: **12:00 – 1:00 p.m. CDT (10:00 – 11:00 a.m. PDT)**

Location: **1000 MNTL at Illinois (KL 361 at UC Merced)**

Abstract:

The diagnostic, interrogational, and therapeutic potential of molecular nanoprobes is rapidly being investigated and exploited across virtually every biomedical imaging modality. While many types of probes enhance contrast or delivery therapy by static localization to targeted sites, significant potential exists for utilizing dynamic molecular nanoprobes. Recent examples include molecular beacons, photoactivatable probes, or controlled switchable drug-releasing particles, to name a few. We have developed a novel class of dynamic molecular nanoprobes that rely on the application and control of localized external magnetic fields. These magnetomotive molecular nanoprobes can provide optical image contrast through a modulated scattering signal, can interrogate the biomechanical properties of their viscoelastic microenvironment by tracking their underdamped oscillatory step-response to applied fields, and can potentially delivery therapy through nanometer-to-micrometer mechanical displacement or local hyperthermia. This class of magnetomotive agents includes not only magnetic iron-oxide nanoparticles, but also new magnetomotive microspheres or nanostructures with embedded iron-oxide agents. In vitro three-dimensional cell assays and in vivo targeting studies in animal tumor models have demonstrated the potential for multimodal detection and imaging, using magnetic resonance imaging for whole-body localization, and magnetomotive optical coherence tomography for high-resolution localization and imaging.

Seminar Presented by:

Center for Cellular Mechanics
University of Illinois at Urbana-Champaign

IGERT Integrative Graduate Education and Research Traineeship
Cellular and Molecular Mechanics and BioNanotechnology

M-CNTC NCI Alliance for Nanotechnology in Cancer
Midwest Cancer Nanotechnology Training Center

CNST University of Illinois Center for Nanoscale Science and Technology