



Label-Free Electronic Detection of microRNA Using Silicon Nanowire Arrays

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Date: Tuesday, September 25, 2012
Time: 12:30 – 1:00 p.m. CST (10:30 – 11:00 a.m. PST)
Location: 1000 MNTL at Illinois (SSM 150 at UC Merced)

Abstract:

Improving the performance and lowering the analyte detection limits of optical and electronic biosensors is essential for advancing wide ranging applications in diagnostics and drug discovery. One of these diagnostic platforms, based upon microfluidics coupled to ion-selective field effect transistors (ISFET's) offer great potential to address some world health goals since they can be made portable, low-cost, miniaturized, and sensitive. One of the biological targets of interest is miRNA, a small RNA which helps regulate protein expression, and its over or underexpression is commonly represented in multiple forms of cancer. Unfortunately, a number of performance issues, such as gate leakage and current instability due to fluid contact, have prevented widespread adoption of the technology for routine use. By using high-k dielectrics, such as hafnium oxide (HfO₂), we have been able to address these challenges by passivating the exposed surfaces against destabilizing concerns of ion transport. With these fundamental stability issues addressed, we have created a fabrication process for HfO₂ dielectric-based silicon nanowires for the detection of miRNA down to femtomolar levels.

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