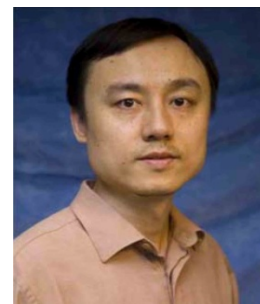


**Dr. Liu Xiaogang**  
**National University of Singapore**



**Date:** 10 November 2009 (Tuesday)  
**Time:** 11.00am – 12.30pm  
**Venue:** NTU SPMS CBC Building Level 2,  
Conference Room  
**Host:** Prof. Xing Bengang

## Colorimetric DNA Detection through Metal Nanoparticle Amplification

The ability to sense and detect ultra-low concentrations of specific DNA sequences using simple and inexpensive assays is important in clinical diagnostics, mutation detection, and biodefense applications. Here we report a homogeneous, colorimetric detection of single-stranded DNA sequences, based upon nicking endonuclease-assisted nanoparticle amplification. The detection system offers a colorimetric detection limit of 0.5 fmol within hours for selected oligonucleotides. Detection of DNA sequences with a single base mismatch or different lengths (24-mer, 36-mer, 48-mer, and 80-mer) was also demonstrated. Additionally, a novel chip-based detection approach, based on nanoparticle-coupled DNA templated ligation reactions for single nucleotide polymorphism (SNP) typing, is reported. In contrast to conventional methods or recently developed techniques, this approach does not need costly instrumentation and complex stringency wash processes, while offering both rapid multiplex SNP detection capability and ultrahigh sensitivity. The ability of the approach to quickly identify the precise location of the single-base mismatch may provide a time-efficient method for high-throughput multiplex SNP genotyping.

## About the Speaker

Dr. Liu was born in Nanchang, Jiangxi Province of China. He earned his BS degree (1996) in Chemical Engineering from Beijing Technology and Business University. He received his MS degree (1999) in Chemistry from East Carolina University in Greenville, North Carolina, under the direction of Prof. John Sibert and completed his PhD (2004) in Chemistry at the Northwestern University in Evanston, Illinois, under the supervision of Prof. Chad Mirkin. In the same year he became a postdoctoral fellow in the group of Prof. Francesco Stellacci at MIT. He joined the faculty of the National University of Singapore in 2006. His research interests include nanomaterials synthesis and self-assembly, bioinorganic and supramolecular chemistry, and surface science for catalysis, sensors and biomedical applications.