

**NUS Graduate School for Integrative Sciences and Engineering
Research Project Write-up**

Title of Project : Development of DNA-nanoparticle Based Detection Systems for Chemical and Biological Agents

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Short Description

The ability to sense and detect the state of broad classes of biological systems and living organisms including bacteria, spores, toxins and viruses optically, electrically and magnetically will be transformed by developments in materials physics and chemistry on the nanometer length scale. We propose to develop integrated sensor devices for rapid detection of chemical and biological agents through the utilization of novel upconversion nanoparticles coupled with DNA. These novel nanostructures allow for development of optical or chip-based biosensors that are significantly faster and more reliable than those presently available.