

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

**Title of Project :**           **Fluorescence based biodetection & bioimaging**

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**Short Description**

Both down-conversion and up-conversion fluorescent inorganic nanoparticles (quantum dots, lanthanide doped nanocrystals) are synthesized and used as fluorescent labels or imaging probes for biodetection & bioimaging. The up-conversion fluorescent nanoparticles can convert near infrared (NIR) light to visible light. Compared to conventional down-conversion fluorescent materials such as organic dyes and quantum dots, these nanoparticles have the following advantages: High light penetration depth in tissues; No photodamage to living organisms; Weak autofluorescence from cells or tissues; Low background light and high sensitivity for detection.

