

## CBC SEMINAR ANNOUNCEMENT



**Professor Christopher B. Murray**  
**University of Pennsylvania**

### **Chemical design of multi-component nanocrystal assemblies and nanocrystal based devices**

The synthesis of colloidal nanocrystals (NCs) with controlled crystal shape, structure and surface passivation provides ideal building blocks for the assembly of new thin films and devices. The NCs are "artificial atoms" with tunable electronic, magnetic, and optical properties. This talk will briefly outline some of the current "best practices" in assembly and integration of NC superlattices. I will focus on the properties that emerge in single component superlattices that retain and enhance many of the desirable mesoscopic properties of individual NCs and explore how these novel building blocks are integrated into a range of electronic, magnetic and optical devices. Multi-component assembly at the nanoscale is accelerating the design new materials and devices with the creation binary and ternary NC superlattices (BNSLs & TNSLs). I will show how we organize differently sized CdSe, CdTe, PbS, PbSe, PbTe, CuInS<sub>2</sub>, FePt, CoPt<sub>3</sub>, Fe<sub>3</sub>O<sub>4</sub>, CoFe<sub>2</sub>O<sub>4</sub>, Au, Ag, Pd, Pt, Ni, and NaYF<sub>4</sub>:Re (Re=rare earths) nanocrystals among other systems into a rich array of multi-functional superlattices or metamaterials (in which the coupling and spatial relation of components dictate the system's response). I will share methods we have recently established to direct superlattice formation by interfacial assembly and transfer and demonstrate how pushing to assembly conditions far from equilibrium can drive the process into oscillatory deposition producing films with controlled periodicity on both the nano and micro scales. I will describe strategies for the fabrication of devices based on these new multi-component nanoscale assemblies share our Penn team's recent observations of emergent physical phenomena in these assemblies including "band like" transport in the NC assemblies.

<b>Date:</b>	<b>13<sup>th</sup> January 2012 (Friday)</b>
<b>Time:</b>	<b>11am – 12.30pm</b>
<b>Venue:</b>	<b>NTU SPMS CBC Building Level 2, Conference Room</b>
<b>Host:</b>	<b>Asst Professor Ling Xing Yi</b>